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STRATEGIC BANKING RELATIONSHIP FORMATIONS
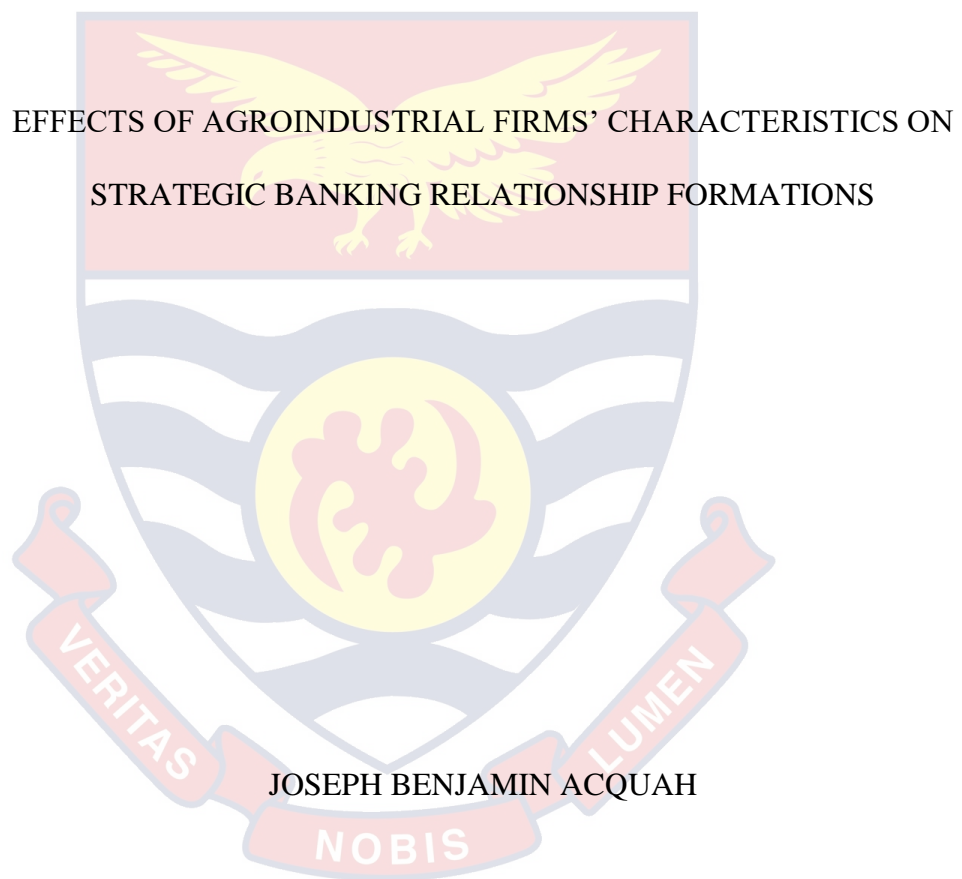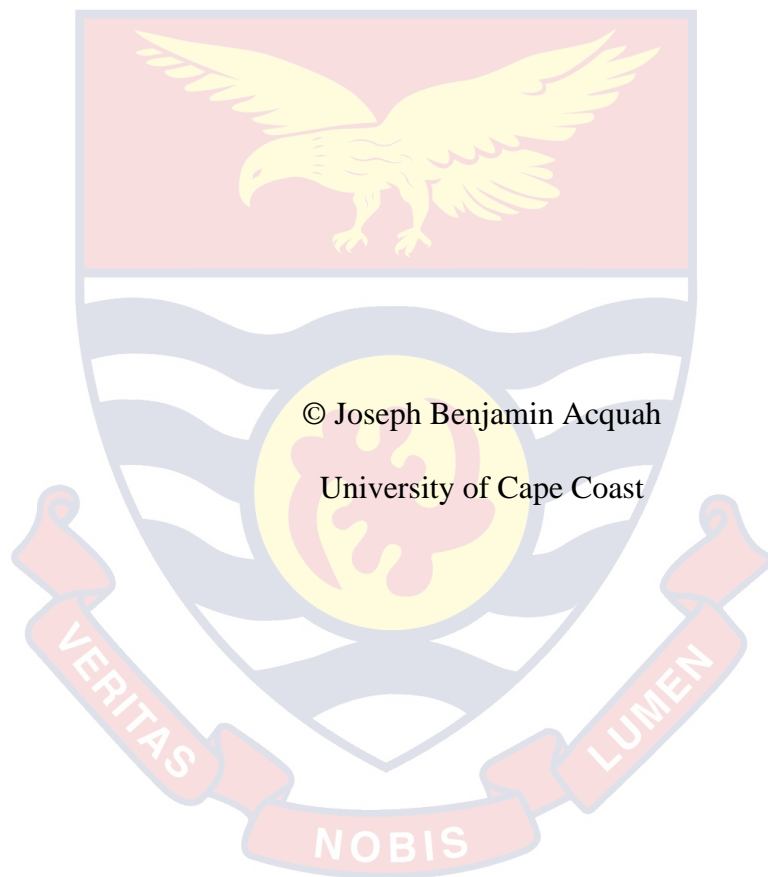
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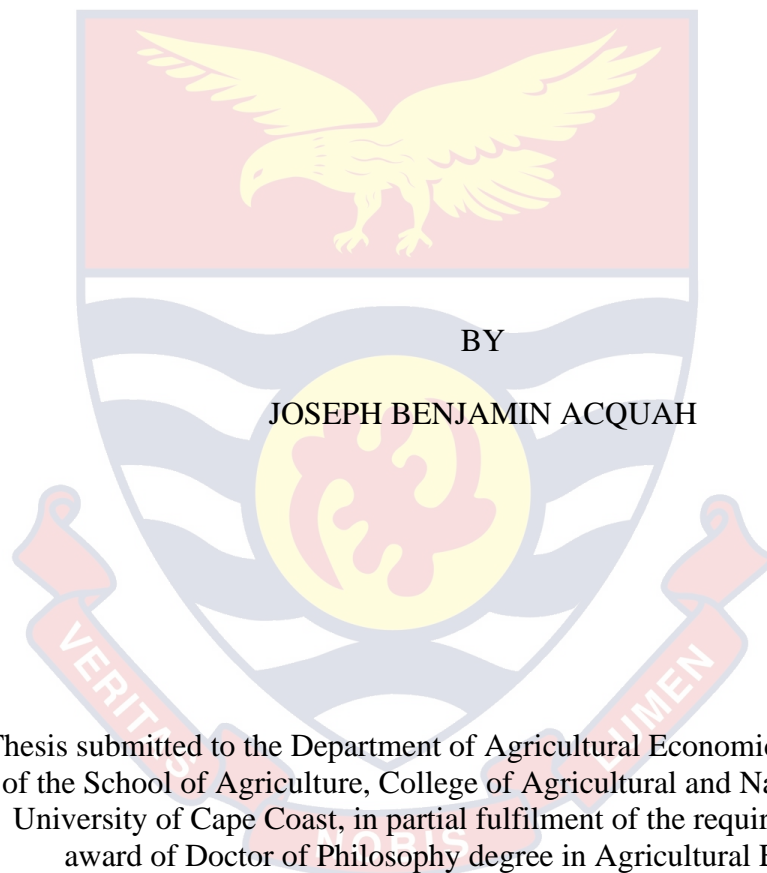
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EFFECTS OF AGROINDUSTRIAL FIRMS' CHARACTERISTICS ON

STRATEGIC BANKING RELATIONSHIP FORMATIONS

BY

JOSEPH BENJAMIN ACQUAH

Thesis submitted to the Department of Agricultural Economics and Extension
of the School of Agriculture, College of Agricultural and Natural Sciences,
University of Cape Coast, in partial fulfilment of the requirements for the
award of Doctor of Philosophy degree in Agricultural Economics

JULY 2020

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature... Date............................

Name: Joseph Benjamin Acquah

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature.................................... Date.........................

Name: Dr William Ghartey

Co-Supervisors Signature.. Date.........................

Name: Dr Samuel Kwesi Ndzebah Dadzie

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ABSTRACT

The empirical literature employing information-centric financial intermediation theories of firm-bank relationships (Aristei & Gallo, 2017; Berger et al., 2008) predict firms' adoption of strategic banking choices in response to financial services supply constraints. However, whether and which agro-allied businesses adopt which relationship strategies remain an empirical question in the developing world. This cross-sectional (correlational) study examines, with the aid of firm-level data, the firm-specific determinants of four major dimensions of strategic banking relationship choices of agro-industrial firms in Ghana: (a) "polygamous" banking relations, (b) state-owned banking choices, (c) primary bank type choices, and (d) relationship intensity. Results show generally that both internal and external characteristics of agro-industrial firms motivate these banking choices. For instance, the number of banking relationships increases in firm size, age, refinancing risk exposure, food-and-beverage sector affiliation, having primary large and state-owned banking relationships and urban location. State-owned bank relationships and diversification propensities are driven, inter alia, by free zone operations, foreign trade orientation, well-connectedness, research and innovation orientation, with marked differences for sector-generic and sector-specific state-owned bank choices. Insistence on efficiency and outreach (closer relationships and quality) drives firms into primary relationships with foreign (state-owned) bank, regardless of their health and size. Finally, inter-industry diversification, firm leverage, corporate governance quality and relationship, trust and commitment and competitive banking markets correlate significantly with relationship intensity. The results motivate the recommendation for the creation of an agro-industrial development bank.

KEY WORDS

Agro-industrial firms

Choice of primary bank types

Credit relationship intensity

Cross-sectional microeconometric models

Number of banking relationships

State-owned banking and diversification

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DEDICATION

To my very dear wife, Sophia,

and children, Osran and Tsetseboampem

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AIF   Agro-industrial Firm

GLiM   Generalised Linear Models

GSS   Ghana Statistical Service

ISDS   Illiquid-Small-Domestic-State

ISFP   Illiquid-Small-Foreign-Private

LLDP   Liquid-Large-Domestic-Private

LLDS   Liquid-Large-Domestic-State

LLFP   Liquid-Large-Foreign-Private

LSFP   Liquid-Small-Foreign-Private

NBR   Number of Banking Relationships

R&D   Research and Development

ROC   Receiver Operating Characteristics

RQ   Relationship Quality

SDSOB   Sector Development State-owned Banking

SDSOBs   Sector Development State-owned Banks

SME   Small and Medium-sized Enterprises

SOB   State-owned Banking

SOBs   State-owned Banks

SSA   Sub-Saharan Africa

CHAPTER ONE

INTRODUCTION

Due to their forward and backward linkages, agro-allied businesses have a huge potential of delivering positive development outcomes. However, they suffer profound financial constraints due to myriad reasons, notably inherent risks, informational frictions and institutional misperceptions. The vast body of firm-bank relationship literature suggests four major, but costly, corporate strategies for mitigating the institutional constraints to financial access. Yet, whether and which agro-allied businesses adopt these relationship strategies remain a universally open empirical question, more relevant in developing countries with deep financial market imperfections and tall barriers to financial access. Filling this knowledge gap, this study identifies which kinds of agro-industrial firms (AIF) in Ghana adopt these theory-predicted adaptive strategies and unearths the rationale behind such banking choices and the implications therein for firm/bank management and public policy prescriptions. For instance, the study identifies adoption of "polygamous" banking relationships as firms' response to refinancing risk exposure (proxy for financial constraints) and shows how the root causes of such exposures (lending rate hikes and inelasticity to policy rates) theoretically incentivize firms' state-owned banking relationship formations, rationalizing some radical interventionist public policy measures.

Background of the Study

The centrality and increasing relevance of agriculture and its allied businesses to life sustenance, in particular, and the positive externalities of agricultural, agribusiness and agro-industrial development, especially the huge

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social and economic returns of related financial investments, are universally indisputable. However, despite the increasing importance of the agro-allied sector, it remains the locus of seemingly daunting challenges (including, inter alia, policy inconsistencies, unfavourable macroeconomic conditions, poor infrastructural development, epizootic and climatic shocks). Of the myriad proximate causes of these impediments, the most oft-cited supply-side factor relates to low productivity growth. Boosting broad-based agro-allied business productivity growth, therefore, holds the greatest potential of accelerating the full realization of the positive development outcomes of rural and urban job creation and expansion (along both the downstream and upstream segments of the agro-food system), economic growth, food and nutritional security, poverty and inequality reductions (Henson & Cranfield, 2009; International Fund for Agricultural Development, 2016; Yeboah & Jayne, 2016).

Though low productivity is the ultimate consequence of the interplay of several interrelated and mutually reinforcing factors (and its reversal logically requires a holistic approach), two critical issues that have attracted the most enduring academic and consensual policy attention are investments and access to finance (Henson & Cranfield, 2009). Whiles the transmission mechanisms between finance and productivity through to growth (at both micro- and macro-levels) are well-documented, even for agro-allied production stages (see, e.g., Alliance for a Green Revolution in Africa [AGRA], 2016; da Silva, Baker, Shepherd, Jenane, & Miranda-da-Cruz, 2009; Heil, 2017; Levine, 1997, 2005; King & Levine, 1993; Mlachila et al., 2016; Rajan & Zingales, 1995; World Bank Group, 2016), financial services (especially credit) supply to the agro-allied business sector, especially in developing countries, is markedly low.

This is evidenced by the fact that, despite financial/banking market structural transformations intended to accelerate economic growth and development via increased financial access, Africa (particularly sub-Saharan Africa (SSA)) experienced a drastic drop and lagged behind other regions in financial services supply, especially credit, to the agro-allied sector (AGRA, 2016; Dixie, Holtzman, M'Bata, & Thapa, 2014; Westercamp, Nouri, & Oertel, 2015). For instance, less than 5%, specifically only a sorry 4.7% (i.e., about US$660 million of US$14 billion), of annual commercial bank lending is channeled into agriculture in Africa (African Development Bank, 2016; Snyder, 2016). In SSA, whiles the sector's share of economy-wide commercial lending is less than 1% (AGRA, 2016), the downward trend of four-year averages of this share, from 0.08% in 1988-1992 to 0.03% in 2009-2012 for the ECOWAS bloc (World Bank, 2015), is more inauspicious.

A multiplicity of (observable and non-observable demand- and supply-side) factors has militated against agro-allied businesses' access to finance, especially in African contexts. Prevalent disincentives, from the financial institutional perspective, are the increasing political and regulatory risks with the resurgence of ad hoc state interference in agricultural finance in post-economic crisis contexts, inefficient legal systems for contract enforcement, and capacity constraints relating, inter alia, to credit risk management. Production seasonality, marketing challenges, institutional apprehension over idiosyncratic sectoral vulnerabilities and non-diversifiable systemic or covariant risks that combine to impair financial resilience and repayment capacity also inform institutional constraints to agro-related business finance (Dellien, 2015; Jessop et al., 2012; Johnson & Williams, 2016; OECD & FAO, 2016; Wenner, 2010).

A singular factor that exacerbates bank transactions and monitoring costs to, most significantly, hamper financial access, especially for small and medium-sized agro-allied enterprises, is the deep financial market frictions relating to imperfect/asymmetric information (and their attendant ills of adverse selection, moral hazard and assortative mating). Overcoming these informational frictions and, hence, reducing transactions and monitoring costs to ultimately boost access to finance for improved lending outcomes (credit volume, price, maturity and collateral requirements, etc.), therefore, rationalize a closer, longer and durable relationship with a single bank (Diamond, 1984)—banking relationship exclusivity. The upshot is the phenomenon of relationship lending, lending/credit relationships that enable the incremental acquisition of "soft" borrower-specific, proprietary information (e.g., repayment behaviour, management quality, etc.) over a considerable period of time through multiple financial interactions between the lender and a borrowing firm (Berger, Klapper, & Udell, 2001; Boot, 2000; Diamond, 1991; Fama, 1985; International Finance Corporation, 2012). The seminal works of Petersen and Rajan (1994) and Berger and Udell (1995) have spawned a large and growing body of rich empirical literature that investigate various dimensions of financial contract (particularly, lending) outcomes of the single-bank financing regime.

Despite its potential benefits, relationship exclusivity is not without costs and risks, especially in the absence of sufficient alternative banking relationships and low bank-switching costs. One adverse concern, especially in concentrated banking markets with potentially high lenders' market/bargaining power, is the asymmetric possession of proprietary information about the borrowing firm between its informed bank and other rival uninformed banks.

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Beyond the borrowing firm's instantaneous inability to transfer such proprietary information to its informed lender's competitors in a bank-switching move, later ability to do may attract a prohibitive "lemon's premium" due to competitors' suspicion of the firm's high credit risk (in avoidance of the winner's curse). The borrowing firm is, therefore, locked in an inert exclusive relationship with an informed lender which engages in opportunism by exploiting its endogenous acquisition of *ex post* informational monopoly power for rent expropriation. Such monopoly rents are seen in terms of lower credit volumes, higher interest rates, stricter collateral requirements, lower maturities, credit rationing/denials, etc.). The lock-in effect generates a hold-up problem (Degryse & Ongena, 2005; Degryse, Ioannidou, & Ongena, 2015; Freixas, 2005; Greenbaum, Kanatas, & Venetia, 1989; Ioannidou & Ongena, 2010; Kim, Kliger, & Vale, 2003; Rajan, 1992; Sharpe, 1990; von Thadden, 2004). A single banking relationship is, thus, a double-edged sword, with the risks showing in concentrated banking markets.

This eventual financial access-constraining effect of the single-bank financing regime is crucially important for firms in bank-based developing economies for, at least, five reasons: (a) firms', especially SMEs', lack of longstanding credit histories, market reputation, absence of credit ratings, the impossibility of credible disclosure of firm quality, and the lack of separation between ownership and management (corporate governance structures), which makes asymmetric information even "noisier" between firms and banks; (b) the underdevelopment of public debt (i.e., capital) markets and the consequent overdependence on and vulnerability to external (bank) financing, (c) the dependence of business growth/development strategies, crucial to economic growth, on funding decisions and conditionalities; (d) higher bank-switching

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costs from informational frictions, and (e) absence of advanced, high quality financial market infrastructure (e.g., credit and collateral reference registries).

Yet, after four decades of implementing the financial market approach to development finance, financial markets of bank-based developing economies have seen dramatic structural transformations resulting in the reconfiguration of the institutional composition of banking markets. Beyond increasing the number of lenders, the emergence of financial intermediaries of diverse formality, size, nationality and ownership structures and with varying mandates, risk appetites, target clientele bases, regional branch expansions and marketing strategies have increased banking market competition and service supply. With the increasingly competitive and widening menu of varied institutional funding sources, the germane question is: given financial institution's disinclination to agro-allied financing and the credit hold-up effects of "monogamous" banking relationship, how would agro-allied businesses form alternative strategic banking alliances to boost financial services supply. Extant research concurs that firms' strategic banking choices are governed primarily by their internal features, with external characteristics playing complementary roles (Aristei & Gallo, 2017; Nifo, Ruberto, & Vecchione, 2018; Ongena & Yu, 2017). Currently experiencing both competitive banking market and agro-allied business developments, the Ghanaian environment offers a fertile context for a policy-oriented enquiry into agro-allied businesses' strategic banking relationship formations.

Statement of the Problem

Economic growth, driven largely by sound firm health and growth, is conditioned by a stable flow of institutionally intermediated finance via banking

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relationships (King & Levine, 1993; Levine, 2005; Levine, Loayza, & Beck, 2000; Northcott, 2004). Unsurprisingly, the literature suggests that various complementary aspects of firms' banking relationship structure (e.g., increased number of banking relationships (NBR), state-owned banking (SOB) choices, allocation of main bank priority, and credit relationship intensity (via borrowing shares)) are optimal strategic responses to financial services supply constraints (Bartz, 2016; Elsas, Heinemann, & Tyrell, 2004; Kornai, 1979; Rajan, 1992).

The phenomenon of relationship multiplicity (i.e., increased NBR) is regarded as a firm liquidity insurance mechanism against banks' exploitative credit holdup and termination tendencies, and liquidity-risk. These benefits (and the associated ills) have generated academic and regulatory policy attention to the determinants and outcomes of firms' NBR. Yet, despite the profusion of theoretical predictions of relationship multiplicity in developing economies with agricultural comparative advantages (Bolton & Scharfstein, 1996; Carletti, 2004; Carletti et al., 2007; Detragiache, Garella, & Guiso, 2000; Volpin, 2001, 2007; von Rheinbaben & Ruckes, 2004), the drivers of the NBR of agro-allied firms in these settings have not been empirically ascertained.

Another strand of literature, inspired by the soft-budget constraint theory (Kornai, 1979, 1980; Kornai, Maskin, & Roland, 2003), suggests the optimality of SOB relationship formation in boosting financial services (credit) supply. Recent research (e.g., Borisova, Fotak, Holland, & Megginson, 2015; Borisova & Megginson, 2011; Megginson, 2016) associate state ownership with implicit government guarantees, preferential access to capital, and maintenance and development of key sectors/industries. Berger, Klapper, Martinez-Peria and Zaidi (2008) hypothesize a durable firm-bank relationship due to SOBs' remote

possibility of financial service withdrawal, low monitoring intensity, tolerance of poor loan repayment performance and provision of politically-motivated and subsidized credit facilities, especially to "priority sector" firms. Whiles the foregoing suggests the utility of maintaining SOB relationships, anecdotal and media reports of SOBs' mission drift are rife in Ghana. Given the pivotal role of agro-industrial firms (AIFs) in Ghana's current industrial development drive, the germane question is: what kinds of AIFs (multiple-banked AIFs) are served by (diversify across) sector-generic SOBs and sector-development SOBs?

Theory (e.g., Elsas et al., 2004; Rajan, 1992) and practice also imply the utility of a deliberate corporate selection of a primary bank as even multiple-banked firms strategically allocate top priority to their relationship with one special bank. The literature (e.g., Aristei & Gallo, 2017; Berger et al., 2008; Ongena & Şendeniz-Yüncü, 2011; Petersen & Rajan, 1994; Schwert, 2018; Stein, 2002) suggests that banks' structural characteristics (size, nationality, ownership, etc.) impinge on their financial services supply and, thus, determine their attractiveness to firms for possible primary bank relationship formations. Despite theoretical motivations (see, e.g., Cantillo & Wright, 2000; Detragiache et al., 2000), a conspicuously missing crucial bank characteristic serving similar purposes, especially in SSA contexts, is banks' financial health. Yet, banks' structural-cum-performance traits are mutually inclusive and primary bank types (characterised by a combination of the relevant performance and structural features) may be appealing to firms with certain features. Given that this research genre is embryonic and non-African, the driving forces behind AIFs' strategic choice of primary bank types (defined simultaneously by their health, size, nationality and ownership statuses) in Ghana beg for empirical enquiry.

Finally, strong firm-bank ties, mitigating informational frictions, are regarded as the catalyst of mutually beneficial outcomes in credit markets. Consequently, the literature examines such outcomes of relationship intensity as credit volume, lending rate, collateral requirements, maturity, credit approval turnaround, post-crisis default probability and resilience, lower credit rationing probability, profitability, financial access, and business growth (Bolton, Freixas, Gambacorta, & Mistrulli, 2016; Cenni, Monferrá, Salotti, Sangiorgi, & Torluccio, 2015; Kysucky & Norden, 2016; López-Espinosa, Mayordomo, & Moreno, 2016). "Therefore, a firm's optimal bank financing policy is characterized not only by the number but also by the closeness of its bank relationships" (von Rheinbaben & Ruckes, 2004, p. 1598). However, the drivers of firm-bank relationship intensity still remain an open empirical question. Even Bartz's (2016) premier study that evidences agribusinesses' exploitation of their greater banking relationship intensity to overcome credit constraints falls short of identifying which kinds of firms adopt intensive banking relationships as their financial access-enhancing strategy. Unearthing the firm characteristics driving relationship intensity in the agro-industrial space in Ghana fills this gap.

Research Purpose

In the light of the above knowledge gaps in the agricultural banking and finance literature, the overarching purpose of this study is to investigate the effects of AIFs' internal and external characteristics on the formation of strategic banking relationships (i.e., the number of banking relationships, state-owned banking relationship formations and diversification choices, primary bank type choices, and credit relationship intensity).

Research Objectives

In view of the above research purpose, the study generally seeks to unearth the internal and external characteristics of AIFs that determine the formation of specific banking relationships as corporate strategies towards increasing financial services supply. The specific objectives are to:

1. Ascertain the effects of agro-industrial firms' internal and external characteristics on their choice of number of banking relationships.

2. Examine the internal and external determinants of agro-industrial firms' SOB relationship formation and diversification choices.

3. Examine the internal and external characteristics that explain agro-industrial firms' choice of primary bank types (defined simultaneously by their performance-cum-structural characteristics).

4. Explore the effects of agro-industrial firms' internal and external characteristics on the intensity of their credit relationships.

Research Questions

The crucial question that this study, therefore, addresses is: which agro-industrial firms' characteristics significantly shape their formation of strategic banking relationships? It answers the following specific questions:

1. How do the internal and external characteristics of agro-industrial firms explain their choice of number of banking relationship?

2. How do internal and external factors determine agro-industrial firms' SOB relationship formation and diversification choices?

3. How do the internal and external characteristics of agro-industrial firms explain their choice of primary bank types?

4. How do the internal and external characteristics of agro-industrial firms determine their credit relationship intensity?

Significance of the Study

The current sparsity of empirical evidence on the nature of firm-bank relationships in developing countries underscores the academic significance of this study. Beyond its modest attempt to fill this academic hiatus and extend the frontiers of existing knowledge on agribusinesses' strategic banking choices in response to agricultural credit market failure, the study provides the premier empirical reference material to incite similar or more comprehensive academic enquiries into other strategic choices of firms in other real economic sub-sectors. Furthermore, uncovering both internal and external firm-specific determinants of firms' strategic banking choices via varied microeconometric models is of immense firm and bank management and public policy significance. It provides firm management policy advice on the optimal nature and structure of banking relationship choices that generate increased financial services supply, as well as guides bank management policy decisions on risk mitigation, client targeting and operational measures to bolster market shares in the agricultural credit market segment. On the public policy front, the study incites a Keynesian-style state interventionist approach (i.e., by scaling up state involvement in agro-industrial development banking) to addressing the profound financial constraints in the agro-allied sector in order to accelerate the full realisation of its positive development impact.

Delimitations

The study focuses on firms in the agro-industrial sub-sector of the dominant manufacturing sub-sector (91.9%) of Ghana's industrial sector, thus excluding all other agro-allied businesses. Moreover, it has a southern eco-regional focus, having drawn the agro-industrial firms from the following five southern administrative regions: Ashanti, Central, Eastern, Greater Accra and Western Regions. In addition, the end limit of the study's reference period corresponds to the period of completion of data collection (May, 2019). Besides, the study's firm-specific character necessitates exclusion of macroeconomic variables from the estimations; other theory-motivated variables also excluded for various reasons relate to legal/judicial efficiency, investor/shareholder rights protection, loan characteristics, and manager and/or chief executive officer characteristics. Generalisations of the research findings herein, must, therefore, be limited to the specified class of firms (but not to specific individual firms in this enterprise class) operating within the specified spatial and temporal limits as well as the included variables.

Limitations

The validity of the study's results may be affected by certain limitations that call for caution in the extent of generalisation of the results. First, the sampling frame of the relevant units of analysis (i.e., agro-industrial firms) was limited to those firms captured by the Integrated Business Establishment Survey (IBES) conducted by the Ghana Statistical Service (GSS) in 2014. Empirical results of replication studies on post-2014 emerging agro-industrial firms may or may not be consistent with results produced by this study. Even though the

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concentration of the units of analysis in the southern eco-region of Ghana is documented and informed the study's geographical scope, a similar caveat covers generalisation of the findings to agro-industrial firms in the northern part of Ghana.

To capture firms' financial performance effects on their banking choices, the study insisted on firm (semi-) formality, as one of the minimum criteria for participation, to enable collection of firm financial data. The characteristic reluctance of private firms to disclose such proprietary information was exacerbated by the timing of the data collection exercise—banking sector crisis period and clean-up exercise. This conspired with the questionnaire requirement to disclose the nature and structure of their banking relationships in that inauspicious period to constrain the final sample size and the response rate, possibly biasing the results. Vulnerability of the results to bias may have been worsened by the choice of cross-sectional microeconometric estimation procedures and would have been minimised with the use of longitudinal data/methodologies and/or instrumental variables estimation to address potential endogeneity problems. Last but not least, the exclusive use of questionnaire as the data collection instrument disallowed further probes to uncover other strategic banking choices and their possible covariates. In spite of these limitations detracting from the reliability of the results and invoking circumspection in interpretation and generalisation, they harbinger suggestions for future empirical investigations using this study as the basic reference point for departures.

Organisation of the Study

The study embodies four closely related, but independent, pieces of empirical research on various dimensions of optimal banking relationships of AIFs. This close relation has influenced the study's structure beyond this introductory chapter which, inter alia, sets out the research gaps, purpose, objectives, questions, and significance. Chapter two is in two sections. The first section is dedicated to a review of the relevant theoretical frameworks that are foundational to analyses of diverse dimensions of firm-bank relationships. The second section of chapter two comprehensively reviews the extant empirical literature in four sections, each for one of the four dimensions of banking choices of interest to the study. Methodological issues are detailed in chapter three. The next four empirical chapters feature presentations and discussions of estimation results for the determinants of AIFs' number of banking relationships (chapter four), state-owned banking relationship formations (chapter five), primary bank types (chapter six) and relationship intensity (chapter seven). The synopsis, conclusions, policy recommendations and suggestions for future research are dealt with in chapter eight. The study concludes with a section of appendices that puts further clarity on issues considered under the various chapters.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This study examines how the internal and external characteristics of agroindustrial firms motivate the formation of (four major dimensions of) strategic banking relationships (i.e., the number of banking relationships, state-owned banking relationship formation and diversification choices, primary bank type choices, and credit relationship intensity). This chapter reviews the related literature in two sections. The first section presents an evolution of theoretical thought that is foundational to and illuminates the aspects of firm-bank relationships relevant to this study. The second section reviews the related empirical discourse to contextualise this study. It is worthy of note that firms' strategic banking choices are fundamentally premised on risks and uncertainties pertaining to firm and bank quality, investment project outcomes and the consequent bank refinancing dilemma (i.e., premature credit continuation or foreclosure decisions). The theoretical discourse on firms' banking relationship structure is, therefore, preceded by a brief overview of the credit market effects of information asymmetry, the root of risks and uncertainty, and the mechanisms by which it generates strategic choices by economic agents.

Market Ramifications of Information Asymmetry

The sterling refinement of the conceptual framework for the interaction among risk, uncertainty and profit by Knight (1921) laid the foundation for an extensive discourse on the effects of uncertainty and imperfect/asymmetric information, a violation of a key neoclassical economics assumption, on

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economic behaviour. And the intellectual insights of George Stigler, J. W. Pratt, Kenneth J. Arrow, Paul Samuelson, and Roy Radner, inter alia, in the 1960s provided the impetus for a more comprehensive exposition on the subject-matter. It was, however, the seminal works of George A. Akerlof, Andrew Michael Spence and Joseph E. Stiglitz on the impact of the dynamics of information flow and/or asymmetry on market development, which popularized the economics-of-information framework of financial market theory.

In its generic framework, the "lemons" market theory of information, propounded by Akerlof (1970), examines the dynamic interaction between quality heterogeneity and uncertainty (i.e., asymmetric information), and the self-reinforcing mechanisms that cause the demise of markets with indefinite guarantees. Asymmetric information generates ex-ante indistinguishability of quality and the consideration of the potential for dishonesty leads to quality uncertainty and perceptual errors of assessment of value (i.e., undervaluation or/and overvaluation) that dampen willingness to pay. With low (high) average returns for high (low) quality vis-à-vis the reduced willingness to pay, the evolving uninformed price system creates a spiral of severe adverse selection problems (i.e., selecting risky options due to hidden information) which, via a positive feedback loop, generate a generalised Gresham's law-like market outcome of bad quality (i.e., lemons) driving out good quality. Despite its initial critical reception on grounds of triviality and incorrectness (due to tempting conclusions of no-trade equilibrium), Akerlof's model prediction of credit market demise and its attendant negative implications for lending outcomes (e.g., on interest rate and credit availability) in underdeveloped countries (due

to non-availability, incompleteness and sub-optimal distribution of information) set the stage for further theoretical enquiries.

Corroborating Akerlof (1970), Williamson (1973) employs his nascent transaction-cost theoretic approach to shed more light on the transmission mechanisms between information asymmetry and market failure. He extends the determinants of financial market failure to supplier heterogeneity, strategic (mis)representations and, most notably, the resultant opportunism – dishonest effort for personal gains – most commonly manifested in strategic disclosure of asymmetrically distributed information. The conspiracy between uncertainty and opportunism creates costly verification of information and establishment of information parity by the uninformed party to a transaction. Indistinguishability between opportunistic exploitation of ex-post information and "honest" representations motivates two noteworthy Williamsonian theoretic conclusions consistent with the Akerlofian Gresham's law-like stance on the determinants of financial market failure: (a) the resultant adverse selection and moral hazard justify excessive high-risk-compensating break-even rates, and (b) the consequent pricing out and market exit of "honest" economic agents and the potential imitation of opportunistic behaviour.

The seminal contribution of Spence (1973), and in his subsequent series of expositional papers, however, focused on the resolution of information asymmetry through his path-breaking proposition of an information signalling theory. The foundation of the signalling theory is that: observable behaviours and actions deliberately undertaken by a better-informed contractual party to convey costly imitable (but latent and alterable) information on her underlying attributes (e.g., ability, characteristics, quality and/or intention), otherwise

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unobservable to an under-informed party, narrow the informational gap. Given costly signalling, the motivation for such manipulable but verifiable disclosures resides in the strategic effects (i.e., positive net benefits) of signalling evidenced by favourable selections from competing alternatives. That is, narrowing of the informational gap facilitates signal observability and interpretability, and the examination of motives that enriches the decision-making process towards aligning conflicting party interests in informed choices that generate mutually beneficial transactional outcomes. Despite its original application to the job market, Spence's classic theory of costly signalling enjoys (inter)disciplinary relevance in enormous applications to selection scenarios, particularly in the financial market.

With a particular focus on competitive financial markets, Joseph E. Stiglitz, in a series of seminal contributions, also provides alternative, yet complementary, mechanisms to mitigate information asymmetry-induced market failure. The contention in Rothschild and Stiglitz (1976), corroborated by Riley (1975, 1979), is that equilibrium in financial markets with asymmetric information and signalling, as specified in the Spencian framework, may be non-existent, unstable and unsustainable, economically inefficient and may generate pathological outcomes. Given such perturbing conditions, obtaining Pareto optimal market outcomes in financial markets requires (a) high-risk individuals volunteering perfect information (demand-side approach), and (b) price and quantity rationing (supply-side approach).

In an apparent response to the critical unanswered question over the criteria for selection from a plethora of indistinguishable better-informed agents by an under-informed party in the Spencian framework, Stiglitz and Weiss

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(1981) formulate the theory of screening to complement the Spencian signalling resolution of adverse selection in credit markets. With imperfect information between banks and borrowers with different repayment probabilities, the ultimate profit-maximising bank objective is identification of borrowers with high repayment probabilities. Owing to the indistinguishability of borrower classes with diverse repayment probabilities, achievement of the objective function invokes a screening exercise.

The Stiglitz and Weiss screening theory posits generally that underlying private attributes (e.g., ability, characteristics, quality and/or intention) of better-informed agents may be discernible from choices they make from a purposely constructed menu of alternatives provided by the under-informed party. In credit market contexts, therefore, the willingness to meet high interest rate and collateral requirements (the screening devices) is a characteristic feature of borrowers with low repayment propensities (or high default risk) due to their affinity for risky projects (the adverse selection effect) and the worsening mix/distribution of borrowers (incentive effect or moral hazard). Stiglitz and Weiss, therefore, caution banks against the imprudence of continuously raising interest rates and collateral requirements to clear excess demand for loanable funds (or re-establish equilibrium) in informationally incomplete credit markets as the two instruments may impair bank returns.

A common thread in the foregoing is the depiction of asymmetric information as originating from incomplete disclosures (or misrepresentations) of attributes by either party or both parties, motivated by mistrust, opportunism and lack of candour, and behavioural responses bereft of moral rectitude. Consistent with its bi-directional character, asymmetric information and its

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associated adverse selection and moral hazard challenges may be mitigated by either/both the better-informed party (through credible communication, as in the signalling theory) or/and the under-informed party (via rationing, as in the screening theory). To achieve the resultant mutually beneficial outcomes, therefore, require institutions with the capacity for continuous information production, screening, monitoring and contract enforcement via resource allocations, and with strong/high-quality relationships with their clients. This leads to the role of financial intermediation in mitigating informational frictions to enhance firms' access to finance. The following sub-section briefly examines this fundamental issue which ultimately aims to emphasize the key roles of banks and ushers in the core theoretical foundations of firm-bank relationships.

Asymmetric Information: Rationale for Financial Intermediation

Market informational imperfections, be it ex-ante (adverse selection), interim (moral hazard) and ex-post (costly state verification or auditing) require the development of the appropriate institutional mechanisms for mitigation of informational frictions. Unlike the general equilibrium paradigm of Arrow and Debreu (1954), the economics-of-information framework espoused in the foregoing provides justifications for the role of financial intermediation and the existence of financial intermediaries in the context of information asymmetry (see, e.g., Degryse, Kim, & Ongena (2009) and Freixas & Rochet (2008) for reviews). To this end, Leland and Pyle (1977) justify financial intermediaries as a natural corollary of information asymmetry by appealing to the scale economies of overcoming the dual problems of appropriability of returns (due to information externality) and information credibility that generate borrowing-

lending synergies, provided good quality is "signalled". Diamond (1984) and Ramakrishnan and Thakor (1984) also independently theoretically identify intermediary formation as the sufficient condition for the realization of such scale economies. The impact of the early theoretical conceptualisations of the information asymmetry paradigm from both the adverse selection and moral hazard schools of thought was a proliferation of similar theoretical inquests into plausible justifications of financial intermediaries from diverse perspectives.

In this regard, several theoretical contributions (e.g., Allen, 1990; Boot & Thakor, 1994, 1997; Boyd & Prescott, 1986; Diamond, 1984, 1989, 1991; Fama, 1985; Hellwig, 1989, 1991; von Thadden, 1995) deserve reverential mention and commendation. Broadening the scope of the discourse, these contemporary proponents of the systemic relevancy of financial intermediaries in the presence of information asymmetry have highlighted the diverse occasions for the centrality of the coordination function of financial intermediaries: client screening, monitoring ex ante project choice and moral hazard, and ex-post debt renegotiation. Contemporary financial market theories, therefore, cite resource mobilisation and allocation, trade facilitation, asset transformation, risk management, monitoring and information processing, and value creation and market segmentation as the central justifications for financial intermediaries (Boissonneault & Staff, 2003; Levine, 1997; Scholtens & van Wensveen, 2003). The general theoretical consensus, therefore, firmly subscribes to Freixas and Rochet's (2008) identification of monitoring and information processing, rather than the transaction cost reduction theory of financial intermediation advocated by Benston and Smith (1976), as the pre-eminent raison d'être for financial intermediaries.

A strikingly recurrent theme, even in a cursory review of this extant theoretical literature, is the widespread acknowledgement of the specialness of banking institutions, among the broad class of financial intermediaries, in terms of the possession of the most efficient technology to resolve costly informational frictions via client screening, monitoring, information-producing, controlling and investor coordination. Given this theoretical unanimity over the exceptional prowess of banks, the question that naturally arises is: what are the mechanisms for mitigating information asymmetry and its accompanying ills of adverse selection and moral hazard to reduce the inherent transaction costs of bank-based financial intermediation to positively influence access to finance? The asymmetric information paradigm responds by advocating the construction and maintenance of close relationships between financial intermediaries and their clients for positive financial market outcomes. The following section provides a brief insight into the working of this mechanism, and isolates the last strain of foundational concepts (i.e., relationship banking/lending) for emphasis as a precursor to an in-depth discourse of the core theoretical underpinnings of firm-bank relationships.

Conceptualising Lending Technology

As informational asymmetry and the concomitant ills inhibit access to finance, banks have, in accordance with the pioneering Stiglitz and Weiss (1981) screening proposition, developed a variety of lending technologies to mitigate these transactional frictions with externally-borrowing firms of all classes for welfare-enhancing credit market outcomes. Berger and Udell (2006, p. 2946) define a lending technology as "a unique combination of primary

information source, screening and underwriting policies/procedures, loan contract structure, and monitoring strategies/mechanisms". The literature cites two broad categories of bank lending technologies, namely, transactions-based lending and relationship lending, the former heterogeneous category consisting of several distinct technologies, including financial statement lending, small business credit scoring, asset-based lending, factoring, fixed-asset lending and leasing (Bartoli, Ferri, Murro, & Rotondi, 2013; Berger & Udell, 2002, 2006; Boot & Thakor, 2000). The diversity of definitions and descriptions of each of these broad lending technologies awash in the literature refer to the information type collected at loan origination, screening and monitoring to address the informational gap as the most distinguishing feature.

Among the transactional or arm's-length lending technologies, lending decisions are based primarily on "hard" (i.e., readily observable, objective, quantifiable and verifiable) information that is relatively easily available at loan origination and transferable through the normal channels/hierarchy of business organisations. It, thus, focuses on a single transaction with a customer, or multiple identical transactions with various customers without aiming at an information-intensive relationship (Boot, 2000). Consistent with the 'long-term interaction hypothesis' (Banerjee, Besley, & Guinnane, 1994; Besley & Coate, 1995; Hodgman, 1961; Kane & Malkiel, 1965; Wood, 1975), according to which banks' acquisition of information from both economic and non-economic relationships through participation in local/rural community life mitigates information asymmetry and agency problems, financing decisions in relationship lending are based on 'soft' information with sharply contrasting features. Despite the more extensive and rapt theoretical and empirical

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consideration it has received in the literature (see, e.g., Bolton et al., 2016; Bongini, Di Battista, & Nieri, 2015; Duqi, Tomaselli, & Torluccio, 2017; Gambacorta, 2016; Kysucky & Norden, 2016), relationship lending still remains a concept under elastic but complementary interpretations.

An early, but more enduring, general definition is provided by Boot (2000, p. 10) who regards relationship banking as "the provision of financial services by a financial intermediary that: (a) invests in obtaining customer-specific information, often proprietary in nature; and, (b) evaluates the profitability of these investments through multiple interactions with the same customer over time and/or across products". This connotes a borrower-bank relationship that permits incremental acquisition of "soft" borrower-specific, confidential or proprietary, non-codifiable, non-transmittable information (i.e., beyond readily available public information) over time through multiple interactions in the provision of multiple financial services and, thus, is characterized by close monitoring, renegotiability and implicit long-term contractual agreements. Given the lack of clear consensus on the strategy for identifying relationship-lending characteristics, the implied borrower-bank relationship intensity has been proxied by myriad indicators. These range from relationship duration, scope, measures of trust, bank/firm self-assessment of relationship type, firms' NBR regime (i.e., exclusivity vs. multiplicity, main bank financing share and credit concentration), to geographical, functional, and informational distance (Bolton et al. 2016; Bongini et al., 2015; Duqi et al., 2017).

The two broad categorisations of bank lending technology on the basis of information type have motivated received theories (Berger & Udell, 2002;

Cole, Goldberg, & White, 2004; Jayaratne & Wolken, 1999; Stein, 2002) to confer comparative advantages to large (small/local) banks in the employment of transactional (relationship) lending due to the varying span and complexity of their organisational hierarchical structures and the differing degrees of centralisation and delegation of financing decisions. By extension, this bank size-lending technology matching has rationalized a traditional dichotomy between domestic and foreign banks an account of their respective comparative advantages in "soft" and "hard" information acquisition and processing, and use of relationship-based and transactional lending technologies. The conventional practice to address informational frictions, as a sequel, is the mapping of big and foreign transactional arm's-length banks to informationally transparent (e.g., large, old, urban, listed) firms, and small and domestic relationship banks to informationally opaque (small, young, rural, unlisted) firms with limited credit histories and guarantees. This mapping structure implies adverse financing repercussions for informationally opaque firms with the entry and banking market dominance of large and foreign banks in developing economies.

The pillars of this conventional size-ownership-technology-clientele matching paradigm are steadily crumbling in the light of several recent cross-country and country-specific evidence (see, e.g., Bartoli et al., 2013; Beck, 2016; Berger, Goulding, & Rice, 2014; Berger & Udell, 2006; Berger & Black, 2011; Claessens & van Horen, 2014; De la Torre, Martínez Pería, & Schmukler, 2010; Ferri, Murro, & Rotondi, 2016; Ongena & Şendeniz-Yüncü, 2011). The emerging consensus from this plethora of evidence is the contextual use of both lending technologies by banks, regardless of their demographic structures and ownership orientation, for the acquisition of the appropriate information type in

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their patternless interactions with both informational opaque and transparent firms, even though there is a seemingly dominant preference for relationship banking in bank-based economies (Duqi et al., 2017). Most significantly, additional evidence stresses overall mutually beneficial effects of close and intense relationship banking (Bongini et al., 2015; Degryse et al., 2015; Duqi et al., 2017; Kysucky & Norden, 2016), mentioned in the introductory chapter of this study, albeit with substantial variations with the normalcy or otherwise of the economy. This explains why the subtle motivations for firms to transition from relationship exclusivity (inherent in relationship banking) to alternative banking relationship regimes (e.g., multiple-bank relationships, etc.), despite the former's much-touted benefits, remain a puzzling academic riddle.

The Theoretical Debate

With the foregoing contextual background, this section and its sub-sections delve deeper into the variety of extant theoretical rationale for firms' choice of NBR with the assumption of synonymy of single-bank financing, pure relationship banking and "informed" bank lending. Given that single-bank financing is but one funding regime, a caveat for this discourse is its departure from an exclusive focus on the single-bank financing regime to emphasize firms' choice of the financing mode from the available menu and the determinants of these alternative choices. The incomplete contract theories of multiple-bank financing (i.e., the hold-up and soft-budget constraint hypotheses) predominate in the corporate finance, firm-bank relationship and information-centric financial intermediation theoretical literature explaining these financial strategic choices. Some other augmenting theories include the

noisy screening (or credit rationing) model, proprietary information leakage/disclosure theories, bank liquidity risk diversification model, bank monitoring models, and credit concentration theories. It must be noted, however, that, beyond explicitly explaining the number of credit or banking relationships and credit concentration, predictions and implications of these theoretical models have been exploited to explain other strategic banking choices under consideration in this study. Since Diamond (1984) provides the intellectual roots of firms' optimal choice of the NBR, the theoretical review commences with his seminal delegated monitoring theory which instigated the afore-mentioned theories.

Delegated Monitoring Theory

Using the assumptions of project returns' independence, unobservability of borrowers' cash flow, complete diversification, and perfect but costly monitoring, Diamond (1984) provides a detailed characterisation of the costs, conditions and overall feasibility of imperfect-information-based financial intermediation in an ex-post (i.e., costly state verification) model that furnishes a robust justification for the existence of banks. With profitable investment projects' dependence on several direct financiers (due to larger project sizes vis-à-vis individual investor capacity), the costly monitoring and information-producing task delegated to banks (as coalitions of uncoordinated individual investors) to avoid cost and effort duplication and free-riding would be better executed than by the uncoordinated individual direct financiers. However, the incentive for an efficient discharge of this investor-delegated responsibility resides in minimum monitoring cost, and Diamond shows that while, by virtue

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of their possession of scale economies, banks, in general, can minimise monitoring costs, well-diversified banks (in terms of large assets with independent returns), in particular, have a net cost advantage in this respect. Asymptotically, the efficiency gains generated from well-diversified bank intermediation (i.e., the surplus of scale economies in monitoring over the reducing monitoring costs) stochastically dominate those from direct finance.

Diamond's (1984) triple suggestions of banks' comparative advantage in efficient monitoring and information production, the optimality of standard bank debt contracts between banks and firms, and the business of banking to be undertaken by one large well-diversified (i.e., a natural monopolistic) bank had, at least, two major implications. First, they profoundly instigated the evolution of a theory of bank debt that debated the potential costs of intermediated finance relative to other borrowing sources, and the anticipatory and mitigation mechanisms. Secondly, they triggered wide consensus on the optimality of single banking relationships of firms to incentivise monitoring and information production, minimise free-riding, and avoid duplication of screening and monitoring efforts to mitigate costly informational frictions, facilitate debt contract design, and enforcement and renegotiations. This laid the theoretical foundations of the debate on the optimal number of firms' banking relations.

Hold-up and Rent Extraction Hypothesis

Providing a formal explanation of the benefit (cost) to the bank (customer) of bank financing in a competitive credit market, Greenbaum et al. (1989) model the effect of bank acquisition of "soft" borrower-specific proprietary information on inter-temporal pricing strategy formulation with the

critical assumption of exogenous search costs. In the presence of high search costs for favourable credit terms and competing banks' inferior and disparate priors on borrower quality, increased bank-client relationship longevity improves the relationship bank's relative informational advantage derived from the acquisition of durable information from the inert relationship. Exploitation of the increased informational advantage over competing banks in the context of clients' high search cost, however, confers monopolistic powers on the relationship bank to establish loan rates that are an increasing function of bank-client relationship duration, with expected long-term bank profit implications.

With the allure of available low-priced loans offered by competing banks (motivated proximately by a desire to poach, capture and establish client relationships (with short-term loss ramifications), but ultimately by long-term monopoly profits), the probability that clients with long-standing relations with the informed bank would switch banks increases to reduce the remaining expected tenure of the relationship. Even though Greenbaum et al.'s model prediction of clients' increased bank-switching propensities in response to competitive banking markets is an implicit endorsement of the single-bank financing regime, it harbingered the effect of (loan price) competition on firms' choices to undo the inertia and monopolistic tendencies in bank-client relationships imposed by high search costs.

Seminal contributions, very close in spirit to Greenbaum et al. (1989), which provide a more succinct characterisation of the sources and costs of inertia that underpins bank-firm relationships in the absence of exogenous search costs, and explicitly appeal to the number of firms' banking relationships as a potential panacea are provided by Sharpe (1990) (whose theoretical

framework has been updated by von Thadden (2004)) and Rajan (1992). Sharpe postulates a theoretical explanation of long-term firm-bank relationships (i.e., the practice of single banking) in a dynamic model of learning by economic agents (i.e., homogeneous banks versus heterogeneous firms with respect to quality) in competitive bank loan markets. In the absence of search costs, long-term firm-bank relations are an endogenous, rather than a natural, consequence of ex-post monopoly power created from the asymmetric evolution of borrower information among banks (via simultaneous learning of borrower quality in the lending process by a lending bank) and the availability of few potential lenders to firms incapable of signalling quality. Thus, the observed firm practice of single-banking is attributed essentially to informational capture or lock-in emanating from information asymmetry among supply-side agents on borrower quality, non-transferability and non-verifiability of firm information, and adverse selection. Sharpe's game-theoretic analysis demonstrates how ex post informational monopoly power insulates relationship banks against market discipline and empowers rent extraction from sound, but locked-in, borrowing firms which, having also gained long-term knowledge of such exploitative bank practices, are, however, faced with high switching costs.

This defines the informational lock-in effect with a common reference in the banking literature as the hold-up problem: the relationship bank's irreplaceability and competing uninformed banks' suspicion of firms' adverse quality (high credit risk) in firms' bank-switching attempts locks the firm in a lending relationship that facilitates the relationship bank's opportunistic monopolistic rent extraction behaviour (i.e., high lending rates and collateral requirements, etc.) in the holdup. von Thadden's (2004) correction of Sharpe's

(1990) erroneous model solution of pure strategy equilibria with mixed-strategy equilibria due to the winner's curse problem, however, echoes more realistic, testable implications of partial informational capture of borrowers in firm-bank relationships, average interest rate increases with relationship duration, and random bank-switching of borrowers. And notwithstanding Niinimäki's (2015) affirmation of an informational lock-in effect persistence even with reversed assumptions on the economic agents in the Sharpe-von Thadden model, banking market competition and multiple-source lending emerge as key mechanisms for dis-incentivising ex post opportunism of market-powered banks to facilitate efficient capital allocations to firms, regardless of the latter's idiosyncratic risks. Sharpe, however, discounts the potency of multiple-banking on grounds that transaction costs appreciation (e.g., duplicated monitoring costs and bankruptcy-related complications) may be benefit-dissipating. The implication of this caveat is Sharpe's endorsement of the optimality of multiple banking with two competing informed banks for a possible elimination of information monopoly, rent expropriation and hold-up costs.

Unlike Sharpe (1990), who restricts his analytic framework to the examination of the costs of the informed bank's control and the potential role of implicit contracts in diluting the relationship bank's informational-rent extraction incentives, Rajan (1992) incorporates the benefits of the inside bank's financing and control into the framework. The bright sides of exclusive firm-bank relationships include easy credit accessibility, improved lending outcomes, efficient contract renegotiation and enforcement of efficient investment decisions via the relationship bank's informational advantage. Despite these benefits of an informed-bank's financing, Rajan demonstrates, via

a cost-benefit analysis, how the endogenous acquisition of bargaining power from its informational advantage over its competitors in the ordinary performance of its monitoring and control functions confers firm lock-in and rent-expropriating powers on the relationship bank. This distorts firms' incentives to exert maximal effort for optimal returns.

Contrasting this cost of bank finance with the benefit associated with inflexible, less informed, arm's-length non-bank financing sources—absolute absence of bank control over firm's investment decisions that incentivise exertion of optimal effort, Rajan (1992) rationalizes a preference for the latter source. Besides firms' choice of borrowing sources, he explicitly emphasizes the roles of competition from an additional/multiple credit sources, inter alia, in the optimal circumscription of bank's monopolistic power to extract rent without compromising control. Two key empirically testable theoretical predictions of Rajan's model are: (a) informational hold-up problems (e.g., interest rates, credit rationing, etc.) increase with firm-bank relationship duration and the probability of firm distress or failure, and (b) multiple banking is a strategic policy option for firms anticipating and are desirous of avoiding potential hold-up problems.

Under the circumstances of distorted ex ante entrepreneurial incentives and sub-optimal long-term investment project choices—eventual results of rent extraction, von Thadden (1992) concurs with Sharpe (1990) and Rajan (1992) in asserting the sufficiency of a second lending relationship (i.e., two banking relationships, rather than a resort to non-bank finance suggested by Rajan) to restore inter-bank competition and limit/eliminate ex post rent extraction. Acknowledging the efficiency of multiple banking at eliminating rent extraction

at the expense of transaction cost duplication, von Thadden (1995), in a dynamic financial contracting model of firm choice of myopic investment horizon, however, spells out additional mechanisms for restraining informed banks' bargaining power and opportunism (i.e., hold-up/lock-in cost reduction) even under a single-bank financing regime. These entail efficient use of long-term debt (and credit-line-like) contracts mainly characterised by a covenant that confers some discretionary powers of unilateral termination of funding to the informed bank precedent on investment failure, but choice of refinancing in that event is governed by original contractual pre-specified terms to ensure incentive compatibility.

Von Thadden's (1995) theoretical advocacy for single-bank financing has received impetus from Hubert and Schäfer (2002) and Jean-Baptiste (2005) who posit that the effectiveness of such optimal contracts is conditioned by the feasibility of future lending commitment contracts; otherwise, multiple-source financing and bank size emerge as alternative holdup-preventing commitment devices. Granted credible firm-bank commitment to long-term ex-ante contingent lending contracts, powerful rent-extractable inside banks and equal multiple-banking opportunities for all firm types, Egli, Ongena and Smith (2006) contend that the optimal endogenous financing method in environments characterised by high aggregate strategic default risk is the single-banking financing regime as it expands financing opportunities.

Soft-budget Constraint Hypothesis

In the spirit of the search for optimal devices for addressing the adverse selection problem of creditors (e.g., Stiglitz & Weiss, 1981; von Thadden, 1995;

Jean-Baptiste, 2005), Dewatripont and Maskin (1995) show that credit centralization or monopoly (implicitly, a single banking context) is associated with sub-optimal managerial exertion of effort and a consequent profusion of inefficient and unprofitable firms. These are institutional outcomes of the soft-budget constraint syndrome, a phenomenon initially conceptualised in 1976 by the Hungarian economist, János Kornai. In our context, it entails a loss-making firm's strong behaviour-influencing expectations of highly probable financial assistance or bail-outs from a highly liquid "paternalistic" bank whose incapacity to enforce the firm's strict adherence to the income-expenditure equality results in recurring refinancing of unprofitable investments. Attributing the syndrome to a lack of resolute commitment not to refinance, the Dewatripont-Maskin model predicts that credit market decentralization (i.e., multiple banking in competitive environments) deflates banks' bargaining power and monitoring incentives, and, coupled with a lack of inter-bank communication, permits the issuance of credible credit supply termination threats to engender firm efficiency and financial discipline. Whiles the benefits of single banking under competitive environments (i.e., increased refinancing opportunities and optimal investment horizon choice) are conditioned by bank size, inter-bank information non-transferability makes refinancing unlikely under multiple banking due to coordination challenges.

Despite its inefficiencies, the soft-budget constraint, as conceptualised by Dewatripont and Maskin (1995), offers several empirical 'foods for thought' on the costs and benefits of single versus multiple banking relationships. Firstly, it conveys the notion that exclusive (or single) banking relationships provide greater inter-temporal flexibility in negotiations, contract-setting and access to

finance to bail out distressed firms. Furthermore, banking market competition becomes a double-edged sword. The gradual dissipation of bargaining/market power and increasing fear of the winner's curse harden the relationship bank's soft budget constraint by strengthening its resolve not to commit to further extension of inefficient credit, thereby facilitating an escape from a potential bank lock-in, with unclear implications for the optimal loan contract terms. With the emergence or availability of competing banks, the simultaneous gain in some bargaining power, however, incentivises a firm's recourse to non-bank finance, bank-switching and/or multiple banking relationships (with two or more competing informed banks), all of which are conduits for mitigating borrower hold-up (Rajan, 1992; Sharpe, 1990; von Thadden, 1992).

The Theory of Coordinated Failure

Close in spirit to the soft-budget constraint hypothesis from the ex post bargaining power perspective, Bolton and Scharfstein (1996) also examine, inter alia, the efficiency of managerial decisions in the context of the impact of the number-of-creditor aspect of banking relationship structure on post-default debt (re)negotiation outcomes. With a one-creditor relationship structure, liquidation probability decreases in firms' credit quality due to the inverse correlation between post-default creditor coordination costs and liquidation value (i.e., the efficiency measure), and inefficiency is inversely related to firms' credit quality, a proposition consistent with Dewatripont and Maskin's (1995) soft-budget constraint hypothesis. A two-creditor relationship structure, in contrast, compounds post-default creditor coordination and free-riding challenges, complicates debt renegotiation, increases costs of averting asset

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liquidation and so reduces managerial incentive for strategic default: a deliberate failure to honour repayment obligations owing to investor-manager incentive incompatibility (such as managerial pursuit of value-reducing empire-building investments to justify perk consumption) in order to force investors' full/partial debt forgiveness. This beneficial managerial discipline effect of the two-creditor relationship structure must, however, be traded off against the ex-ante cost of low liquidation value (i.e., inefficiencies) in a liquidity default (i.e., one beyond managerial control) that follows straightforwardly from the high coordination/transaction costs that discourage positive asset valuation, with dire bankruptcy risks for already financially distressed multiple-banking firms (Hubert & Schäfer, 2002).

The empirically testable Bolton and Scharfstein (1996) model endogenizes the choice of the optimal financing regime (one- or two-creditor relationship structure) with observable firm characteristics as its principal arguments, complemented by firms' asset versatility/redeployability, asset complementarity, and industrial cyclicality. The key model predictions are the optimality of single (two) creditor relationship structure for firms with low (high) credit quality to maximise (minimise) liquidation values (strategic defaults), and a potential non-monotonic U-shaped relationship between the optimal number of creditors and default risk/credit quality. In addition, asset versatility has an ambiguous effect on regime choice due to its inverse correlation with asset complementarity which itself enters as a decreasing argument of the choice of a two-creditor relationship structure. Finally, the one- (two-) creditor financing regime is optimal for firms in noncyclical (cyclical) industries or in industries subject to idiosyncratic (common) shocks and

characterized by high (low) liquidation values, where creditors need not be relationship lenders. These regime choice predictions of firms' credit rating and industry cyclicality have conflicting implications for agricultural firms in the developing world where, owing to technological deficiencies, the elements impose sectoral business cyclicality and exogenous shocks. These cyclical shocks generate covariant risks to expose idiosyncratic vulnerabilities that result in widespread impairment of repayment capacity which, in the absence of appropriate risk management tools, defines bank aversion to the sector.

The regime choice implications of firms' credit quality in the Bolton-Scharfstein optimal contracting framework stoke the theoretical debate on this nexus as they confirm and partly/fully contradict different strands of the extant theoretical literature. The Bolton-Scharfstein prediction of a negative relation between the likelihood of firm-bank relationship exclusivity and firms' credit quality is in accord with the model implications of Diamond (1991) that: (a) low-quality firms tend to concentrate their borrowing on a single lender, and (b) positive reputation effects of high-quality firms' discreet choice of investment risk rationalize less bank monitoring, thus increasing the likelihood of multiple banking. In contrast, it is a partially contradictory proposition vis-à-vis Rajan's (1992) suggestion of an inverted U-shaped relationship between the likelihood of single-banking relationships and firms' credit quality. Whiles Bolton and Scharfstein's (1996) view on the monotonic relations between the financing regime and firms' credit quality sharply contradicts Rajan's, both papers are in harmony on the non-monotonic relations. However, it diametrically opposes von Thadden's (2004) thesis of an increasing probability of single-banking for

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high credit-quality firms due to an inter-temporal selection process where low-quality firms exit exclusive relationships via bank-switching tendencies.

Despite the theoretical ambivalence of firms' credit quality effect on financing regime choice (i.e., single versus multiple banking relationships), it is evidently clear that the hold-up or bank informational rent extraction and soft-budget constraint hypotheses are key perspectives of explaining the number of banking relationships maintained by firms. More noteworthy is their consensual prediction of a positive correlation between firm quality and the number of banking relationships which, in turn, explains the negative correlation between firm quality and lending rates. Together, but with varied theoretical lenses, they also distil a multiplicity of factors such as observable firm characteristics, industry-specific features, banking market structure (e.g., competition versus concentration), bank-specific characteristics, relationship parameters, loan contract terms, and the availability and coverage of financial system infrastructure to illuminate firms' choice of the number-of-banks aspect of their strategic banking relationships.

To the extent that comprehensive bankruptcy regulations govern post-default creditor coordination and debt renegotiations, other factors such as regulatory stringency, bankruptcy deadweight cost, judicial efficiency and creditor rights enforcement define the trade-off between creditor protection and manager protection and, hence, the choice of financing mode. Even though Bolton and Scharfstein (1996) broach the discourse on this channel, the hold-up and soft-budget constraint hypotheses are, however, generally silent on this important link. In addition, despite Bolton and Scharfstein's extension of the trade-off between strategic default deterrence and realisation of low liquidation

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value to multiple-creditor scenarios, the fundamental implication of these frameworks is that the optimal number of firms' banking relationships is two.

Noisy Screening (Credit Rationing) Model

More explicit theoretical justifications for the optimality of multiple banking relationships (i.e., more than two banks) are provided by Thakor (1996) in a noisy compulsory screening model underpinned by a strong informational assumption of perfect observability of borrower-bank relationships to explain the credit supply implications of risk-based capital requirement shocks. The following sequential intermediate links in the transmission chain from loan funding/screening costs to credit supply characterise banks' adaptive response to firms' choice of financing regime: expected bank screening profit, individual bank-specific credit rationing probability and systemic credit denial probability. Banking market structure, in the model, conditions the possibility of firms' relationships with multiple banks whose bargaining powers are tempered, in consequence. With unfettered banking market competition, the dual benefits of multiple monitoring/screening—market identification/endorsement of and competition for high credit quality firms—are the real motivations underlying multiple banking relationships. However, the benefits of firms' 'polygamous' banking relationships are traded off against the costs of credit rationing/denial which emerge from banks' bargaining power diminution and value-dissipating screening cost hikes. The implication (inconsistent with that of the soft-budget constraint hypothesis) is that monopolistic lending (essentially relationship exclusivity) is a precondition for bank loan profitability. Thus, overall, the model's monopolistic (by implication, relationship exclusivity) outcome,

underscored by relationship banks' lending or rationing preference (conditioned only by creditworthiness), is harmonious (inconsistent) with the holdup (soft-budget constraint) hypothesis.

Thakor (1996) derives a symmetric Nash equilibrium outcome in which firms, regardless of their relative creditworthiness, approach more than two banks, risking ex ante positive rationing/denial probabilities which, besides enabling banks to recapture a quasi-monopoly position for modest rent extraction, however, vary inversely with firms' relative creditworthiness. As high credit quality firms experience hold-up (i.e., monopolistic loan rates with limited credit supply) in single banking relationships, multiple banking relationships (with more than two banks) evolve as the optimal financing regime as it enhances ex post positive lending outcomes (i.e., increased credit supply, competitive rates and state-dependent payoffs), absence of which rationalizes the optimal choice of only two banks (i.e., the implications of the incomplete contract theories. Like Bolton and Scharfstein (1996), Thakor endogenizes the firm's optimal financing regime choice, but as an adaptive response to the financial system infrastructure (e.g., credit reference bureaux), banking market structure, bank performance (e.g., loan-funding/screening costs and screening efficacy), and firm features (e.g., credit quality, firm size and reputation).

Proprietary Information Disclosure Theories

The proprietary information leakage theories, focusing on research and development (R&D) and innovation intensity (Bhattacharya & Chiesa, 1995; von Rheinbaben & Ruckes, 2004; Yosha, 1995), recognise the centrality of firms' financial performance effects of confidential information spillover by

banks to firms' competitors as a crucial determinant of financial policy choices. The common premise of these models hinges on a two-faceted intuition: (a) firms' regular disclosure of confidential information as a quality-signalling tool in credit markets to secure financial access can be detrimental in the event of intentional/inadvertent transmission of such information to firms' competitors by self-interested creditors, and (b) the potentially costly post-transmission loss of bank client and reputational capital (e.g., from a legal tussle), and firms' preference for confidentiality to address adverse selection and "two-audience" signalling problems impose a mutual affinity for bilateral (i.e., single-banking) firm-bank relationships. In this light, Bhattacharya and Chiesa model the choice between bilateral and multilateral financing arrangements in the context of competing firms' R&D financing race in which the ex-ante optimality of information sharing hinges on a positive expected net benefit of obtaining information from competitors. The crucial value of and dependence on secrecy/confidentiality to avert free-rider problems with public disclosures in this context motivates R&D-intensive firms' preference for exclusive credit relationships.

The game-theoretic models of Yosha (1995) and von Rheinbaben and Ruckes (2004), grounded in the strategic utility of confidential information in product market competitive behaviour, couple firms' choice of the number of banking relationships with profit maximisation. Both models are set in the context of asymmetric information on the profitability impact of an innovator's entry into a product market dominated by an incumbent monopolist whose choice of aggressive defensive response to mitigate the adverse post-entry profitability and repayment effects is conditioned by learning potential entrant's

quality, revealed by the number of financing sources. Yosha models the trade-off between bilateral and multilateral financing arrangements, respectively entailing an endogenous cost of aggressive reaction to inferred high firm quality (with adverse firm profitability implications), and exogenous costs of multiple disclosures, increased information leakage probability and coordination costs, and loss of discretion. The model equilibrium is characterized by high-quality (i.e., more profitable/innovative) firms' preference for bilateral financing in order to avoid/minimise the divulgence of sensitive information to direct competitors or third parties. Thus, by trading off the costs of multilateral financing with the gain in profit, the firm with multilateral financing credibly signals its low quality to avert/dampen product market competitors' aggressive response and secure an accommodating stance.

To address the information disclosure exogeneity assumption (i.e., insensitivity of firm disclosures to information leakages) in Bhattacharya and Chiesa (1995) and Yosha (1995), von Rheinbaben and Ruckes (2004) extend Yosha's game-theoretic model to explain firms' optimal financing regime choice and relationship closeness in terms of extent of information disclosure. The von Rheinbaben-Ruckes intuition rests on three key pillars incorporated in the model: (a) firms wield discretionary control over the choice and extent of disclosure policy and the number of bank financing sources, (b) the expected detrimental effect of information spillover (i.e., poor financial performance) is manageable with such discretionary decisions, and (c) financing regimes' costs and benefits, beyond profitability, also entail transaction costs and lending outcomes, premised on both micro- and meso-factors. With regard to the entrant's optimal financing regime choice, monotone comparative static

analysis reveals that, regardless of the disclosure policy, the number of bank relationships decrease (increase) in exogenous transactions costs (refinancing costs). However, with disclosure, the number of bank relations increases in firm quality, but decreases in information leakage probability and expected cost of information leakage. These results inform von Rheinbaben and Ruckes' novel empirically testable prediction of non-monotonicity (specifically, a U-shaped relationship) in the innovativeness-regime choice nexus, reversing Yosha's monotonically negative correlation.

In addition, firm quality differentials (reflecting, particularly, in size and age), imposing different requirements of confidential information disclosure for quality certainty, rationalize different financing regime choices. Thus, von Rheinbaben and Ruckes (2004) obtain theoretical support for the 'life cycle' or 'emancipation' hypothesis (see, e.g., Harhoff & Körting, 1998; Hellwig, 1991): over their growth trajectory, firms emancipate themselves from creditors' informational lock-in by maintaining a significant number of loose bank relationships with better quality-signalling instruments. von Rheinbaben and Ruckes also posit that a disclosure policy with multilateral financing arrangements improves lending outcomes (i.e., lending rates and repayment quality) due to a combination of positive firm quality and credit market competition effects. This suggests a potential influence of firm quality and banking market structural differences on different financial regime choices for similar lending outcomes. More noteworthy is the model prediction of industry effects on firms' financing strategy choice, suggesting that relationship multiplicity may be a feature of firms in industries (e.g., the agricultural sector) that cannot attenuate quality uncertainty and risk perception via information

disclosures. Thus, von Rheinbaben and Ruckes corroborate earlier observations that firms' optimal bank financing policy determination varies with their quality, demographic characteristics, time, industry, and credit market structure.

Bank Liquidity Risk Diversification Theory

The contemporary topicality of the practical economic and financial relevancy of firms' number of banking relationships emanates from the ground-breaking United States-Italy comparison and the ensuing pioneering observations by Detragiache et al. (2000) of (a) a substantial difference in the number of banking relations maintained by small and medium-sized firms in the two countries, (b) a prevalence of single (multiple) bank relationships in the U.S. (Italy), and (c) widespread penchant for multiple banking relations among 55.5% of firms in the single-banking-dominant U.S. Their curiosity to explore the unexplained motivations, other than those preceding theories, for multiple banking relationships of firms in those two economies was accentuated by these countries' diametrically contrasting financial systems (bank-based Italy and market-oriented U.S.). Detragiache et al. rely on the mechanisms of adverse selection and liquidity shocks to develop a two-stage, one-period theoretical model of financing regime choice (i.e., single versus multiple banking) and the optimal number of banking relationships, which, unlike Rajan (1992), has a pure strategy equilibrium with refinancing outside of the primary bank relationship.

The straightforwardly intuition of Detragiache et al.'s (2000) model is that a relationship bank's unexpected incapacity to refinance a borrowing firm's profitable project owing to severe internal problems (e.g., liquidity and asset quality impairments) and the real probability of uninformed bank's non-

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availability or refusal to ensure project continuation due to project quality uncertainty and severe adverse selection are sufficient justifications for the optimality of multiple banking. Under these circumstances, an ex-ante multiple-bank financing regime, serving as an anticipatory or insurance mechanism to ensure stable credit supply and liquidity from the availability of at least one informed bank to mitigate the risk of premature project liquidation for the realization of expected profits, is of net value as the endogenous monitoring and transaction costs are overridden by the aforementioned benefits of this widely-observed phenomenon. Exploiting their model, Detragiache et al. (2000) derive empirically testable theoretical propositions: firms' strategic propensity for the multiple-bank financing regime choice is decreasing with the probability of bank fragility (i.e., liquidity crisis), loan recovery or enforcement efficiency and project/firm profitability; and, conditional on relationship multiplicity, the optimal number of banking relationships is increasing in these mechanisms.

The resultant potential non-monotonicity (specifically, inverted U-shaped) implications in the correlation between the optimal number of banking relationships and these mechanisms are explained with a simple intuition: there exists multiple-banking-regime-choice defining parametric thresholds for these mechanisms below or above which the incidence of single-bank financing is more likely; but, conditional on the choice of the former relationship regime, the number of banking relationships is positively more responsive to further improvements in the mechanisms. Simulation analysis shows that, while both the efficiency of the loan enforcement mechanism and profitability should have a strong (weak) impact on the financing regime choice (number of banking relationships), bank fragility matters for both regime choice and the NBR. With

minimal (moderate) liquidity shock probabilities, firms choose only a single-bank (multiple-bank) financing regime with relationship bank(s); and with maximal probability, firms again choose a single-bank financing regime, the intuition being that very high liquidity shocks reduce adverse selection among refinance-seeking borrowers, incentivising credit supply by uninformed banks. Detragiache et al., thus, confirm firm characteristics and credit contract terms (e.g., maturity), but also emphasize bank health and the legal/regulatory environment as potential determinants of firms' banking relationship choices. These testable implications point to the fertility of developing country contexts for the examination of firms' strategic banking relationship choices.

Monitoring Intensity and Diversification Theory

Addressing the monitoring intensity exogeneity assumption underlying the preceding theoretical frameworks, Carletti (2004) and Carletti, Cerasi and Daltung (2007) employ a double moral hazard (i.e., non-observability of firm behaviour and banks' monitoring choices) static model of bank lending to respectively propose a complementary monitoring intensity and diversification theory of firms' (banks') optimal borrowing (lending) structure. Closest in spirit to Thakor's (1996) pre-lending screening theory, Carletti's (2004) post-lending monitoring framework considers the determination of banks' profit-maximising choice of monitoring intensity by firms' pre-existing borrowing structure (or NBR) and the mediatory effect of monitoring incentives on firms' optimal borrowing choices and lending outcomes (loan rate and repayment). A sine qua non of bank financing, monitoring aims to influence firms' optimal behavioural choices to mitigate the moral hazard problem, and banks' monitoring incentives

are premised on the number of firms' banking relationships. Carletti theorizes that, due to the mutually reinforcing double moral hazard problem and banks' parochial profit motivations, the single-bank financing regime leads to over-monitoring, higher total monitoring costs (convex, as a model assumption) and, consequently, a compensatory higher loan rate, relative to a two-bank financing structure. Relationship exclusivity, thus, distorts firms' behavioural choices.

A strategic response to over-monitoring and its concomitant inefficient lending outcomes of firm-bank relationship exclusivity, a two-bank financing structure, however, suffers from coordination failure that breeds monitoring externality, duplication of efforts (due to monitoring non-observability), free-riding and sharing of monitoring benefits. Notwithstanding the negative cumulative effect of curtailing aggregate banks' monitoring incentives and intensity, (relative to the single-bank financing regime) a two-bank financing structure benefits from diseconomies of scale in monitoring which, dominating the afore-stated drawbacks, leads to lower monitoring but not necessarily lower financing costs. Firms' optimal choice of borrowing structure (or NBR), Carletti (2004) conjectures, entails a trade-off between monitoring benefit (i.e., higher expected profitability) and its costs (i.e., higher total monitoring costs and lower expected private returns), crucially determined by the relative difference in monitoring and lending outcomes under the two scenarios. Carletti's proposition (on lending outcomes of NBR) sharply contradicts the hold-up and soft-budget constraint theoretical implications and, thus, throw the lending outcomes of firms' borrowing structure into ambiguity. Firms' financing regime choices may then have ambiguous mediatory effects on the relationship between firm characteristics and lending outcomes.

Enriching the Carletti (2004) monitoring framework by incorporating banks' potential gain from multiple financing relationships when faced with limited diversification opportunities and lending capacities, Carletti et al. (2007) reverse the market structural assumptions underpinning the basic Carletti (2004) model, generating credit market disequilibrium—competition for bank credit, to analyse the optimality of different lending structures (i.e., from banks' perspective). With realistic model assumptions of limited lending capacity and imperfect diversification, Carletti et al. (2007) identify bank equity/deposits, monitoring costs and firm profitability as additional drivers of banks' monitoring incentives, beyond the prime mover—banks' lending structure (i.e., exclusive lender vis-à-vis multiple informed cooperative lenders)—in lieu of firms' borrowing structure in Carletti's (2004) model. Carletti et al. (2007) argue that, with exclusive lending relationships, inside equity financing elevates bankruptcy risks and agency problems mitigation which rationalizes higher equilibrium monitoring effort (as in Carletti (2004)), which increases (decreases) with firm profitability (monitoring costs), and lower deposit rates.

Confirming the inefficiencies identified by Carletti (2004) for the two-bank borrowing structure, Carletti et al. (2007) posit that cooperative sharing of firm financing, however, permits the financing of multiple independent firms/projects to generate positive diversification outcomes. The equilibrium monitoring effort, determined by trading off the costs and benefits of multiple-bank lending structure, depends ultimately on the severity of banks' moral hazard problem with depositors, which is increasing with equity and project returns, but increasing with monitoring costs. They argue further, more significantly, that mitigation of a sufficiently severe moral hazard problem and

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achievement of higher monitoring, lower monitoring costs and, consequently, higher expected profits make the multiple-bank lending structure more appealing than exclusive relationships when banks are less equity-financed, project returns are low and monitoring costs high. However, Carletti et al. emphasize the sub-optimality of full diversification as infinite increments in the number of banks sharing firm financing is counterproductive, thus, providing a theoretical justification for the regular empirical observation that the puzzling phenomenon of multiple banking relationships, if it occurs, frequently entails many banks.

The main contributions of this bank monitoring intensity and diversification theory of borrowing/lending structure relate to the optimality of multiple banking relationships for both firms and banks in connection with overall monitoring and lending outcomes thereof. Model predictions from both perspectives indicate that the optimal borrowing/lending structure is determined by firms' private benefits and ex ante profitability, banks' equity and consolidation experience (e.g., mergers and acquisitions), and monitoring costs (i.e., ease of information acquisition). Juxtaposing the two perspectives, however, present a seemingly ambivalent effect of firm quality/profitability on the propensity for multiple banking relationships, understandable from the contrasting effect of monitoring intensity on firms' private benefit and banks' profitability. Beyond this quandary, Carletti et al. (2007) assert unambiguously that the optimality of multiple-bank lending (in terms of increase in overall monitoring effort) decreases with banks' equity—as bank size increases, multiple-bank (single-bank) lending becomes a suboptimal (optimal) financing structure in terms of achieving greater diversification and monitoring. Both

Carletti (2004) and Carletti et al. (2007) concur on the attractiveness of multiple-bank financing structure increasing with monitoring cost, itself also related indirectly to firm quality/transparency.

In relation to monitoring costs and managerial discipline, another key Carletti-theoretic prediction is the prevalence of relationship multiplicity in countries and/or sectors with laxer accounting and information disclosure standards, inefficient judicial systems, weaker investor and/or creditor rights protection (broached originally by Bolton & Scharfstein (1996)), and less integrated and regulated markets. These predictions emphasize the relevance of developing countries and, in particular, their agricultural sectors as ideal testing grounds for empirical verification. Further, the theoretical prediction of a negative correlation between firm quality and the NBR, implying a prevalence of relationship multiplicity among informationally opaque (e.g., young, small, rural-based, unlisted, etc.) firms, buttresses the imperative for an agricultural sector-specific study as these profiles are in sync with predominant characteristics of agricultural firms in developing countries.

Spinning off from the firm quality-NBR nexus in this framework and the tenable assumption of opacity erosion over firms' life cycle, I propose a competing, but potentially complementary, strand of the "emancipation" hypothesis— "quality-signalling" hypothesis, more explicit in Carletti (2004) than in Carletti et al. (2007). In this sense, firm opacity, especially in the nascent stages of growth, rationalizes the choice of monitoring-minimising and private benefit-maximising multiple-bank financing, whiles over time (with monitoring cost-mitigating availability of public information) firm transparency (occurring in later stages of growth) defines an eventual preference for monitoring-

maximising and private benefit-minimising single-bank financing to instil managerial discipline.

Conflict Game-Signalling-Agency Model

Drawing from the multifarious impacts of coordination failure (arising from renegotiation deadlock in securing multiple claimants' simultaneous cooperation), Bris and Welch (2005) primarily model the exogenous role of distressed firms' debt structure in deadweight bankruptcy costs (i.e., claims recovery waste). This model inspires an endogenous derivation of the optimal debt structure (NBR) and its determinants, in line with Bolton and Scharfstein (1996). The logic of Bris and Welch's multi-version model (in which number of creditors translates into aggregate collection strength/weakness) lies in the conjecture that coordination challenges inherent in creditor dispersion (i.e., large number of creditors) arise from dominant passivity and mutual free-riding incentives. These inefficiencies, in turn, reduce deadweight lobbying or rent-seeking and compromise creditors' aggregate collection abilities/efforts which, coupled with distressed firms' resistance, facilitate multiple uncoordinated claimants' expropriation for socially desirable outcomes (i.e., reduction in firm distress and firm value enhancement). In the financial distress/conflict game version of the model, the ex-ante choice of creditor dispersion (extreme concentration or single-bank financing) increases (decreases) firms' bargaining strength (in line with the holdup prediction), decreases (increases) the likelihood of bank debt renegotiation (in line with the soft-budget constraint hypothesis), elevates (diminishes) the propensity for ex post creditor expropriation and, finally, minimises (maximises) deadweight lobbying cost.

However, firms' strategic choice of creditor dispersion (concentration) attracts appropriate ex ante compensation during the quest for external (i.e., debt) financing—higher (lower) interest rates—for the likelihood of maximal (minimal) ex post creditor expropriation due to asymmetric bargaining strength, sharply contradicting Bolton and Scharfstein (1996) and Thakor (1996). Nevertheless, Bris and Welch (2005) derive a monotonically positive (negative) correlation between creditor concentration (dispersion) and in-equilibrium deadweight claims collection costs (i.e., expenditure on conflict) and a positive relation between creditor dispersion and distressed firms' value (i.e., lower distressed firms' expropriation by dispersed creditors). The trade-off in the latter result contains the intuition for the derivation of the optimal debt structure: for optimal firm value enhancement via complete avoidance of in-distress firm-creditor conflicts (i.e., zero deadweight or wasteful bargaining and/or collection expense) and proper ex ante dispersed creditors' compensation for ex post expropriation, extreme creditor dispersion (i.e., infinitely large number of creditors) emerges as the ex-ante first-best debt structure, similar to Detragiache et al.'s (2000) conclusion. The most critical prediction, harmonious with that of Bolton and Scharfstein, is diffused creditors of distressed firms have a poor debt recovery and enforcement rate than concentrated creditors due to firms' full commitment to creditor expropriation in their creditor dispersion choices.

To ameliorate adverse selection problems (emanating from widespread quality imitation via creditor concentration choices to signal sound firm health), Bris and Welch (2005) incorporate a signalling variant of their model in which signalling efficacy is grounded in significant firm quality differentials, reducible only by costly imitation by low-quality firms, and imitation deterrence by high-

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quality firms imposes a preference for lower in-distress expected payoffs. Given that creditor concentration increases deadweight (litigation) waste and reduces entrepreneurs' or firms' post-litigation share to cumulatively reduce in-distress payoffs, concentration signalling emerges as a necessary quality-separating mechanism. Bris and Welch derive a signalling equilibrium with trivial imitation gains for cheating/imitating firms, and a Pareto-dominant separating signalling equilibrium in which low- (high-) quality firms prefer revelation of their true quality via creditor dispersion (concentration) choices, diametrically contrasting Bolton and Scharfstein (1996) and Thakor (1996), but in sync with the Carletti-inspired quality-signalling hypothesis. This signalling outcome is reaffirmed in the model's agency version in which a positive managerial discipline effect of creditor concentration choices of high-quality firms incentivises bank investment in monitoring activities, again confirming Carletti (2004) but disaffirming the Bolton-Scharfstein conclusions.

The imitation-deterring comparative statics of the signalling version of the Bris-Welch model endogenize the optimal debt structure (or NBR) which increases in firms' assets, the convergence of the distress probability of both firm quality types, decreases in (the costs of) external financing, and is non-decreasing in the contested outstanding/defaulted repayment, inter alia. Besides these explicit measures of firm operations, credit terms and repayment quality, implicit in the entire model is the suggestion that such firm demographics and financials as size, profitability, credit quality and equity, as well as the external regulatory environment, respectively broached and explicitly modelled by Bolton and Scharfstein (1996) and Detragiache et al. (2000), have potential effects on debt structure choices. In respect of the latter mechanism, the Bris-

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Welch model implies that inefficient judicial and creditor rights protection systems and prohibitive deadweight legal cost of repayment enforcement feed entrepreneurial/managerial incentives for creditor dispersion choices (i.e., of the multiple-bank financing regime). Another signalling model implication is the insufficiency of quality determination via extreme concentration signalling (i.e., pure relationship lending) due to adverse selection (i.e., high uncertainty arising from quality imitation), motivating high-quality firms' transition to debt yield signalling (i.e., a willingness to pay higher lending rates to the single relationship bank) as an additional sufficient quality-signalling mechanism, thus refining Stiglitz and Weiss' (1981) seminal signalling proposition. Firm quality differences, therefore, induce different debt structure choices which, in turn, influence differences in lending outcomes.

Optimal Ownership Structure Choice Model

In furtherance of the search for the panacea to the well-documented holdup costs of (single) relationship banking (i.e., rent extraction), Volpin (2001, 2007) proposes a model that couples firms' capital and ownership structure choices and inspires further derivations of complementary covariates of bank relationship structure. The original model's intuition is that severe adverse selection problems, emanating from investment project quality indistinguishability, disincentivise arm's-length/uninformed banks' long-term and full investment financing, leaving an uncompetitive oligopolistic capital market of strategically interacting relationship banks to finance quality projects. However, privileged or proprietary knowledge of borrowing firms' new investment project's quality or profitability fuels relationship banks' bargaining

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strength in negotiations for external financing, thereby facilitating rent extraction. However, the executive power of the firm's founding entrepreneur, controlling/majority shareholder or, more generally, any executive decision-making organ similarly lubricates the efficiency of incomplete-debt-contract-motivated extraction of private benefits of control. As in Carletti (2004) and Carletti et al. (2007), these pecuniary and non-pecuniary benefits are a "morally hazardous" externality emanating from the non-observability of entrepreneurial behavioural choices and are generally characterised by a quiet life, empire-building power, excessive remuneration, preferential transfer prices, managerial perks, and diversion of non-verifiable corporate resources/revenues for private gain, inter alia. In Volpin's model setting, therefore, private benefits are increasing in partial investment cash flow appropriation (itself decreasing in the controlling party's equity stake (i.e., ownership concentration) and investor (shareholder) legal protection) and, therefore, decreasing in the latter mechanisms.

The actual rent/surplus appropriated from investment cash flows by relationship financing is, therefore, net of the controlling party's diversion of private benefits of control which, by transitive reasoning, decrease in both equity stakes and investor legal protection. Coupling these results with the assumption of oligopolistic competition among relationship banks, Volpin (2001) derives the following rent extraction determinants and the underlying rationale: (a) rent is strictly increasing in the firm's controlling party's equity stake and investor legal protection via the diversion of private benefits of control, and (b) rent is a decreasing function of firms' number of banking relationships due to increased interim inter-bank competition for the

entrepreneur's choice of relationship bank for project finance, consistent with the holdup thesis' prescription for rent mitigation. Given the ultimate entrepreneurial objective of mitigation of rent extraction in single-banking relationships, initial multiple-bank relationship financing regime is an efficient instrument, as in Detragiache et al. (2000) and Bris and Welch (2005), while the positive correlation between the controlling party's equity stake and rent incentivises a reduction in the former for utility maximisation, albeit at the cost of greater extraction of private benefits of control. The key implication, therefore, relates to the efficiency of extreme ownership concentration (i.e., sole proprietorships with minimal firm leverage) as the optimal initial ownership structure. Together with the corresponding initial ex-ante relationship structure, ownership structure solves a trade-off between the lower information-producing and screening costs of creditor concentration and the minority shareholder expropriation and agency cost reduction benefits of creditor dispersion.

The Volpin (2001, 2007) model delivers six notable, empirically testable predictions and implications for firms' number of banking relations, motivated by firms' relationship banks' rent mitigation objective, the maximisation of the controlling party's private benefit of control, and shareholder/investor legal protection. First, it establishes a micro-level positive correlation between the NBR and the controlling party's equity stake. The intuition is that a multiple-bank financing regime is associated with high entrepreneurial bargaining power, less creditor expropriation, greater stability of control and a stronger potential for extraction of private benefits of control guaranteed by high ownership concentration or majority shareholding. Second, although the model is bereft of an explicit nexus between the NBR and relationship banks' equity ownership in

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firms, it argues for a negative relationship on account of their complementary impact on rent extraction and more robust bargaining power and agency cost reduction impacts of bank ownership share of firm. In addition, under general (i.e., cross-country and country-specific) contexts, the Volpin model predicts a negative correlation between firms' optimal number of banking relationships and the quality of investor (minority shareholders') legal protection. This prediction is, thus, harmonious with the implications of the soft-budget constraint literature (Bolton & Scharfstein, 1996; Dewatripont & Maskin, 1995), the bank liquidity risk diversification argument (Detragiache et al., 2000) and Bris and Welch's (2005) distress-signalling-agency model, but irreconcilable with the typical single relationship banking implications of the bank monitoring literature (Carletti, 2004; Carletti et al., 2007; Diamond, 1984; von Thadden, 1992).

Moreover, controlling for investor (shareholder) legal protection, the number of banking relations increases in the opportunity for the extraction of private benefits of control at the micro-level. This inspires an empirical enquiry into the banking relationship regime choice impacts of the controlling or executive party/organ's demographic and socio-economic characteristics, managerial competence, and the industrial characteristics of firms' sector of operation as these mechanisms are potential sources of variability in the opportunities for the expropriation of private benefits of control (Volpin, 2001). As there are cross-country differences in the availability and value of such private benefit expropriation opportunities, the model further predicts a negative correlation between the optimal number of banking relationships and investor protection. This predicts the prevalence of the multiple-bank financing regime

(and high ownership concentration) in countries with poorer investors' rights (legal) protection, rationalizing a sector-specific enquiry on firms' banking relationship structure in developing country settings. Finally, as the multiple-bank financing regime increases the costs of, and therefore disincentivises, information production, screening and monitoring, any benefits of intensified bank monitoring are pre-conditioned by firms' creditor concentration choices. This makes banks' debt concentration in firms' total debt (i.e., relationship intensity proxy), rather than firms' NBR, the most relevant banking relationship structure in offsetting arm's-length/transactional banks' monitoring free-riding incentives. This foretells the emergence in countries with low investor legal protection of firms' forming special relationships with main banks among multiple banks (i.e., asymmetric or heterogeneous multiple-bank financing regime), the subject-matter for an in-depth discussion in the immediately following section.

The Credit Concentration Theory

A salient feature of the majority of the foregoing theoretical standpoints is the predominant focus on firms' strategic game-theoretic choice of borrowing structure with the implicit assumptions of symmetric banks and (conditional on the multiple-bank financing regime choice) equal, homogeneous or symmetric allocation of firms' borrowing shares across the continuum of banks. Generally motivated by a prevalence of empirical evidence, credit concentration models, however, complement firms' optimal financing regime choice literature by emphasising the asymmetry in the relative significance of banks in firms' multiple credit relationships, sharply contrasting the notion of homogeneous

multiple-bank financing. The primary motif is the simultaneous minimisation of the well-documented costs associated with both single or relationship-bank and multiple-bank financing structures to maximise the gains from, and thereby justify use of, a special structural variant of relationship-bank financing characterised by a strategic coexistence of both NBR regimes. The intellectual roots of the theory of credit concentration can, therefore, be traced to the two oft-cited incomplete contract theories of multiple-bank financing (i.e., the hold-up and soft-budget constraint theses) collectively proposed by Sharpe (1990), Rajan (1992), von Thadden (1992), Dewatripont and Maskin (1995) and Bolton and Scharfstein (1996).

Its pillars stand on the trade-off between the virtues and vices of the multiple-bank financing regime: whilst, à la the holdup literature (Rajan, 1992; Sharpe, 1990; von Thadden, 1992), multiple-bank financing is credited with the mitigation of the hold-up costs of single relationship-bank financing, it can precipitate coordination failure in case of default, à la the soft-budget constraint literature (Bolton & Scharfstein, 1996; Dewatripont & Maskin, 1995). As the optimal number of banking relationships is inevitably determined by trading off the risk of coordination failure (in multiple-bank financing regime) against the holdup problem (in single-bank financing regime), amelioration of these inefficiencies rationalizes the joint existence of these regimes. Proponents of credit concentration theories, therefore, advocate a mixture of the two funding regimes into a unified strategic funding regime. Hence, the emergence of the multiple asymmetric (or heterogeneous multiple) bank financing structure, a regime characterised by simultaneous (re)financing from multiple arm's-length/transactional banks and a special relationship bank with systematically

higher financing shares, informational advantage and bargaining power relative to the former. This unique banking relationship structure provides the framework and enhanced motivation for empirical investigations into the drivers of firms' primary bank type choices and credit relationship intensity, besides credit concentration.

Some theoretical papers on homogeneous multiple-banking relations that provide the earliest implicit suggestions of creditor concentration or multiple asymmetric bank financing relationships are Bolton and Scharfstein (1996), Detragiache et al. (2000), Volpin (2001, 2007) and Bris and Welch (2005). However, Hubert and Schäfer (2002) undertake a more explicit theoretical synthesis of holdup costs (of single relationship lending) and the risk of coordination failure (in multiple-source financing) to sow the earliest justifying seeds for subsequent conceptualisation of the heterogeneous multiple-bank financing regime. In their comparative analysis of the isolated renegotiation effects of a single relationship-bank lending regime vis-à-vis those of a homogeneous multiple arm's-length bank financing mode, Hubert and Schäfer derive the following general Bolton-Scharfstein-like results: (a) given sufficient monopolistic bank's bargaining power and non-commitment to eschew rent-appropriating renegotiations, the gains of multiple-bank financing (in preventing such renegotiations) outweigh its costs in terms of coordination failure; and, (b) firms with optimistic business prospects are subject to substantial quasi-rent appropriation by the powerful monopolistic lender in the renegotiation process, whiles firms with sufficiently low expected returns incur the risk of coordination failure.

These results seemingly validate the Bolton-Scharfstein prediction of high propensity for multiple banking by high credit quality firms; however, the theoretical novelty in Hubert and Schäfer (2002) lies in the provision of a sound justification for conferring a leading role to a strategic lender among the firm's multitude of lenders (i.e., asymmetric financing)—maximising the gains of both funding regimes. Extensions of three of the major strands of the theoretical literature on firms' banking relationship structure (i.e., the hold-up, soft-budget constraint and creditors' monitoring theories) explore such differential/unequal allocations of banks' strategic role and the consequences of this unique borrowing structure.

Extending the holdup thesis on main banks' bargaining power-reducing efficacy of multiple borrowing and complementing earlier theoretic work on credit market coordination failure, Elsas, Heinemann and Tyrell (2004) are arguably among the first to synthesize the pros and cons of both funding regimes in one integrated framework in their analysis of default- or illiquidity risk-minimising firms' optimal debt structure. Elsas et al. (2004) explore conditions where multiple by asymmetric bank financing arises endogenously as firms' optimal capital structure choice in a stylized model of concentrated debt financing with and without loan contract renegotiability, bargaining power, ex post rent extraction and debt forgiveness in financial distress. The sheer absence of or minimal coordination risk (i.e., efficient coordination), characterised by efficient credit extension by multiple small banks (i.e., with a disproportionately lower cumulative share of total firm debt), increases (decreases) credit supply (the holdup risk) at the intermediate financing stage.

However, lack of bargaining and debt (re)negotiation powers and, hence, strategic complementarity of multiple small banks' financing decisions increases the risk of premature coordinated credit foreclosure at the interim stage as refinancing dilemma arising from project quality uncertainty elevates Pareto-inefficient coordination risks, precipitating default risks for financially distressed firms, as in Morris and Shin (2004). The presence of a relationship bank, therefore, adversely affects firms' state-contingent profits due to the emergence of the hold-up problem, thus increasing rent extraction due to the relationship financier's larger financing share and bargaining power. As holdup inefficiencies dominate the coordination effect and are reinforced under coordination failure (i.e., coordinated multiple small bank credit discontinuation and its attendant default/liquidity/bankruptcy risks), Elsas et al. (2004) emphasize the crucially beneficial role of the relationship bank in mitigating the adverse coordination effects.

The relationship bank's risk-bearing capacity for debt (re)negotiation and forgiveness, and relaxation of the budget constraint, especially in bad states of nature, ensure firm/project continuation/survival and reduce default/liquidity risk to raise the likelihood of debt repayment to and increased expected profits of multiple small arm's-length banks. These generate testable propositions that firms' ex ante default/liquidity risk and profits (the cumulative size and characteristics of multiple small arm's-length banks' financial exposures and profits) are decreasing (increasing) in the size of the relationship bank's financial exposures. The most germane question that needs resolution, therefore, relates to the extent of debt concentration (i.e., optimal size of the relationship bank's financial exposure) that optimally balances the two

countervailing effects—holdup inefficiencies of relationship-bank financing with coordination risk of multiple-bank financing. Given the fore-mentioned propositions, Elsas et al. (2004) assert optimality of the multiple asymmetric (or highly concentrated) debt structure (i.e., a sufficiently large relationship bank's financing share in firm's total bank debt) as it incentivises multiple banks' credit extension under efficient coordination and ensures firm health and banks' profit maximisation under inefficient coordination.

This informs Elsas et al.'s (2004) model prediction of a high propensity for multiple asymmetric/concentrated debt financing structure by risky firms (i.e., those with high opportunity costs of capital or low expected cash flow or asset liquidation values) and less risky firms' preference for multiple arm's-length bank financing regime, implying a general positive (negative) effect of firms' informational opacity (transparency) on the degree of debt concentration. The model comparative statics also predict a non-monotonic U-shaped association between firms' asset liquidation value and the extent of debt concentration due to the conflicting impacts of default probability and the relaxation of credit extension constraints on the relationship bank's optimal size, with variations in collateral. Besides highlighting the mechanisms for default/liquidity risk-mitigating impact of multiple asymmetric financing and the counterproductive role of high loan collateralization on risk management, Elsas et al.'s analysis also confirms the non-triviality of firm and credit contract characteristics in the determination of the optimal debt structure, especially the degree of debt concentration (i.e., the optimal financing share), conditional on the probability of differentiation.

In contemporaneous extensions of extant incomplete contract theories of multiple banking, especially the soft-budget constraint theory, Minetti (2006) and Guiso and Minetti (2004, 2010) argue for the equivalence of the relationship bank's larger financing share to its relative informational advantage and precision, disregarded by Elsas et al. (2004). This way, they examine how borrowing and informational differentiation between two banks (relationship and transactional) may be employed as a disciplining device against resource appropriation (i.e., hold-up cost) in reorganizational contexts. The theoretical logic is premised on the informed or relationship bank's stronger project restructuring and resource appropriation abilities during reorganisation due to exploitation of its relative informational advantage in more effective project quality assessment (for restructuring or liquidation decisions) and redeployable asset recognition for eventual seizure.

Pre-empting opportunistic continuation of inefficient projects (which is symptomatic of the soft-budget constraint) for reorganizational misbehaviour (i.e., bank seizure of distressed firms' assets) when liquidation is optimal motivates informational diversity/gap between (relationship and transactional) banks. According to Guiso and Minetti (2004), a central tenet of information heterogeneity is its dual implications for firms' banking relationship structure choice as a disciplinary device: (a) firms' choice between exclusive banking relationships (i.e., undifferentiated funding) and multiple-bank relationships with differentiated borrowing (i.e., differential borrowing from two banks with information asymmetry), and (b) conditional on the latter funding regime choice, firms' allocation of borrowing shares, the differential of which increases with the informational gap and precision.

Multiple but concentrated borrowing (from two banks) is shown to dominate other funding regimes in preventing the soft-budget constraint syndrome (by strengthening banks' resolve to discourage entrepreneurial choice of inefficient projects), rent extraction (hold-up) and reorganizational misbehaviour (Guiso & Minetti, 2004, 2010; Minetti, 2006). This derives from the lack of incentive for the informationally disadvantaged transactional bank (with a lower financing share) to veto the continuation of inefficient projects while anticipating reorganizational loss (from asset seizure by the more informed bank). These benefits of differentiated borrowing must, however, be traded off against the cost of inefficient restructuring decisions (ultimately leading to the premature liquidation of a good project (strategic default)) arising from the transactional bank's noisy information and less effective project quality assessment and asset recognition.

The model predicts that the propensity for differentiated (multiple-bank) borrowing decreases in firms' assets, asset liquidity or redeployability, project quality and/or informational transparency (i.e., firm quality); but, increases with asset heterogeneity and banks' restructuring costs, whiles firms' credit quality has an ambiguous effect. Conditional on the choice of differentiated borrowing, these determinants, however, have converse effects on the degree of borrowing differentiation, except credit quality (informational transparency) that has no (maintains its negative) effect. Thus, the optimal borrowing regime choice (i.e., differentiated versus undifferentiated/single-bank borrowing) and the allocation of borrowing shares/information across multiple creditors, conditional on a differentiated borrowing choice, are endogenously derived as functions of firm characteristics, as in Elsas et al. (2004). Following the contemporaneous path-

breaking contributions of Elsas et al. (2004), Minetti (2006) and Guiso and Minetti (2004, 2010), (all arguably motivated by Hubert and Schäfer's (2002) earlier work), several recent theoretical works on asymmetric multiple bank financing (e.g., Bannier, 2007; Egli et al., 2006; Janda, 2006, 2007; Schüle, 2007; Sufi, 2007) have mainly focussed on firms' optimal debt structure, in terms of the degree of credit concentration, and the multifaceted roles of the relationship bank in that financing system.

The Empirical Debate

An important revelation from the theoretical literature review relates to firms with contrasting qualities (in terms of the degree of informational transparency) making theory-defying strategic banking relationship structure choices. This puzzling feature underscores the impotence of the extant theoretical literature in completely and reliably explaining all the nuances of firms' banking choices. In the next four sub-sections, therefore, a thematic critique of the substantial body of empirical literature on the determinants of firms' strategic banking choices is presented with a prime objective: to provide evidence of the paucity of empirical firms' banking relationship structure choice research in the developing SSA context and, more specifically, in the agro-allied sector. Due to the large volume of the extant empirical literature, particularly on the number of banking relationships, the review is generally limited to those thematic areas for which data availability permitted their inclusion in the study and thus rendered them relevant to and aids the discussion of the study's empirical results.

Empirical Discourse on Number of Banking Relationships

The first sub-section discusses the extant empirical literature on the wide-scoping determinants of firms' strategic choice between the two main banking relationship regimes in respect of the number of banking relationships (i.e., exclusivity vis-à-vis multiplicity) and the actual number of banking relationships. Generally, these determinants revolve around financial market development, the local legal and institutional environment (undiscussed due to its irrelevance arising from data challenges that compelled its exclusion from the study), and socio-economic development, bank-specific characteristics, loan-related features (also undiscussed for the same afore-mentioned reason) and, most importantly, core internal firm-specific characteristics. These thematic areas guided the ensuing discourse.

Financial Market Development

Consistent with model predictions of Dewatripont and Maskin (1995) and Thakor (1996) and theoretical conjectures by Detragiache et al. (2000), macro (or country-level) determinants of the number of banking relationships relate to the financial system architecture. This refers particularly to the relative importance and/or development of the banking and public capital/security markets, and the banking system's institutional structure, competitiveness and health, inter alia. The starting point relates to the works of Ongena and Smith (2000b), Volpin (2001, 2007) and Hernández-Cánovas and Koëter-Kant (2010) in respect of the relative impacts of an economy's dependence on banking and/or capital markets development on firms' banking relationship choices. They consistently document that the relative development/size and importance

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of the banking (capital/securities) market have a complementary (substitution) effect on firms' banking relationship regime choice and the number of banking relationships. There is, therefore, a substitution effect between securities market- and banking market-financing and development: the likelihood of multiple banking decisions increases (decreases) in banking (securities) market development. This pioneers the perception that the puzzling financial phenomenon of multiple banking relationships is a survival strategy for credit-constrained bank-dependent firms in bank-based economies (i.e., those with less-developed equity markets).

Ongena and Smith (2000b) and Volpin (2001, 20007) also find an unsurprising evidence, consistent with Dewatripont and Maskin's (1995) model prediction, of a negative relationship between the number of firms' banking relationships and the degree of banking system concentration, pointing to the optimality of the multiple-bank financing regime for firms in countries with relatively decentralised or competitive banking systems. This result, however, is contested by Hernández-Cánovas and Koëter-Kant (2010) who explain multiple banking relationships as both a diversification strategy and liquidity insurance mechanism against relationship banks' exploitative tendencies (arising from their comparative proprietary informational advantage) and non-relationship banks' credit foreclosure in more concentrated banking markets. However, despite the positive nexus between banking market concentration and bank size and the logically expected negative correlation between the relative size of banks in a country and the number of banking relationships, Ongena and Smith show a seemingly perverse positive nexus.

Testing the cross-country predictions and Italian empirical evidence of Detragiache et al.'s (2000) diversification theory, Ongena and Smith (2000b), corroborated by Volpin (2001, 2007) and Hernández-Cánovas and Koëter-Kant (2010), confirm the non-monotonicity with respect to bank fragility in the banking relationship regime choice and/or the number of banking relationships, but with a contradictory U-shape trajectory. These results overturn Detragiache et al.'s interpretation of the original inverted U-shape path. Thus, with low banking system fragility (or relatively high banking system stability), a decline in stability is associated with a dominant negative effect on the number of banking relationships; however, with high systemic fragility (or low systemic stability), further deterioration in fragility is positively correlated with the number of banking relationships. Whiles this empirical divergence may be attributed to differences in research coverage (i.e., cross-country versus country-specific contexts), estimation strategies and operationalisation, the implication that diversification of banking relations is a motivation consistent (inconsistent) with highly fragile (stable) banking systems should not be lost.

Overall, the evidence that the multiple-bank regime, besides functioning as a substitute for equity market financing in bank-based economies, thrives in competitive banking markets dominated by large banks has research relevance to developing/emerging economies experiencing increased banking market competition due mainly to foreign entries amidst persistent systemic fragility. Caution must, however, be exercised in overstretching these tentative results and implications into the arena of causality as, excepting Detragiache et al.'s (2000) paper, they focus on the implications of various national financial systemic factors in explaining cross-country differences in firms' choice of the

number of bank relationships. This has motivated a number of within-country studies focusing on firms' NBR choice effects of bank-specific factors such as demography and financial health (discussions deferred to the subsequent sub-sections) and the institutional composition, structure (i.e., concentration), conduct (competition) and development of the local/regional banking market.

Focusing on the pathways via which local banking markets define the supply-side determination of firms' financial policy choices (including their NBR), Farinha and Santos (2002) furnish early evidence that the arrival of new banks, altering the institutional composition and local banking market structure, influences some firms' decision to initiate multiple banking choices as the positives of these structural transformations rationalize a reconfiguration of established relationships. Counterintuitively, however, competition in firms' regional banking market of operation is irrelevant to explaining the switch to multiple banking relationships, possibly due to cross-regional homogeneity in banking market competition. Misaligned with Farinha and Santos' findings, other studies (e.g., Aristei & Gallo, 2017; Mercieca, Schaeck, & Wolfe, 2009; Nifo et al., 2018) document unequivocal evidence of a consistently robust positive local banking market competition effect on the number of firms' banking relationships. These results motivate an easy conclusion that the sheer luxury of more banking choice options, increased access to financial services due to the availability of more favourable terms, reduced fixed costs of firm-bank relationship establishment or increased market power of proximate banks (permitting exploitative behaviour) associated with developed or competitive local banking systems facilitates credit-constrained firms' development of new and/or multiple bank relationships.

Similarly, the pillars of Ongena and Smith's (2000b) ground-breaking cross-country evidence of a negative correlation between banking market structure (a concentration index) and the number of banking relationships, respectively corroborated and contested by Volpin (2001) and Hernández-Cánovas and Koëter-Kant (2010), are steadily losing their foundations. For example, while Mercieca et al. (2009) and Ongena, Tümer-Alkan, and von Westernhagen (2012) weakly corroborate this finding, Tirri (2007) and Berger, Klapper, Martinez Peria and Zaidi (2008) provide contrary evidence, and Harhoff and Körting (1998), Neuberger, Räthke and Schacht (2006), Garriga (2006), Neuberger, Pedergnana and Räthke-Döppner (2008), and Aristei and Gallo (2017) assert the statistical and economic irrelevance of the local banking market concentration effect on the likelihood of engaging multiple banking relationships and/or the number of banking relationships.

Thus, while the concentration impact and the countervailing effects of both competition and concentration, as posited respectively by Ongena and Smith (2000b) and Mercieca et al. (2009) are unclear, Mercieca et al.'s dual observations are noteworthy: (a) banking market structure (i.e., concentration) and bank conduct (i.e., competition) capture different banking systems' features and have independent effects on firms' number of banking relationships, and (b) the more consistent and significant competition effect has better explanatory power. And, as evidence of a greater positive competition effect in less concentrated banking markets, the overall regional credit supply, responding to the increased local banking market competition, is positively correlated with the number of firms' banking relationships (Aristei & Gallo, 2017), much in line with the predictions of the structure-conduct-performance paradigm.

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Socio-economic Development of Firms' Regional Location

As the local or regional socio-economic environment is considerably paralleled by the degree of development and characteristics of the local/regional financial/banking system, recent papers, albeit few, explore the relevance of local socio-economic factors to firms' banking relationships choices, but with conflicting findings. Berger et al. (2008) initially document the statistical and economic irrelevance of the local socio-economy (proxied by local population density) to explaining firms' choice of the number of banking relationships. However, testing the banking relationship structure choice effects of local socio-economic structural characteristics to account for differences in the local economy and its correlate of banking services supply, Aristei and Gallo (2017) and Nifo et al. (2018), for example, document a significant negative correlation between local economic development (i.e., provincial and regional GDP per capita) and both the number of banking relations and the probability of relationship multiplicity. Thus, regardless of the economic development heterogeneity in firms' provincial and regional location, creditor concentration (dispersion) choices are made in response to the prevalent use of internal (external) resources for investment financing associated with increased local economic development (underdevelopment).

Bank-specific Characteristics

There is unanimity in the relationship banking and banking relationship structure choice theoretical literature on the centrality of bank-specific characteristics to the benefits of relationship exclusivity and the motivation (and optimality) to switch to relationship multiplicity (Carletti, 2004; Carletti et al.,

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2007; Detragiache et al., 2000; Dewatripont & Maskin, 1995; Jean-Baptiste, 2005; Petersen & Rajan, 1995; Spiegel & Yamori, 2003). With initial theoretic conceptualisations based on bank size (i.e., market power) and fragility, this literature has witnessed empirical extensions to other facets of bank demographics (e.g., age, location/proximity, ownership structure, etc.) and general financial/operational performance to capture the nuances of supply-side motivations for variations in firms' banking relationship choices.

Bank Demographics

Regarding bank demographics, the earliest evidence on the lending banks' size channel was provided by Harhoff and Körting (1998) who document that German SMEs' interaction with at least one of the five largest German banks incentivises an increase in the number of their lending relationships. This ground-breaking evidence of a positive bank size effect corresponds to similar contemporaneous findings by Detragiache et al. (2000) and Ongena and Smith (2000b), subsequently corroborated by Volpin (2001, 2007) with the same European cross-country data used by the latter authors, Berger et al. (2001), Neuberger et al. (2006) and Ongena et al. (2012). Detragiache et al., in particular, find that firms' lending banks' average size has a significant negative effect on the probability of the single-bank borrowing regime choice and the number of banking relationships. Despite the positive correlation between banking market concentration and bank size, and the logically expected negative correlation between the relative size of banks in a country and the number of bank relations, Volpin supports Ongena and Smith's confirmatory evidence of a positive nexus using the same European cross-country dataset.

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These results seem to be in sync with the hypothesis that large banks' provision of wide-ranging services with high screening costs relative to small banks incentivises loan parcellation (i.e., partial funding of many borrowing firms) that motivates multiple-banking decisions due to unmet credit supply gaps.

Farinha and Santos (2002), however, find that neither bank size nor its growth plays a role in firms' decision to substitute single with multiple banking relationships, while Berger et al. (2008) document a significant negative effect of firms' main bank size on both the likelihood of engaging in multiple banking relationships and the number of banking relationships. These murky pieces of evidence on firms' bank size effect leaves a limbo over firms' bank relationship choice implications of Williamson's (1967) theory of hierarchical control which posits that there are operational differences between banks of contrasting sizes. Bank age, capturing possible differences in old and new banks' business models and modus operandi and the associated impact on clients' financial decisions, is not relevant to explaining firms' initiation of multiple banking relationships (Farinha & Santos, 2002). In respect of bank location, Farinha and Santos find, rather unsurprisingly, that firms' main bank branch presence in their region of operation is irrelevant to explaining the switch to the regime of multiple banking relationships. Similarly, Ogawa, Sterken and Tokutsu (2007) document the irrelevance of regional banks, but find a strong significant positive effect of city banks on the number of banking relationships, asserting that firms' strong association with a "too-big-to-fail" city-based bank signals their relatively low default probability (as they can be bailed out of distress) and, hence, induces other banks to lend to them.

Banks' Ownership Structure

Berger et al. (2008) broaden Detragiache et al.'s (2000) prediction (of multiple-bank financing choices as an insurance mechanism to mitigate firms' liquidity risk and potential premature project liquidation emanating from main banks' financial fragility) to the fragility of the banking relationship based on firms' main banks' ownership structure and the inherent differences in bank monitoring intensity (à la Carletti (2004) and Carletti et al. (2007)). They document strong statistical significance and substantial magnitudes for positive (negative) correlation between firms with foreign (state-owned) main banks and the likelihood of maintaining multiple relationships, with predictions of more than two additional (fewer) relationships on the condition of making a multiple-bank financing regime choice. These original findings confirm their hypothesis that firms' relationships with foreign (state-owned) banks may be fragile (sturdy), independently of their financial fragility, attributing the differences in the banking relationship strength to two main channels.

The first channel relates to foreign banks' availability of more overseas business opportunities, their consequent weaker ties with host economies and ease of market exit, and state-owned banks' relative long-term distress-proofness due to strong government backing and, hence, a lower likelihood of withdrawal of financial services due to firm quality deterioration (i.e., soft-budget constraint syndrome). The complementary channel cites monitoring intensity differences amongst banks of different ownership structures, whereby foreign (state-owned) banks' high (low) monitoring intensity and intolerance (tolerance) of poor repayment quality is interpreted as a net monitoring cost (benefit) in terms of high (low) repayment pressure to borrowing firms with

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exclusive relationship with foreign (state-owned) banks. Berger et al. (2008), however, find these conjectures to be inconsistent with the NBR choices of firms with nationalised and private domestic banks as their main banks, as these main bank choices significantly and positively correlate with the number of bank relationships.

Inconsistent with Berger et al. (2008), Ongena et al. (2012) report significant differences in the number of banking relationships maintained by firms with main relationships with public sector banks and those with special functions, on the one hand, vis-à-vis those with main relationships with commercial banks; similarly, they observe significant multiple-banking probability gaps between firms with main relationships with cooperative sector banks and those with special functions, on the one hand, and those with main relationships with commercial banks. Neuberger and Räthke (2009), however, contend that main bank ownership type (i.e., private and cooperative) has an insignificant influence on the number of German microenterprises' banking relationships due to the prevalence of relationship banking and high borrower loyalty.

Banks' Financial Health

Consistent with the prediction of their bank liquidity risk diversification model, Detragiache et al. (2000) find significant positive impacts of bank fragility (measured variously as idiosyncratic liquidity shocks and asset quality/non-performing loans) on both the proclivity for relationship exclusivity and the number of banking relationships (conditional on multiple banking), and obtain support for the predicted inverted U-shaped non-monotonicity in the

relation between the probability of single-bank financing and liquidity shocks. Whiles the former result confirms the motive of multiple bank relations as a liquidity insurance mechanism against premature termination of bank services, the trajectory of the latter results has been contested by Ongena and Smith (2000b), Volpin (2001, 2007) and Hernández-Cánovas and Koëter-Kant (2010). This questions the overall robustness and validity of Detragiache et al.'s model derivations and the former results, setting the tone for somewhat conflicting pieces of evidence. Harmonious with Detragiache et al.'s evidence on Italy, Neuberger and Räthke (2009) find that German firms' main banks' poor ratings significantly increase their number of bank relations in anticipation of the risky premature termination of the bank-firm relationship.

However, a study of Argentine banks finds that bank fragility (measured in terms of bank's size, liquidity volatility, nonperforming loans, leverage or profitability) has a positive impact on the likelihood to borrow from multiple banks (Berger et al., 2001). This is contrary to Detragiache et al.'s (2000) model prediction of a negative bank fragility impact on the probability of multiple banking, but a positive effect on the number of banking relations, conditional on the multiple banking regime choice, and their confirmatory empirical priors on Italy. Similarly, Ongena et al. (2012) and Berger et al. (2008) document a negative impact of bank fragility on both the probability of entering into multiple banking relationships and the number of banking relationships, conditional on a multiple banking regime choice. At the regional level, Aristei and Gallo (2017) also document a positive correlation between the likelihood of multiple banking relationships and overall regional banking asset/credit quality. Farinha and Santos (2002), on the other hand, doubt the economic

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significance of firms' banks' lending capacity (i.e., liquidity and profitability) in explaining their NBR regime choices, even though German firms' main banks' profitability explains the NBR (Ongena et al., 2012). Consistent with Carletti et al. (2007), main banks' monitoring cost increases the proclivity for relationship multiplicity (Ongena et al., 2012). Despite this mixed evidence, coupling the potential main bank-specific and banking systemic fragility effects on firms' number of banking relationships incites an empirical test of these implications in developing country contexts characterised by questionable banking systemic stability arising from unsound bank-specific operational performances.

Non-bank-related Firm-specific Characteristics

Consistent with the overwhelmingly unanimous predictions of the varied theoretical models and following the seminal empirical papers of Petersen and Rajan (1994), Houston and James (1996), and Harhoff and Körting (1998), contemporaneous country-specific and cross-country contributions of Detragiache et al. (2000) and Ongena and Smith (2000b) have popularised the notion of the dependence of firms' banking relationship choices on firm-specific characteristics. Ranging from firms' financial health, relationship quality, organisational form and geographical footprints, decision factors, demography, ownership/management structure, and innovation, research and development (R&D) and internationalisation behaviours to operational sector/industry, these firm-specific characteristics and variations thereof generally signal differences in demand and risk factors that shape cross-firm differences in bank relationship choices.

Firms' Financial Health, Investment and Access

To assess the relevance of firms' financial performance to the formation of strategic banking relationships, the theoretical literature has motivated the conventional inclusion of several financial statement indicators in empirical enquiries into the main features of firm-bank relationships. In accord with their model prediction, Detragiache et al. (2000) observe both the probability of the single-bank financing regime choice and the number of banking relationships increasing in firm profitability, albeit statistically significant only for regime choice. Similarly, other research also documents empirical evidence of a persistently negative firm profitability impact on either or both the likelihood of multiple-bank financing arrangements or/and the number of bank relationships (Berger et al., 2008; Castelli, Dwyer, & Hasan, 2012; Degryse & Ongena, 2001; Farinha & Santos, 2002; Ongena & Yu, 2017; Ziane, 2003).

These results are consistent with the predictions of the firm risk diversification hypothesis according to which incumbent relationship/main banks' refusal or reluctance to increase their exposure to firms due to the latter's poor past performance incentivises both relationship multiplicity (to mitigate firms' financial constraints) and risk-sharing among banks (Cosci & Meliciani, 2002; Farinha & Santos, 2002). As an alternative explanation, the relatively high financial independence and credit quality of high-performing firms make them value the anticipated and/or actual benefits of single-bank or concentrated debt relationships. These benefits are manifested both in terms of minimising information disclosures (consistent with proprietary information disclosure model predictions of Bhattacharya and Chiesa (1995), Yosha (1995) and von

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Rheinbaben and Ruckes (2004)) and signalling their relative quality (consistent with Bris and Welch's (2005) and Carletti (2004) model predictions).

However, some studies document a significant positive profitability impact on firms' penchant for multiple banking relationships and/or the number of banking relationships (e.g., Aristei & Gallo, 2017; Berger et al., 2008; Refait-Alexandre & Serve, 2016), much in line with the predictions of the holdup and soft-budget constraint hypotheses (Bolton & Scharfstein, 1996; Rajan, 1992; Sharpe, 1990). Thus, for well-performing firms, the anticipated benefits of relationship exclusivity seem to be outweighed by the desire for protection against the monopoly power of their main banks and the concomitant extraction of informational rents inherent in the hold-up problem.

Reconciling these opposing schools of thought on the firm profitability impact, Degryse, Masschelein and Mitchell (2004) obtain a non-linear (inverse U-shape) relationship between the probability of multiple-bank financing regime choice and firms' performance (measured by profitability). This confirms Detragiache et al.'s (2000) assertion that firm profitability should have a strong impact on banking relationship regime choices and their model prediction of potential non-monotonicity in this nexus. Thus, while very low and/or very high profitability levels reduce the optimality of multiple-bank financing to increase the likelihood of single-bank financing regime choice, firms with moderate or intermediate profitability levels tend to make multiple-bank regime choices with many banking relationships.

Consistent with the earliest evidence by Harhoff and Körting (1998) and model predictions of Detragiache et al. (2000) and Carletti et al. (2007), firm leverage (i.e., capital structure) has a significant negative (positive) effect on

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the propensity for single-bank financing (the number of bank relationships). This is due to the positive correlation between leverage and default probability, which increases the severity of the adverse selection problem, incentivising the choice of multiple-bank financing regime and an increased number of banking relationships (Detragiache et al., 2000). Full confirmation of Detragiache et al.'s original positive firm leverage effect on both the number of bank relationships and the propensity for multiple-banking relationships is supported by several studies (e.g., Aristei & Gallo, 2017; Berger et al., 2008; Cosci & Meliciani, 2002, 2006; Degryse et al., 2004; Degryse & Ongena, 2001; Gómez-González & Reyes, 2011; Miarka & Tröge, 2005; Nifo et al., 2018; Ogawa et al., 2007; Ongena et al., 2012; Ongena & Yu, 2017; Refait-Alexandre & Serve, 2016; Yu & Hsieh, 2003; Ziane, 2003). Cosci and Meliciani (2002), in particular, provide an alternative explanation to Detragiache et al.'s: multiple banking relationships are firms' optimal strategic response to an urgent need to satisfy a high excess demand for leverage (i.e., a huge credit supply gap) artificially created by banks who perceive bank loan parcellation (i.e., more loans of smaller sizes) as an optimal firm- and/or loan-risk diversification (harmonious with Harhoff & Körting, 1998) and market share maximisation strategy.

Proxying anticipated firm default probability (itself positively correlated with the number of bank relations (Ongena et al., 2012)), high firm leverage and its seemingly consensual positive effect on both the tendency for engagement in multiple-bank relationships and the number of bank relations support the hypothesis that anticipated/actual financial distress may compel firms' multiple banking decisions to accommodate their stable credit supply needs (Detragiache et al, 2000). This conjecture was earlier validated by Petersen and Rajan (1994)

and Harhoff and Körting (1998) who document financially distressed German SMEs' penchant for multiple banking relationships, eliciting counterarguments from some empirical papers (e.g., Guiso & Minetti, 2004; Machauer & Weber, 2000; Neuberger & Räthke, 2009). However, Cosci and Meliciani (2002) and Degryse et al. (2004) seem to concur that, particularly on the verge of market exit, financially distressed firms are less likely to maintain multiple banking relationships, presumably to avail themselves of the debt renegotiation/amnesty and coordinating benefits of relationship exclusivity and/or concentrated bank relationships for a bail-out.

Similar to the NBR choice impact of firms' capital structure, several authors (e.g., Aristei & Gallo, 2017; Farinha & Santos, 2002; Gómez-González & Reyes, 2011; Miarka & Tröge, 2005; Nifo et al., 2018; Ogawa et al., 2007; Ongena, Tümer-Alkan, & Vermeer, 2011; Ongena & Yu, 2017) also document unsurprisingly consistent results on the economic relevance of the role of firms' liquidity management (i.e., debt-servicing capacity) to NBR choices. Increased (problematic) firm liquidity reduces (elevates) the likelihood of relationship multiplicity and, hence, the number of banking relationships, thus confirming the predictions of the hold-up hypothesis. However, firms' short-term financing needs (i.e., working capital, positively correlated with liquidity) has a positive effect on the likelihood of using multiple banking relationships (Refait-Alexandre & Serve, 2016), as this financing regime is a strategy to reduce the risk of credit rationing. The documented evidence on the firm profitability, capital structure, financial distress and liquidity impacts weighs heavily in favour of the long-held notion of an inverse causal correlation between firms' financial health and the number of banking relationships, despite the seeming

disagreement on the direction of causality (see, e.g., Foglia, Laviola, & Marullo Reedtz, 1998; Harhoff & Körting, 1998).

On firms' investment impact (paralleling R&D and innovation effects), Farinha and Santos (2002) and Ongena and Yu (2017) assert a positive effect of firms' long-term capital investment expenditures on both the probability of engaging in multiple banking relationships and the number of banking relationships. However, the lack of robustness of this correspondence coupled with the inconsistency of its statistical and/or economic significance to different model specifications by the latter paper casts a bit of doubt about this nexus as well as about the likelihood of high-growth-oriented firms' choice of the multiple-bank financing regime predicted by the hold-up hypothesis. This quandary is deepened by Refait-Alexandre and Serve's (2016) evidence of a negative impact of firms' investment needs on the probability of multiple-bank financing choices, lending credence rather to Von Thadden's (1995) theoretical viewpoint that investment financing requires a single-bank relationship for greater monitoring intensity.

Aside stock market listing of informationally transparent firms, two of the major mechanisms that hamper or facilitate informationally opaque, credit-constrained and bank-dependent firms' access to finance are group membership and asset specificity or tangibility. However, the evidence on the respective effects of these mechanisms on firms' NBR choices is either mixed or perverse. According to Detragiache et al. (2000) and Nifo et al. (2018), group membership, a proxy for the relative ease of access to non-bank external funding (e.g., group/consortium membership funding in the absence of non-relationship bank financing), is neither relevant to financing regime choice nor to the number

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of bank relationships. In sharp contrast, Berger et al. (2008) document a seemingly counterintuitive positive impact of business group belongingness on both the likelihood of engagement in multiple banking relationships and the number of such relationships. They contend that the use of group membership guarantees and the lower bankruptcy likelihood effect of diversified business group memberships via access to intra-group credit incentivise choice of relationship multiplicity.

Intensifying the debate, Aristei and Gallo (2017) assert a negative correlation between firms' belongingness to a foreign/national group and the propensity for relationship non-exclusivity, positing that access to intra-group financial resources and/or liquidity management attenuates firms' reliance on bank financing and multiple-bank relationships. In another breath, despite their greater informational transparency (emanating from stock exchange disclosure standards) which increases access to public equity financing and reduces their dependence on banks, listed firms have a greater penchant for multiple banking relationships and practically maintain more relationships (Berger et al., 2008). This empirical evidence is discordant with Bris and Welch's (2005) signalling model prediction for high-quality firms.

Firm intangibility, reflecting the degree of firms' asset and informational opacity and incapacity to signal quality via collateral pledges and secure debt financing and, hence, defining firm-specific lack of financial access, similarly provides mixed evidence, significantly determining NBR choices from both directions in some cases, but asserting explanatory irrelevance in others, as exemplified in Ongena et al. (2012). Whiles it correlates positively with the likelihood of multiple-bank financing (Guiso & Minetti, 2004, 2010; Nifo et al.,

2018), it has a persistently significant negative impact on the number of banking relationships (Ongena & Yu, 2017). However, Farinha and Santos (2002) fail to obtain evidence of an increased conditional likelihood of initiation of multiple banking relationships for firms with more opaque or intangible assets and with greater ability to pledge collateral, a more direct measure of firm transparency and financial access. Altogether, these results seem to weaken the validity of the hypothesis that apprehension over future exploitative hold-up costs is the prime motivation for firms' substitution of relationship exclusivity for multiplicity.

Firm-bank Relationship Characteristics

From both the financial and social interactional paradigms, the crucial dependence of the construction, stability, durability and quality/strength of firm-bank relationships on the type, quality and frequency of information flows, captured by the two major lending technologies, defines the centrality of information deficit minimisation. The consequent improvement in relationship quality/strength facilitates access to external funding and positive lending outcomes (i.e., a complete reversal of lock-in and holdup inefficiencies) and discourages the formation of opportunistic banking relationships. As a sequel, the independent effects of sub-dimensions of (the multi-dimensional concept of) relationship strength/quality on the likelihood of establishing multiple banking relationships and the actual number of banking relationships have been empirically tested. Proxying firms' perceived bank relationships strength by relationship scope and relationship importance (a more direct measure), Ongena and Smith (2000b) assert that the number of firms' banking relationships

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significantly increases with relationship scope, which captures the (strength of the) breadth of non-lending-related bank relationships (i.e., for other classic banking and financial services beyond lending relations). This implies that firms' greater requirements of cash management services incite the choice of additional banks for specific financial services in response to a limited range of bank services on offer.

However, there is mixed evidence on the economic significance of relationship importance's consistent negative effect on the number of firms' bank relationships; Neuberger and Räthke (2009) contest Ongena and Smith's (2000b) earlier attribution of significance, leaving a hint of inconclusiveness of the validity of the hold-up theory or the relationship banking hypothesis. Whiles this discordance may stem from differences in research coverage (cross-country vs within-country studies) and methodological matters (such as measurement and estimation procedures), Ongena and Smith's result, consistent with the relationship banking hypothesis, suggests that a stronger perception of the value of bank relationships motivates firms' creditor concentration choices and that multiple-banked (single-banked) firms have transactions-oriented (relationship-based) connections. With feeble evaluation of exclusive bank relationships, the share of bank debt provided by the incumbent bank consistently decreases with firms' initiation of multiple banking relationships (Farinha & Santos, 2002), confirming firms' stronger perception of the value of the second or, more generally, subsequent banking relationships. These results are in sync with Mercieca et al. (2009) and Nifo et al.'s (2018) findings that the relatively greater importance of firms' main banks, in terms of exhibiting a supportive and helpful

attitude and share of total debt respectively, has a decreasing impact on the likelihood of multiple-bank financing choices.

Investigations on medium-sized and large German firms (Machauer & Weber, 2000), large Norwegian firms (Ongena & Smith, 2001), small Portuguese firms (Farinha & Santos, 2002), and small Japanese firms (Ogawa, et al., 2007) also furnish consensual evidence of the positive impact of firm-bank relationship duration, an intuitive indicator of relationship strength or quality, on firms' banking regime choices. Specifically, Ongena and Smith, for example, observe that multiple-banked firms tend to terminate a relationship sooner than single-banked firms, implying a negative (positive) correlation between relationship quality and multiple (single) bank financing decisions. Consistently, Farinha and Santos document a positive duration dependence of relationship multiplicity, indicating that the likelihood of firms' substitution of an exclusive bank relationship with multiple relationships increases with the duration of relationship exclusivity. However, empirical evidence also exists of a significant negative duration impact on medium-sized US firms and French SMEs' number of banking relationships (Guiso & Minetti, 2004, 2010; Ziane, 2003) and the statistical/economic irrelevance of relationship duration to Italian firms' choice of the NBR (see, e.g., Nifo et al., 2018). That notwithstanding, the dominant positive nexus tilts the balance of theoretical probabilities towards the hold-up hypothesis' predictions of multiple banking for mitigation of rent extraction in single-bank relationships, casting doubt on the validity of the relationship lending value hypotheses.

Refait-Alexandre and Serve (2016) exploit an extant characterisation of the dimensions, antecedents and consequences of trust to demonstrate that trust,

another primary indicator of banking relationship quality, provides a major explanation of financing regime choice. They find that rating knowledge, a proxy for the information asymmetry antecedent of trust, has a positive impact on SMEs' use of multiple relationships, suggesting that managers' knowledge of their main banks' firm rating process (or main banks' transparency) prompts self-appraisals. In line with Mercieca et al. (2009), the consequent awareness or subjective perception of the financial hold-up potential, arising from negative self-assessments, drives an increased probability of developing multiple-bank relationships to mitigate credit supply constraints. Even though the irrelevance of bank visits and monitoring, capturing banks' effort at information deficit minimisation via frequent communication and verifications, has been evidenced by Neuberger and Räthke (2009), contrary findings emerge. The frequency of firm-bank exchanges, capturing the communication and information sharing antecedent of trust, has a seemingly perverse positive, albeit feeble, impact on the use of multiple banking relationships (Refait-Alexandre & Serve, 2016), presumably due to uncaptured intricacies in financial exchanges.

Refait-Alexandre and Serve (2016) add that the managerial incentive to construct a valuable long-term firm-bank relationship that facilitates soft information disclosure (rather than engage in systematic opportunistic search for low-cost transactions), a proxy for the consequence of trust, has a negative impact on the likelihood of multiple banking relationships. Moreover, the propensity for multiple-bank relationships increases with geographical distance (another key dimension of banking relationship quality) between the firms and headquartered (rather than branch-located) loan officers. These results overwhelmingly endorse Agostino, Ruberto and Trivieri's (2015) stance that

close ties with their main banks negatively impacts firms' tendency to adopt the multi-bank financing regime. However, the evidence on firm-bank geographical proximity contradicts some extant findings by Neuberger and Räthke (2009) and Mercieca et al. (2009) for Germany and the UK where distance has an insignificant influence on firms' financing regime choices.

In relation to the information type disclosed by firms to aid banks' information deficit minimisation efforts, fresh empirical evidence emphasizes the impact of banks' borrower risk/credit quality assessment mode (with respect to the quantitative versus qualitative information dichotomy) on firms' optimal financing regime choices. Hernández-Cánovas and Koëter-Kant (2010) and Aristei and Gallo (2017) assert a positive association between firms' revelation of exclusively soft (hard) information and the likelihood of single (multiple) banking relationships, pointing to the validity of the relationship banking hypothesis. Despite the inconclusiveness of the evidence on soft information (Hernández-Cánovas & Koëter-Kant, 2010), these results are in tandem with von Rheinbaben and Ruckes' (2004) proprietary information disclosure model prediction of a negative (positive) nexus between firms' penchant for multiple-bank relationships and confidential information disclosure restriction (latitude).

Conditional on irreparable deterioration of relationship quality (via, for example, dishonest information disclosure or/and leakage, moral hazard and/or complete breakdown of all/key sub-dimensions of relationship quality) without the incentive for establishing multiple banking relationships, bank switching (involving the simultaneous termination of an existing bank relationship and establishment of a new one with another bank) remains the optimal alternative. Even though both bank switching and initiation of multiple relationships are

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exclusive firm-bank relationship value-dissipating alternative mechanisms for averting ex post hold-up rent extraction, Farinha and Santos (2002) document an increasing likelihood of substituting single with multiple relations with the frequency of bank switching, debunking the substitutability hypothesis.

In sum, previous studies' emphasis on the independent NBR choice effects of the afore-discussed sub-dimensions of relationship quality (i.e., duration, distance, frequency of information sharing, and trust) grossly overlook the impacts of other determining factors/dimensions of relationship quality (e.g., communication quality, commitment, and firm satisfaction). Besides, an overemphasis on sub-dimensional effects discounts the mutual inclusivity of these highly interactive factors and their "omnibus effect" on firms' propensity for strategic banking relationship formations. The need to address this oversight with methodological rigour incites the construction of a comprehensive firm-specific composite of all the qualitative evaluations—banking relationship quality indices—and the testing of their respective impacts on the propensity for the formation of strategic banking relationships.

Organisational Form and Locational Footprint

Differences in firms' organisational and/or legal form may translate into differences in the quality of corporate governance practices, the severity of agency conflicts among (internal/external) stakeholders, degrees of information opacity/transparency, exposure to hold-up frictions and, therefore, differential access to financial markets that ultimately defines differences in banking relationship choices. However, the relative sparsity of this genre of research is not bereft of conflict. For example, Ferri and Messori's (2000) conjecture about

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cooperative firms' traditional affinity to reputable local/cooperative banks with whom they establish close long-term relationships has attracted mixed empirical reactions. Whiles Cosci and Meliciani (2006) uphold this conjecture with a significant negative impact of firms' cooperative statuses on both the probability of engaging in multiple banking relations and the number of banking relationships, Nifo et al. (2018) assert both statistical and economic irrelevance of this nexus. With regard to firms' legal form, differences in firm type (e.g., private versus public) also reflect on differences in NBR choices, as private firms have a lower probability of maintaining relations with multiple banks (Mercieca et al., 2009). Thus, public non-financial firms leverage their easy direct and/or indirect access to external finance, by courtesy of implicit government guarantee, large size and multiple locational footprints, to engage multiple banks to meet their credit supply needs (Berger et al., 2008). However, Ongena et al. (2012) furnish contrary evidence on the relevance of firms' legal form to explaining the number of banking relationships.

Other enquiries that corroborate the NBR effect of firms' organisational form but also shed insightful light on the implications of its locational or geographical footprint include Farinha and Santos (2002), Guiso and Minetti (2004, 2010), Berger, Miller, Petersen, Rajan and Stein (2005), and Ongena and Yu (2017). In particular, Farinha and Santos, for example, posit that independent firms belonging to industrial conglomerates have a lower penchant for initiating multiple banking relationships. However, true to their model predictions, Guiso and Minetti contend that the geographical dispersion of firms' multiple operational plants, a proxy for asset heterogeneity, has a positive and significant impact on borrowing differentiation to maximise the benefit of

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bank proximity and production assessment expertise. Consistently, Ongena and Yu also document a significant positive correspondence between the number of firms' banking relationships and the number of subsidiaries under their direct control. These results capture the simple logic that, regardless of independent subsidiaries' banking autonomy, the configuration of the local banking market, for example, asymmetric bank branch presence in subsidiaries' operational location, plays a key role in firms' multiple banking decisions.

Decision Factors

Following Ongena et al. (2011), Aristei and Gallo (2017) furnish fresh evidence on the relevance of decision-making factors related to firms' choice of banks as influential determinants of multiple banking. First, the competitiveness or affordability of services offered by firms' main banks is positively related to the tendency of relationship exclusivity. However, firms' emphasizing the importance of bank proximity (i.e., short inter-party distance) are characterised by a lower likelihood of relationship multiplicity and, hence, a lower number of banking relationships. This is suggestive of the relevance of convenience of bank location, information transparency and search cost-reducing incentive to creditor concentration decisions. Furthermore, firms' preference for banks implementing flexible procedures (e.g., handling and processing speed and ease of negotiation) increases the number of banking relationships, confirming the notion that firms with informational limitations are associated with a greater number of banking relationships as a mechanism for diversifying external financing sources to alleviate credit constraints.

Firms' Demographics

The empirical relevance of firm-specific demographic characteristics to explaining the NBR is so deeply rooted in the variety of theoretical models that the ever-expanding empirical literature is generally characterised by their regular indisputable inclusions as statistical controls for the demand for financial services and credit risk. Such inclusions also derive inspiration from earlier studies unrelated to the determinants of firms' NBR choices, but that incorporate the number-of-creditor aspect of banking relationship structure as a proxy for the intensity of banking competition into investigations of the value of banking relationships (e.g., Cole, 1998; Harhoff & Körting, 1998; Houston & James, 1996; Ongena & Smith, 2001; Petersen & Rajan, 1994). For example, Petersen and Rajan document a positive relationship between the number of creditors and firm size. Studying the association between firm characteristics and different types of debt finance (including multiple versus single banking) for a sample of large publicly traded U.S. firms, Houston and James find that firm size and age are positively correlated with multiple banking and so is the share of bank debt in total debt (i.e., asymmetric multiple-bank financing). Harhoff and Körting also find that, in their sample of smaller German companies, the number of creditors increases in firm age and firm size. The next two sub-sections are, therefore, dedicated to a succinct discourse of the empirical evidence on the firm demographic effects on the NBR.

Firm Size

There is overwhelming cross- and within-country empirical evidence of a significant positive relationship between firm size (regardless of its

operationalisation) and the NBR, justifying the contemporary argument that firm size is the single most important determinant of firms' NBR choices. The premier set of empirical papers on this aspect of firm demography in relation to the NBR includes Harhoff and Körting (1998), Detragiache et al. (2000), Machauer and Weber (2000) and Ongena and Smith (2000b). Detragiache et al. confirm Harhoff and Körting's ground-breaking evidence of a positive correlation between the number of bank relationships and micro/small German firms' size, finding that firm size has a statistically significant negative (positive) impact on the likelihood of the single-bank financing regime choice (the number of banking relationships) of Italian SMEs. Corroborating consistent findings by Machauer and Weber for medium and large German firms are contemporaneous results from a European cross-country study by Ongena and Smith. They assert that, overall, there is a positive and statistically significant correlation between firm size and the (choice of the) number of banking relationships—larger firms tend to maintain more bank relationships and have a greater number of banking relationships than small firms.

Several other confirmatory findings have emerged from enquiries in Argentina, Belgium, India, Italy, France, Germany, Portugal, Switzerland, Thailand, and the U.S. (see, e.g., Berger et al., 2001, 2005, 2008; Cosci & Meliciani, 2002; Degryse et al, 2004; Dietsch, 2003; Guiso, 2003; Guiso & Minetti, 2004; Farinha & Santos, 2002; Hommel & Schneider, 2003; Neuberger & Räthke, 2009; Neuberger et al., 2006; Ongena et al., 2012; Ziane, 2003). European cross-country studies by Volpin (2001), Hernández-Cánovas and Koëter-Kant (2010) and Ongena and Yu (2017) have also confirmed this statistically and economically significant correspondence between firm size and

the likelihood of the multiple-banking financing regime choice. The newest pieces of in-country evidence by Agostino et al. (2015), Refait-Alexandre and Serve (2016), Aristei and Gallo (2017) and Nifo et al. (2018) cement this now conventional results: firm size has a statistically and economically significant positive impact both on the likelihood of the multiple-bank financing regime choice and the number of banking relationships.

This consensual positive firm size effect is generally put down to differences in informational opacity, credit risk/quality, access to financial markets, a spectrum of financial services and loan requirements, and the nature of firm-bank relationship (i.e., relationship-oriented versus transaction-based) between firms of contrasting sizes (e.g., between SMEs and large firms). The lack/inadequacy of credit history, the consequent absence of credit rating, the impossibility of credibly signalling their creditworthiness via collateral value and the lack of separation between ownership and management conspire to define the relative informational opacity of small firms. A similar interaction among a resultant low credit quality assessment, limited access to private-sector credit, organisational simplicity, limited geographical footprint (often leading to operation in the same socio-economic milieu as their main lenders), limited and undiversified financial service/loan requirements, crucial provision of soft information via relationship lending, and easy management of low fixed transaction costs makes single or concentrated banking relationships the optimal financing regime choice for small firms. According to information-centric intermediation theories, the optimality of this financing regime for relatively small firms rests on its efficiency in minimising informational deficit, easing monitoring and credit denial/rationing probabilities, and increasing access to

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external funding (Agostino et al., 2015; Aristei & Gallo, 2017; Berger et al., 2008; Detragiache et al., 2000; Ferri & Messori, 2000; Garriga, 2006; Guiso & Minetti, 2010; Neuberger & Räthke, 2009; Ongena & Yu, 2017; Refait-Alexandre & Serve, 2016).

Intertemporal firm growth in size and organisational complexity occur pari passu with increasing (decreasing) informational transparency (opacity) via acquisition of quality-signalling instruments—availability of hard information, credit history, credit ratings, collateral and institution of quality corporate governance structures. The increased access to financial markets, arising from the resultant reduction in credit risk and denial and/or rationing probabilities, coupled with growth in financing needs and widening of the spectrum and sophistication of financial services requirements beyond main banks' capacity due to increased growth opportunities and expansion in geographical footprints, incentivises large firms to meet their higher needs through reliance on multiple banks to ameliorate concerns over future holdup costs (Aristei & Gallo, 2017; Berger et al., 2008; Degryse et al., 2004; Detragiache et al., 2000; Farinha & Santos, 2002; Guiso & Minetti, 2010; Harhoff & Körting, 1998; Hernández-Cánovas & Koëter-Kant, 2010; Ongena & Smith, 2000b; Refait-Alexandre & Serve, 2016). The incentive for relationship multiplicity may also be induced and/or accentuated by banks whose preference for firm-specific credit/default risk diversification inform their exposure- and/or concentration-risk limiting decisions, compelling large or bank-dependent firms to spread their borrowing across other banks (Degryse et al., 2004; Detragiache et al., 2000; Farinha & Santos, 2002; Harhoff & Körting, 1998).

Firm Age

However, more generally, the empirical evidence on firms' age effect on the decision to engage in multiple-bank financing and the number of banking relationships is rather surprisingly mixed and inconclusive, with three schools of thought asserting positive, negative or no impacts, with varying degrees of statistical and economic significance (see, e.g., Degryse et al., 2009). Arguably the premier paper on this subject-matter, Harhoff and Körting (1998) observe that the number of German SMEs' bank relationships increases with their age. Detragiache et al. (2000) and Cosci and Meliciani (2002) corroborate Harhoff and Körting's evidence for Italian firms, the former, however, observing that firm age has an insignificant impact on the likelihood of the single-bank financing regime choice. The finding that early market entrants (akin to young firms) have a lower probability of making multiple-bank financing regime choices (Degryse et al., 2004) sealed an early thinking that younger (older) firms maintain fewer (more) bank relationships. Several other enquiries confirm the statistical and economic significance of the positive firm age effect on both the penchant for the multiple-bank financing regime and the number of banking relationships (e.g., Aristei & Gallo, 2017; Hernández-Cánovas & Koëter-Kant, 2010; Neuberger & Räthke, 2009; Nifo et al., 2018). The information-based intermediation theory-motivated arguments on the consequences of differences in informational opacity, credit risk and quality, access to financial markets, financial services/loan requirements, and the nature of firm-bank relationship (i.e., relationship-oriented versus transaction-based) advanced to explain the correspondence between firm size and the NBR are also invoked to explain this positive firm age effect.

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In sharp contrast to the more conventional notion of a positive firm age effect on the number of banking relationships, a rival school of thought advances the firm age irrelevance argument. For instance, Farinha and Santos (2002), Ziane (2003), Yu and Hsieh (2003), Degryse et al. (2004) and Berger et al. (2008) assert the economic insignificance of the firm age effect on financing regime choice, despite data support for the positive correlation between firm age and multiple-bank financing choice for European (Portuguese, French, Belgian) and Asian (Taiwanese and Indian) firms. A possible explanation for firm age redundancy in explaining the substitution of single-bank relationships with multiple-banking arrangements is the collinearity between factors that could be captured by firm age and other correlates of NBR in models (Farinha & Santos, 2000).

A minor body of literature, however, assert a negative firm age effect on the likelihood of multiple banking relationships and/or the number of banking relationships (e.g., Degryse & Ongena, 2001; Garriga, 2006). This suggests that, as public information on firms' track record (on performance, credit quality, and reputation) becomes available with age, older firms may face less severe adverse selection problems when seeking non-relationship finance (Detragiache et al., 2000); coupling that with the recognition of the value of monitoring-intensive exclusive or fewer bank relationships in terms of increased credit availability and minimisation of proprietary information disclosure incentivise creditor concentration choices, much in line with the predictions of the secrecy, monitoring and signalling-agency theories (Bris & Welch, 2005; Carletti et al., 2007; Detragiache et al., 2000; von Rheinbaben & Ruckes, 2004). Ongena and Yu's (2017) European cross-country evidence of statistically and economically

significant positive and negative impacts of firm age on the number of firms' banking relationships with diverse linear and non-linear model specifications epitomises the debate. The seemingly ambiguous firm age effect is attributed to potential non-monotonicity in the interface between firm age and the number of bank relations by Tirri (2007) and Aristei and Gallo (2017) who reconciliatorily validate this conjecture, albeit with contrasting trajectories. This suggests that the number of banking relationships decreases (increases) with firm age before a critical age threshold beyond which it rises (declines).

Firms' Ownership and Management Structure

In the information-centric financial intermediation theoretical literature on firms' debt structure, Leland and Pyle (1977) make a passing allusion to the notion that a firm's share of equity capital (i.e., ownership structure) determines the number of lenders (banks) from which the remaining equity could be raised. A priori, this argument intuitively draws a negative ownership concentration effect on firms' NBR choices as entrepreneurs' equity share signals ownership structure (i.e., dispersion or concentration), management structure and decision-making autonomy, and bank relationship strength. However, to the extent that these mechanisms are also corporate governance surrogates the quality of which defines firms' informational transparency or opacity, this original theoretic stance is in the firing line. Accounting for the differential impact of differences in corporate governance practices of firms with different ownership and management structures on their NBR regime preferences, therefore, justifies the inclusion of firms' ownership types and management structure in empirical

enquiries. Unsurprisingly, the theoretical argument reflects on the mixed and inconclusive empirical results.

In Detragiache et al. (2000) and Aristei and Gallo (2017), for example, SMEs' ownership concentration (i.e., largest shareholder's equity stakes), proxy for entrepreneurial control rents and greater management and/or shareholders bargaining power vis-à-vis creditors', has insignificant, inconsistent (i.e., both positive and negative) and, therefore, inconclusive effects on both financing regime choice and the number of bank relations. In sharp contrast, but lending strong credence to their optimal ownership structure and asymmetric multiple borrowing models' predictions, Volpin (2001) and Guiso and Minetti (2004, 2010) find that the number of Italian and US firms' banking relationships and the probability of making multiple-banking choices increase with ownership concentration. Consistently, Volpin (2001, 2007) obtains both in-country and cross-country evidence of a positive and significant correlation between the number of firms' banking relationships and the opportunities for the extraction of, and the size of, the private benefits of control (measured respectively as firm-specific voting premium and country-level block premium, both strongly correlated with ownership concentration). Volpin, thus, provides robust support for his model prediction, in line with those of the Carletti-inspired monitoring intensity and diversification theory (see Carletti, 2004; Carletti et al., 2007).

Aristei and Gallo (2017) suggest differential effects of firms' ownership and management structure controls (i.e., ownership concentration, family ownership, foreign ownership and decentralised management) on both the financing regime choice and the number of banking relationships on the basis of different firm size classifications. Whiles, excepting foreign ownership, none

of these controls is relevant to SMEs and small firms, they (exclusive of family ownership) are decisively relevant in explaining large corporations' financing regime choice and number of banking relationships. With respect to corporate ownership structure, foreign-owned firms are characterised by a significant lower probability of multiple-bank financing and a lower number of banking relationships relative to locally-owned firms, contesting Berger et al.'s (2008) original evidence of a seemingly perverse positive impact. Aristei and Gallo's finding, thus, confirms Berger et al.'s original conjecture that heterogeneity in origin, access to and cost of bank finance, and corporate governance practices between domestic and foreign-owned firms reflect on differences in firms' preference for bank ownership structure and strength of engagement with the local banking market (Aristei & Gallo, 2017; Berger, Dai, Ongena, & Smith, 2003; Berger et al., 2008; Ongena et al., 2011). Similarly, state-owned non-financial firms, a special category of domestic firms, exhibit the tendency of engaging multiple banks (Berger et al., 2008), because of their typical large size, multiple locational footprints and, most importantly, easy access (direct and/or indirect) to external finance courtesy of implicit government guarantees.

Innovation, R&D and Internationalisation Choices

In Detragiache et al. (2000), almost all measures of R&D and innovation intensity, serving as additional proxies for entrepreneurial control rents, have the predicted negative effects on the probability of single-bank financing. However, their individual statistical insignificance, confirmed by Berger et al. (2008) and Neuberger and Räthke (2009), throws the hold-up hypothesis' prediction of rent appropriation mitigating effect of multiple-bank financing in

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doubt and also debunks the applicability of the proprietary information leakage theories of firms' NBR. However, consistent with some earlier studies (e.g., Harhoff & Körting, 1998; Cosci & Meliciani, 2002), recent pieces of evidence (see, e.g., Agostino et al., 2015; Aristei & Gallo, 2017; Neuberger et al., 2008; Nifo et al., 2018; Refait-Alexandre & Serve, 2016) uphold the predictions of the hold-up hypothesis with significant positive effects of the indicators of firms' R&D investment and product/process and organisational innovation on both the likelihood of multiple-bank financing decisions and the number of banking relationships. Thus, due to the positive correlation between their R&D drive and long-term investment orientation (Ongena & Yu, 2017), innovative firms appear riskier to their main banks whose firm-risk-sharing tendencies reflect in hold-up problems that incentivise innovative firms' multiple-banking decisions. The positive effect, consistent with the hold-up predictions of multiple banking as a credit rationing mitigation strategy for innovative firms characterised by high external financing needs, dominates the negative effect due to proprietary information disclosure issues à la the secrecy theories.

The conundrum over the role of (the degree of) firm internationalisation (i.e., exporting or otherwise, and, particularly, the extent of export or foreign market orientation) in firms' NBR choices emerges due to the increased demand for both domestic and foreign bank services for foreign cash flow management. This leads to either single-banking or multiple-banking relationships or a cross between the preceding two NBR regimes (i.e., asymmetric bank financing). Arguably among the first to test this link, Ongena and Smith (2000b) document a negative correlation between firms' non-domestic/worldwide sales (proxying for the size of firms' foreign operations) and the number of domestic bank

relationships, ceteris paribus. The implication is that firms with high export market orientation/sales maintain strong domestic banking relationships (e.g., with single-, concentrated, or asymmetric multiple bank financing) and compensate these domestic creditor concentration choices with more bank relationships in foreign countries to meet the increased demand for bank services to manage export activity. This proposition seems to be validated by some studies (e.g., Aristei & Gallo, 2017; Nifo et al., 2018; Ongena et al., 2011). In particular, Ongena et al. and Aristei and Gallo concur that the importance firms attach to banks' availability of international networks reduces the number of bank relationships, the latter authors adding that this preference, rather than firms' foreign trade participation, significantly elevates the probability of the multiple-bank financing regime choice. Nifo et al. also document internationalised firms' greater propensity for making multiple-bank financing decisions and use of relationship multiplicity to manage their foreign transitions and activities.

Industrial Sector of Firms' Operations

Due to both cross-country and in-country spatial variation in industrial and sectoral comparative advantages, industrial and sectoral differences in informational transparency/opacity and credit risk, and, hence, bank differences in industrial/sectoral specialisation and (dis)inclination, there may be sectoral differences in credit access and constraints (Rajan & Zingales, 1995). Firms' sector of operation may, therefore, generate differences in financial services requirements that shape their differential degrees of dependence on the banking system and banking relationship structure choices. However, the empirical

evidence in the extant literature on the interface between firms' sector of operation and their NBR choices is generally markedly inconclusive.

While Hernández-Cánovas and Martínez-Solano (as cited by Iturralde et al., 2010) totally discount the link between firms' specific sector of activity and the number of banking relationships, there is considerable evidence that specific industrial sectors of firms' operation influence the NBR choice (e.g., Hernández-Cánovas & Koëter-Kant, 2010; Iturralde et al., 2010; Ongena & Smith, 2000b), but with conflicting results. While country-specific studies by Neuberger and Räthke (2009) and Iturralde et al. report insignificant services sector effect, Ongena and Smith's European cross-country study posits that arts, entertainment, accommodation and food services sub-sectors of the service industry significantly explain cross-country variations in NBR choices, with a negative impact. Again, Iturralde et al., and Hernández-Cánovas and Koëter-Kant's European cross-country study conspire on the positive number-of-banking-relationship impact of the transport and communication sector against Ongena and Smith's evidence on the irrelevance of the transportation sector impact. Furthermore, Ongena and Smith, and Iturralde et al.'s assertions of irrelevance of the trade and construction sectors' impacts are at sharp variance with Hernández-Cánovas and Koëter-Kant's stance of respective positive and negative impacts.

However, there is widespread concurrence that the manufacturing sector (subsuming the class of agro-industrial firms), rather than the production agricultural sub-sector (comprising agriculture, forestry, fishing and hunting), is a broad industrial classification that significantly explains both cross-country and in-country variations in NBR (see, e.g., Iturralde et al., 2010; Hernández-

Cánovas & Koëter-Kant, 2010; Ongena & Smith, 2000b). But, the unanimity on the manufacturing sector impact comes with its peculiar empirical debate on the directionality of impact. In sharp contrast to Ongena and Smith's finding that firms operating in the manufacturing sector are less likely to maintain multiple bank relationships, Hernández-Cánovas and Koëter-Kant concur with Iturralde et al. that the manufacturing sector has a significant positive correlation with the likelihood of multiple-bank financing regime choices. Juxtaposing this empirical divergence on the manufacturing sector's effect with Aristei and Gallo's (2017) unreported but significant sector controls, the most natural conclusion elicited is that cross-country and within-country variations in NBR choices could be explained, but unexclusively, by industry-level heterogeneities and, hence, by firms' sectoral specialisation of their main operational activity (Neuberger et al., 2008).

Connectedly, Ongena and Yu (2017) obtain fresh evidence that enlargement of firms' industry operational scope (i.e., industrial diversification or increase in the number of firms' operational industry) corresponds to a higher proclivity for relationship multiplicity and an increasing number of banking relationships. This industry-relationship correspondence derives from the first-order real world phenomenon of banks' industry specialisation, implying that firm industry diversification calls for a strategic top-level management decision of carefully searching and engaging banks with specialised focus, comparative advantage, and greater representation in the newly entered industry.

Yet, the empirical inconclusiveness on the relevance of industry and/or sector impact and the concord on the manufacturing sector impact, regardless of the unresolved puzzle on its directionality, has afforded researchers the

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convenient discretionary choice and inclusion of sector of interest in within-country enquiries. However, the choice of manufacturing firms for analysis of banking relationships is remarkably predominant, and examination of sector-generic firms' banking relationships has motivated the inclusion of sectoral controls the results of which are mostly unreported (see, e.g., Aristei & Gallo, 2017; Berger et al., 2008; Degryse et al., 2004; Farinha & Santos, 2002; Nifo et al., 2018; Ogawa et al., 2007; Ongena & Yu, 2017; Volpin, 2001, 2007). In all, firms operating in high-technology industries/sectors have a higher propensity for multiple-bank financing and maintain more banking relationships (Cosci & Meliciani, 2002; Nifo et al., 2018). This observation has elicited the consensual conviction that both the penchant for multiple banking relationships and the actual number of banking relationships increase with firms' operational sectors' (credit) riskiness (Cosci & Meliciani, 2002; Neuberger et al., 2008; Neuberger & Räthke, 2009; Nifo et al., 2018). This suggests that the puzzling phenomenon of relationship multiplicity is an informationally sparse/opaque sectors' (and related firms') response to financial institutional disinclination to credit exposures to these perceptibly risky sectors, credit denial and rationing, and the consequent excess demand for leverage (i.e., credit supply gap).

The afore-discussed sector riskiness implications for bank relationship structure choices naturally draw the nature of agro-allied firms' banking relationships into the debate. But there is a paucity of information on the nature of firm-bank relationships in the agricultural banking and finance discipline (Kong, Turvey, Xu, & Liu, 2014; Turvey, Xu, Kong, & Cao, 2014). To the best of my knowledge, the solitary empirical paper explicitly explaining the NBR as a financial strategy response of agro-allied firms to constrained access to

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financial services in the agricultural banking and finance sub-discipline is Brewer, Wilson, Featherstone and Langemeier (2014). They exploit farm-level data on a sample of US farms belonging to the Kansas Farm Management Association to examine the determinants of the number of lending relationships from 2002 to 2010. With 49.6% (50.4%) of Kansas farm operators maintaining single (multiple) lending relationships, NBR choices of agricultural firms are unclear and remain an unresolved empirical question, even though the number of lending relationships exhibited a statistically significant positive time trend over Brewer et al.'s (2014) study period.

Brewer et al.'s (2014) results indicate that farmer proclivity for multiple lending relationships to ensure continued credit access increases with financial risk (i.e., leverage) but decreases with liquidity, while it decreases, albeit insignificantly, with farm profitability and operators age, the two latter results suggesting the inconclusiveness of the profitability impact and the debt consolidation effect of owner/manager age. Even though Brewer et al.'s (2014) findings for the agricultural sector are all consistent with the conventional wisdom noted for the non-agricultural industry, the study was conducted in a western economy context and the generated insights may not fully capture the nuances of agro-allied firms' NBR choices in a developing economy. And, despite several theoretical predictions of high propensity for relationship multiplicity in developing countries with comparative agricultural advantages, this puzzling phenomenon still remains open for empirical enquiry in these contexts.

Empirical Discourse on Bank Diversification Choices

Conditional on engaging in "polygamous" banking relationships, firms make bank diversification choices if, at least, two of the banks in their pool of multiple banks vary in terms of nationality and ownership structure, age, size and proximity or other observable distinguishing characteristics which may be mutually inclusive. The pertinence of these subtle choices resides in their underlying rationale which, inter alia, include the need to reduce liquidity and credit rationing risk, diversify external financing sources, diversify bank monitoring intensity, and satisfy diverse, complex and specialised financial services requirements. Despite the importance of these possible bank diversification patterns in the composition of a multiple-banked firm's pool of banks, the empirical research is in its embryonic stage.

To the best of my knowledge, only two studies on manufacturing firms in non-African countries, specifically Italy and India (i.e., Aristei & Gallo, 2017; Berger et al., 2008) address the pertinent question of the empirical determinants of multiple-banked firms' bank diversification choices, and both are from the bank ownership type perspective. Sharing theoretical roots with choice of the number of bank relationships, the determinants of bank ownership type diversification choices of multiple-banked firms are identical to those of the number of banking relationships. These range from environmental factors (encompassing local banking market structure/conduct, legal and institutional environment (again undiscussed for reasons adduced elsewhere) and socio-economic development), to, most notably, internal firm characteristics relating to relationship banks' (financial and ownership) characteristics, and other core firm-specific characteristics. Given the sparsity of this research genre, the next

few sub-sections present a detailed thematic discourse on the emerging empirical evidence.

Environmental Determinants

The scanty evidence on firms' bank-type diversification behavioural responses to environmental factors (encompassing regional/local credit market characteristics, as well as socio-economic development) is solitary, furnished largely by Aristei and Gallo (2017). To account for differences in local/regional financial and economic development, and banking services supply in firms' vicinity of operation, these solitary papers control for the bank ownership type diversification effects of the structure (concentration) and conduct (competitiveness) of the local/regional banking system. Aristei and Gallo assert that local/regional banking system concentration (market structure) negatively affects firms' propensity for haphazard (i.e., any form of) bank ownership type diversification, regardless of its insignificant impact on the likelihood of multiple banking relationships in the extensive margin (i.e., in the first stage). This evidence is unsurprising because concentrated banking markets afford potential multiple-bank borrowing firms fewer banking choices, either in terms of number of banking relationships or on any distinguishing bank characteristics (e.g., ownership, etc.), to diversify across.

Aristei and Gallo (2017), however, posit that, conditional on a positive and significant likelihood of multiple banking choices, regional bank branch density (which captures the spatial competition effects of local financial market development) has a significant positive effect on haphazard bank ownership-type diversification. The evident implication is that, in regions with relatively

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developed financial or banking markets, the engendered competition has a secondary impact on firms' bank diversification choices beyond the primary effect of the likelihood of multiple banking. These sharply contrasting bank ownership type diversification effects of market structure (concentration) and conduct (competition) re-affirm the growing views of a school of thought that these dimensions capture different characteristics of the banking system. Berger et al. (2008), however, furnish a more nuanced perspective of the local banking market characteristics effect of multiple-banked firms' diversification choices. They contend that diversification across bank ownership types decreases with bank ownership concentration, conditional on the latter's impact on the likelihood of multiple banking relationships, suggesting intuitively that, in regions with a limited diversity of bank ownership types, firms have a lower proclivity for bank diversification across ownership types.

Unsurprisingly, overall regional credit/asset quality negatively impacts the probability of both haphazard and strategic bank diversification choices, but lack sufficient economic significance to explain these choices (Aristei & Gallo, 2017). However, conditional on an increasing tendency to engage in multiple banking relationships, the likelihood of haphazard and strategic diversification choices (specifically, across domestic (local and national) intermediaries) decreases in overall regional credit supply (Aristei & Gallo). Thus, the bank type diversification disincentive emanates from lower severity of financial constraints and, hence, credit availability in firms' regions of operation.

The empirical evidence on the effect of the socio-economy of multiple-banked firms' bank type diversification behaviour is somewhat mixed and inconclusive. While Berger et al. (2008) find an economically negligible impact

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of the urban-rural location of firms on their diversification choices, Aristei and Gallo (2017) document an inverse association between the level of economic development of firms' region of operation and both haphazard and strategic (domestic and foreign bank) diversification, conditional on a similar correlation with relationship multiplicity. This variation in firms' bank-type diversification response to contrasting levels of regional economic development may be explained by firms' differential access to and use of externally vis-à-vis internally generated liquidity (à la the pecking order financing hypothesis of Myers & Majluf, 1984) and, hence, differential levels of demand for external financing in different regions.

Characteristics of Firms' Relationship Banks

Berger et al.'s (2008) ground-breaking investigation into diversification of banking relationships emphasizes the structural-cum-financial characteristics and, most importantly, the ownership type of all banks with which the firm has a banking relationship. Regarding the impact of the former set of covariates, the evidence is somewhat inconsistent. The effect of relationship banks' average size is significantly positive, pointing to multiple-banked firms' higher propensity for bank ownership type diversification if they have relationships with large banks, presumably due to the impersonal arm's-length interactions with large-sized banks. However, the impact of relationship banks' average liquidity (fragility) is generally negative, unsurprisingly suggestive of lower diversification tendencies of firms in relationships with financially healthy banks, but counterintuitively insignificant for multiple-banked firms.

On the bank ownership characteristics effect, Berger et al. (2008) document at least three original (suggestive) findings: (a) regardless of their NBR regime (i.e., single- or multiple banking) and the ownership structure of their relationship bank(s), all sampled Indian firms have a significantly greater likelihood of diversification across bank ownership types; (b) firms with relationships with foreign banks are significantly more likely to diversify across ownership types relative to their counterparts with state-owned and/or private domestic banks, confirming the fragility of foreign bank-firm relationships in host economies; and (c) relationships with private domestic (state-owned) banks increases (decreases) the likelihood to diversify across bank ownership types. These findings are crucial in the sense of the relative contributions of banks with different ownership structures to aggregate credit supply, disaggregated sectoral credit allocations, firm growth and economic development in bank-dependent host countries.

Firm-specific Features

The empirical evidence furnished by Berger et al. (2008) and Aristei and Gallo (2017) also affirm the likelihood of bank ownership type diversification choices as a function of firm-specific characteristics (i.e., financial heath and access, demographics, ownership and management structure, R&D, innovation intensity and internationalisation choices). With regard to firms' financial performance, the evidence is inconclusive, perhaps due to variations in the research environment (developing vs developed economy) and methodological matters relating to sampling and estimation procedures. Per Berger et al., the likelihood of bank ownership type diversification, conditional on maintaining

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multiple banking relations, decreases in firm profitability, attributing profitable firms' disincentive for diversification choices to the pecking order hypothesis whereby profitable firms first resort to internal financing of operations or to the relative ease of bank switching. However, Aristei and Gallo contend that, even without significant multiple banking relationships, the proclivity for both haphazard and strategic diversification (i.e., across ownership types) increases in firm profitability. Strategically, as firm profitability rises, the propensity for diversifying between domestic (i.e., local and national) banks and between domestic and foreign banks significantly rises, perhaps to satisfy their more sophisticated financial services needs arising from more complex operations.

There is also little in the way of agreement on the effects of other firm financial health metrics as the empirical debate on the bank ownership type diversification impact of firm profitability between Berger et al. (2008) and Aristei and Gallo (2017) extends to the diversification effects of firms' capital structure. Whiles, conditional on multiple banking choices, the tendency to diversify across bank ownership types decreases in firm leverage (Berger et al.), due potentially to preoccupation with settling outstanding bank claims, the probability for both haphazard and strategic diversification choices (i.e., among domestic (local and national) intermediaries) increases in firm indebtedness (Aristei & Gallo). However, Aristei and Gallo corroboratively qualify Berger et al.'s finding on the significant indirect capital structure effect on diversification, asserting a negative correlation between the likelihood for diversification choices (between domestic and foreign banks) and short-term debt composition of firms' total indebtedness, regardless of the insignificance of multiple banking choices. Aristei and Gallo further document the irrelevance of the firm liquidity

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effect on both haphazard and strategic diversification choices, a seemingly natural corollary of a significant negative impact of liquidity on the likelihood of the multiple banking financing regime choice (i.e., the precondition for bank ownership type diversification).

The empirical convergence between Berger et al. (2008) and Aristei and Gallo (2017) on the relevance of firms' access to non-bank external finance to explaining their bank ownership type diversification choices (conditional on engaging in multiple banking relationships) is also tampered with controversy over the effect of one specific measure, namely, business group belongingness. Contrary to their theoretical motivations, Berger et al. find robust statistical significance of a positive relationship between well-connectedness (i.e., firms' business group membership) and the likelihood of bank ownership type diversification. On the other hand, and consistent with their a priori conjectures, Aristei and Gallo document a relatively weak statistical significance of a negative correlation between (foreign or national) business group belongingness and the tendency to diversify among domestic intermediaries (i.e., local and national banks). These sharply contrasting results are driven largely by similar diametrically opposite effects of firms' membership of business group on the precondition of bank ownership type diversification choices of firms—the choice of relationship multiplicity—in these papers. However, seemingly in line with Berger et al.'s original a priori expectations, Aristei and Gallo's speculative explanation of their findings, despite its weak explanatory power, is more intuitively appealing.

According to Aristei and Gallo (2017), increased access to intra-group financial resources and liquidity smoothers and/or use of group member(s)

guarantees via belongingness to a business group incentivises firms' creditor concentration choices (i.e., a lower likelihood of reliance on multiple banking relationships) to meet their credit supply needs and, hence are less likely to diversify among domestic intermediaries. Beyond the mixed evidence on the diversification effects of business group membership, an uncontested piece of evidence on the diversification effects of access to non-bank external finance relates to firms' stock exchange listing. Berger et al. (2008) posit that, conditional on a significant positive likelihood of multiple banking choices, listed firms are more likely to diversify across bank ownership types, cashing in on their high-quality status with regard to greater informational transparency (due to exchange disclosure requirements) and better access to public equity financing.

The bottom line of the arguments advanced on the diverse effects of the two measures of access to external non-bank finance on firms' bank diversification choices by ownership type is the relevance or otherwise of firms' dependence on bank financing in explaining their bank ownership type diversification choices. Aristei and Gallo's explicit test of this link churns out the original finding that, premised on a robust significant positive effect on the choice of relationship multiplicity, firms' strong dependence on bank financing replicates this impact on their penchant for haphazard diversification the disaggregation of which reveals an affinity to domestic intermediaries.

Aristei and Gallo (2017) further document the pivotal role of firm investment in research and development (R&D) and innovativeness in driving diversification choices, with contrasting levels of economic significance. R&D investment has a positive impact, albeit weak economic significance, on the

probability of both haphazard and strategic diversification (between domestic banks, local vs national), corresponding to its insignificant correlation with the probability of relationship multiplicity in the extensive margin. However, given an increasing penchant for multiple banking relationships, innovative firms are less (more) likely to engage in haphazard (strategic) diversification across bank ownership types and, strategically, are less (more) likely to diversify among domestic (national) intermediaries, pointing to a thought-provoking foreign bank support for firm innovativeness.

Corroborating Ongena et al.'s (2011) findings on the relevance of decision-making factors (i.e., key decision criteria defining corporate choice of banks for primary relationship formation) to the NBR choice, Aristei and Gallo (2017) extend the role of decision factors to explain bank ownership-type diversification choices of firms. They assert four original findings: (a) emphasis on the convenience of bank location (i.e., preference for proximity) incites the tendency for haphazard diversification choices, most especially across domestic intermediaries, conditional on a reduced likelihood of relationship multiplicity; (b) firms' preference for flexible banking procedures significantly increases the likelihood of ownership type diversification among domestic intermediaries, despite its irrelevance to the probability of relationship multiplicity in the extensive margin; (c) the impact of firms' consideration of the competitiveness and affordability of banking services is economically negligible in explaining diversification behaviour, despite its significant positive effect on the penchant for relationship multiplicity in the extensive margin; and, (d) conditional on engaging in multiple banking relationships, firms considering the scope of banks' international networks are less likely to diversify among domestic

intermediaries, presumably to facilitate their foreign trade activities via foreign banks' networks.

The empirical literature also furnishes evidence of bank ownership type diversification effects of firm demographics (i.e., size and age). Conditional on a statistically robust positive effect on the proclivity for relationship multiplicity, firm size has a similar secondary impact on the likelihood for bank ownership type diversification (Aristei & Gallo, 2017; Berger et al., 2008). Aristei and Gallo add that, beyond haphazard diversification, the probability of diversification among domestic (i.e., local vis-à-vis national) intermediaries and between domestic and foreign national banks significantly increases in firm size. The requirement of different specialised financial services from different types of financial institutions as operational complexity increases explains this positive firm size effect (Berger et al.). Beyond this concurrence, however, Berger et al., and Aristei and Gallo post diametrically contrasting evidence on firm age effects on diversification behaviour in both the intensive and extensive (i.e., second stage) margins of their estimation procedures. While Berger et al. assert the economic irrelevance of firm age to both the NBR regime and diversification choices, Aristei and Gallo argue that, given relationship multiplicity, firm age decreases (increases) the likelihood of diversification between local and national (domestic and foreign) banks, suggesting the predominant use of national banks over time.

Furthermore, both Berger et al. (2008) and Aristei and Gallo (2017) attribute economic relevance to the deterministic relationship between firms' ownership and management structure and bank diversification behaviour, given relationship multiplicity. They, however, present contrasting evidence on the

ownership structure effect. According to Berger et al. (Aristei and Gallo), the penchant for bank diversification, given significant relationship multiplicity (exclusivity), increases (decreases) for foreign firms relative to domestic firms. Berger et al. rationalise foreign firms' greater proclivity for bank ownership type diversification by appealing to their operational complexity and resultant greater, more sophisticated and geographically diverse corporate credit and service requirements. Aristei and Gallo's evidence of a generally negative foreign ownership effect, however, points to foreign firms' weaker ties with the local banking market, especially if foreign subsidiaries lack financial autonomy in bank relationship structure choices in host nations. An unsurprising, but exceptional, piece of evidence relates to foreign firms' greater propensity to diversify between domestic and foreign banks (Aristei & Gallo), presumably with the view to maximising the benefits of heterogeneous financial services from banks with different ownership structures, as argued by Berger et al. (2008).

In addition, multiple-banked state-owned non-financial firms (relative to privately-owned firms) have a greater tendency to diversify across bank ownership types (Berger et al., 2008) because of their large size, dense geographical footprints and better access to bank finance via explicit/implicit government guarantees. Perhaps connected to the economic irrelevance of firms' ownership concentration effect, family-managed firms have lower, but unsurprisingly weakly significant, probability of diversifying among nation-wide (i.e., foreign and domestic) banks (Aristei & Gallo, 2017). It is a logical conclusion then that firms with decentralised management structures (i.e., enjoy decision-making autonomy in some business areas) are less (more) likely to

strategically diversify among domestic (nation-wide) intermediaries (Aristei & Gallo, 2017).

Finally, foreign trade participation increases firms' proclivity for diversification between domestic and foreign banks (Aristei & Gallo, 2017), pointing to internationally active firms' increasing use of multimarket foreign intermediaries. Internationalised firms' preference for foreign banks is, thus, aimed at fulfilling all their increasingly specialised and complex financial, banking and investment needs crucial to accessing foreign markets and facilitating their international commercial activities.

The concurrence of increasingly competitive banking markets, complex mix of all the major different bank nationality and ownership types, firm heterogeneity and financial market imperfections prevalent in developing countries provide reasonable motivations for African firms to make, and also differ in, bank nationality/ownership type diversification choices, conditional on engaging in relationship multiplicity. However, this is a virgin area of research in Africa, blessed with a comparative advantage in agriculture and experiencing a meteoric rise in interest in agro-industrialisation.

Empirical Discourse on Firms' Bank Type Choices

Firm-bank relationship formations constitute a defining characteristic of financial markets. Given the heterogeneity of institutions at both the demand- and supply-side of banking markets (i.e., firms and banks respectively), firm-bank relationships are inevitably characterised by an intricate matching or pairing of firms and banks according to a wide array of firm-specific and bank-specific characteristics. Yet, a fundamental implication of a major strand of the

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reviewed theoretical frameworks is the optimality of relationship exclusivity and maintenance of a special primary banking relationship for multiple-banked firms. Whiles theory motivate a deliberate corporate selection of a primary bank, it is, however, arguably explicitly clueless on key bank structural-cum-performance characteristics that should practically aid this strategic choice by firms with certain characteristics.

Contemporaneous theories (Cantillo & Wright, 2000; Detragiache et al., 2000) suggest that maintaining a primary relationship with a healthy, informed relationship bank is the optimal strategy for insuring firms against premature withdrawals of financial services from financially fragile banks, potential liquidity shocks, project discontinuance, and, ultimately, the risk of financial distress. Yet, the choice of a financial intermediary with a certain health status for a primary relationship does not preclude the simultaneous characterization of the deliberately selected primary bank on the basis of other defining, more stable structural characteristics (e.g., size, ownership and nationality, etc.) that complementarily determine its attractiveness to firms with certain characteristics.

The extant empirical firms' bank type choice literature (even on predominantly manufacturing firms in the developed world) is in an embryonic stage. Given the increasing topicality of firms' primary banking choices (see, e.g., Ford & Lee, 2018; Ghosh, 2016; Schwert, 2018), and the absence, to the best of my knowledge, of empirical studies investigating the occurrence and nature of firm-bank matching in African banking markets, there is a need for a study of the matching of a wide array of agro-industrial firm-specific characteristics and their primary banks' characteristics (health, size, nationality

and ownership). The extant literature examining firm-bank relationships from firms' perspective (e.g., Aristei & Gallo, 2017; Berger et al., 2008; Ghosh, 2016; Ongena & Şendeniz-Yüncü, 2011) concur that internal firm-specific characteristics are pre-eminent in determining firms' bank type choices, albeit environmental factors play complementary roles. The following section details a thematic review of the empirical literature on the determinants of firms' bank type choices, starting with the external factors.

Environmental Considerations

Bank branching preferences, the availability to firms of banks with certain organisational structures and performance characteristics (e.g., size, nationality, ownership, profitability, etc.), banking services supply and, hence, firms' choice of bank types respond to the local geographic, socio-economic and business environment as well as the local banking market competitive structure. In sync with this postulate, a few studies (see, e.g., Aristei & Gallo, 2017; Berger et al., 2008) focus on bank type choice responses to the differences in the composition, structure and competitiveness of the banking systems, and overall credit supply in firms' region of operation. With respect to the composition of the banking system, the existing evidence is consensual on the significant effects of the regional presence of banks with various dimensions and ownership/nationality types on firms' bank type choices. This evidence is, however, mixed on the effects of alterations to the structural characteristics of the composition of the regional banking system.

Consistent with Berger et al. (2008), according to whom the propensity of courting private and foreign banks increases with the presence of a foreign

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bank in the locational region of firms' headquarters, Aristei and Gallo (2017) find a decreasing probability of a national bank choice by firms with the increase in foreign bank branches in firms' regions of operation. Granted that increasing the density of foreign bank branch network is accompanied by a simultaneous alteration in the local banking system configuration in favour of private banks (but against domestic banks) this evidence is intuitive. However, large (local) bank branch network expansion in firms' region of operation increases (reduces) their affinity towards national banks, but decreases (increases) their proclivity for local banks (Aristei & Gallo), generally signalling a predominant choice of domestic banks. Generally, similar bank type preferences are revealed by firms in response to variations in firms' credit market structure and competitiveness (measured by regional branch density) to the disadvantage of national and foreign banks. Specifically, intensification of local banking market competition and, consistent with predictions of the structure-conduct-performance paradigm, an increase in overall regional credit supply raise the probability of firms coupling with local banks (Aristei & Gallo), pointing to the overpowering effect of local banks' home advantage and market aggression over foreign banks' global advantage as competition hots up.

Some empirical works have also demonstrated how local geographic and socio-economic circumstances influence firms' choice of bank types. Despite their unreported estimated impacts of controls for firms' four main geographical (cardinal) locations, Berger et al. (2008) furnish the evidence that geographical affiliations, that is, rural-based (urban-based) firms have a higher (lower) likelihood of securing a relationship with state-owned (privately-owned) banks. This ground-breaking evidence points to the impact of the

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disparity in the availability of banks with different ownership structures to firms with different rural-urban locations on firms' bank type choices. Further empirical evidence also suggests the existence of systematic differences in primary bank type choices of firms with contrasting regional locations, the contrasting feature being the region of the national capital city (Ongena & Şendeniz-Yüncü, 2011). Ongena and Şendeniz-Yüncü report of an increasing likelihood of firms located in the region of the national capital city to associate with large-domestic-private and foreign banks, presumably due to the greater concentration of such banks in such regions. This suggests that firms in other regional locations deal more with small domestic (including state) banks due to such banks' special mandates to serve firms in these relatively under-developed regions and, therefore, less with foreign banks because of their sharp urban focus.

Firms' Financials and Bank Dependence

As in the preceding discourses that underscore the significance of firms' financial metrics in defining firm-bank relationship types, the extant literature assesses the role of firms' financial performance in their bank ownership and nationality type choices. Solitarily, Berger et al. (2008) assert a decreasing likelihood of highly leveraged firms establishing relationships with private and foreign banks, probably reflecting such firms' reluctance to court banks with rigorous risk management techniques, greater screening ability and monitoring intensity. Besides, there is concordant evidence of proof of the corollary of the above finding: the probability of a domestic intermediary choice, particularly of state-owned, national and local banks, increases in firms' leverage and low

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profitability (Aristei & Gallo, 2017; Berger et al., 2008; Ghosh, 2016). Such bank type choices by low-quality (i.e., risky and poorly performing) firms are unsurprising as such banks are noted for their relatively inefficient risk management techniques, weaker screening and monitoring efficiency, and politically-motivated, as opposed to performance-driven, relaxation of the budget constraint with their deeper involvement in local/domestic economic development (Berger et al., 2008; Berger et al., 2014). The key developmental roles of domestic intermediaries, relative to their foreign counterparts, make them the optimal choice for more bank-dependent firms (Aristei & Gallo, 2017), which are mainly opaque SMEs (Berger et al., 2008).

Nevertheless, given the noted under-performance of domestic banks (see, e.g., Berger et al., 2008), the crux of these evidence suggests an empirically testable hypothesis of low-quality firms coupling low-quality banks. Drifting from the predictions of this hypothesis and that of the soft-budget constraint hypothesis, however, Aristei and Gallo (2017) show, albeit counterintuitively, that firm profitability has the greatest impact on the probability of maintaining a national bank relationship, despite exerting a positive and significant effect on the choice of all bank ownership types. This mixed evidence on the role of firm performance in bank type choices and the absence of empirical evidence on the aforementioned low-quality firm-bank hypothesis motivate an investigation to unravel the existence or otherwise of a systematic pairing of well-performing firms with well-performing banks.

Firms' Demographic Characteristics

The predominant view in the empirical literature emphasizes the relevance of the role of firm demographics to firm-bank relationship formation and, particularly, to the determination of firms' bank type choices. Blazing the empirical trail on this research genre, Berger et al. (2008) demonstrate the effect of firm age on bank ownership type choices, finding that state-owned (private) banks are significantly less (more) likely to provide banking services to young firms. The suggestion of a potential mission drift for state-owned/quasi-state-owned banks coupling with old firms, to the detriment of young opaque firms, has received empirical endorsements from Aristei and Gallo (2017) and Ongena and Şendeniz-Yüncü (2011). In this light, Aristei and Gallo assert an increasing tendency for older (younger) enterprises to maintain relationships with larger national or foreign (local) financial intermediaries. Harmoniously, Ongena and Şendeniz-Yüncü report robust findings of a unique correspondence of firm age to a higher likelihood of formation of relationships with large-domestic-private banks. This implies the existence of a systematic difference in bank type choices of firms with contrasting age cohorts – specifically, while old firms court large-domestic-private banks, young firms are generally inclined towards private banks, regardless of the latter's size-nationality-orientation mix. Despite the patterned old firm-large bank coupling reflecting an emphasis on "hard information" in transactional firm-bank relations and young firms' patternless association with banks reflecting the complex mix of bank characteristics in relationship banking, the common motive underlying these differentiated firm-bank couplings on the basis of firm age relates to the deliberate avoidance of

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banks suffering some form of fragility (i.e., illiquidity, insolvency or poor asset quality) à la Detragiache et al. (2000).

There is also consistent and robust evidence of a positive relationship between firm size and the likelihood of maintaining relationships with foreign, state, generally domestic and private banks (Aristei & Gallo, 2017; Berger et al., 2008). Besides indicating the proclivity of such banks to provide (withdraw) critical banking services to (from) more transparent (opaque) firms, pointing to a potential mission drift for state-owned banks, this evidence points to the need for firms with increasing organisational complexity to maintain primary relationships with larger banks. Ongena and Şendeniz-Yüncü (2011) test this firm-bank sorting and suggest a similar systematic difference in bank type choices by firms with contrasting size classes, albeit with converse results. Small Turkish firms generally place a premium on bank size, ownership and, especially, nationality (i.e., domestic banks), revealing a specific preference for large-domestic-private and state banks; contrastingly, large firms sort with foreign banks and, counterintuitively, with small-domestic-private banks, thus emphasizing bank ownership and showing a dominant preference for private banks. Generally, this evidence incentivises maintaining a primary relationship with larger and highly liquid or performing banks that can effectively satisfy growing firms' increasingly complex financing needs.

Firms' Transparency and Financial Access

Even though firms' demographics, particularly firm age and size, are conventional proxies for firm transparency or opacity, Ongena and Şendeniz-Yüncü (2011) directly investigate the role of information asymmetry in bank

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type choices. They assert the robust existence of systematic differences in the primary bank type choice of firms with contrasting degrees of informational asymmetry (i.e., transparency versus opaqueness), measured by the timeliness of firms' provision/disclosure of information. Whiles opaque firms have a unique correspondence with the engagement of large-domestic-private banks, transparent firms deal with all other bank types. The reasonableness of this result resides in the notion that mitigating constraints to financial access requires credit-constrained opaque firms to make strategic choices of large and more liquid banks, and transparent firms, wielding quality-signalling structures and instruments, are unhindered in their banking relationship formations.

Yet, the inconsistency of this result with those on the firm age and size effects throws the appropriateness of the use of these demographic features as proxies of information asymmetry into a quandary. That notwithstanding, Berger et al. (2008) coherently provide evidence that listed enterprises, enjoying access to public equity financing, have a higher likelihood of maintaining relationships with banks with myriad nationality and ownership features (specifically, foreign, state/quasi-state and private banks) due to greater firm transparency stemming from strict exchange disclosure standards. Still related to the impact of access to external non-bank financing, Aristei and Gallo (2017) corroborate Berger et al.'s evidence that business group belongingness (i.e., well-connectedness), enabling access to intra-group financing and membership guarantees, has a higher likelihood of securing relationships with non-local (e.g., foreign and state-owned) intermediaries. This sharply controverts Ghosh's (2016) finding that group-affiliated firms are more likely to maintain primary state-owned banking relationships.

Firms' Ownership and Management Type

Complementary mechanisms that determine access to external non-bank finance, need for bank finance and, hence, bank type choices (due to corporate governance structures and practices, availability of cheaper financing sources and implicit/indirect guarantees) are firm ownership (i.e., private vs state-owned) and nationality (i.e., foreign vs domestic). In this respect, there is concurrent evidence (see, e.g., Aristei & Gallo, 2017; Berger et al., 2008; Ghosh, 2016) that foreign-owned enterprises have a greater (lower) proclivity than domestic firms to engage foreign (local/national) intermediaries, especially their home country banks, ostensibly to ensure liquidity for their varied activities, consistent with Berger et al. (2003) and Giannetti and Ongena (2012). Coherently, government-owned enterprises have a significantly higher (lower) tendency to establish relationships with state-owned (foreign and private) banks (Berger et al., 2008), even though current evidence posits that state-owned banks are in primary relationships with both state-owned and foreign firms (Ghosh, 2016). This furnishes mixed evidence on whether state-owned banks provide banking services to privately-owned firm types which constitute the focal clientele of their core incorporation mandate (i.e., the mission drift thesis).

Aristei and Gallo (2017) also demonstrate the effects of governance and management structures on firms' bank ownership type choices. They report that family-managed firms under an insignificant controlling family's influence have a higher likelihood of establishing primary relationships with foreign intermediaries. Presumably, such a firm-bank matching arises because these firms' organisational and governance structures and relatively less centralised management systems make them more attractive to foreign banks noted for their

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affinity for transparent firms (Berger et al., 2008). This tentative conclusion is in harmony with Aristei and Gallo's evidence from an explicit test of the impact of decentralised management: companies adopting a decentralised management structure are significantly less (more) likely to court local (foreign) banks. Finally, they assert a positive correlation between ownership concentration and the likelihood of courting local intermediaries, signalling a potential switch to national (including foreign) banks with an increase in ownership concentration due, possibly, to the need to satisfy their growing liquidity needs, inter alia. The predominant thinking in this discourse, therefore, points to the conclusion that high-quality firms (signalled by their management structures) tend towards foreign intermediaries, usually large, healthier (e.g., more liquid) and private in nature.

Firms' Banking Relationship Regime

An interesting strand of the sparse empirical literature on firms' bank type choice also suggests the existence of a significant difference in the choice of a (primary) bank by firms with contrasting NBR regimes (i.e., between multiple-banked and single-banked firms). Solitary proponents of the notion that firms' primary bank type choices respond to the number of their banking relationships, Ongena and Şendeniz-Yüncü (2011) find robust evidence that Turkish firms' number of banking relationships corresponds uniquely to a lower likelihood of forming relationships with large-domestic-private banks; thus, while, as a deliberate corporate financial strategy, single-banked firms engage such banks, their multiple-banked counterparts, with a sharply contrasting strategy, understandably team up with all bank types (i.e., a complex

combination of size, religious/secular orientation, nationality and ownership), but particularly with small-domestic-private, state and foreign banks.

Decision Influencers

Inspired by Ongena et al.'s (2011) exploratory study that revealed the criticality of decision-making criteria, inter alia, in firm-bank relationships, Aristei and Gallo (2017) tender first evidence on the significant relevance of such factors in shaping firm-bank relationship types, including firms' choice of their bank types. Specifically, enterprises emphasising the importance of bank location and the implementation of flexible procedures have a greater likelihood of establishing relationships with local intermediaries, with the former class of firms further revealing a significant tendency to disassociate from national banks. In sharp contrast, attribution of importance to the availability of banks' international networks increases (decreases) the probability of association with national (local) banks as the revealed preference for national banks increases in the quest for more liquid, large and well-diversified banks with the capacity to meet complex financial services needs arising from engagement in international business. On the whole, these pieces of fresh evidence suggest a dominant preference for domestic banks by firms emphasising the afore-mentioned key decision criteria in their main bank type choices and this choice may be rationalised by domestic banks' home-advantage hypothesis. With better knowledge of and stronger roots in the local/domestic economic system and banking market milieu, domestic banks are more adept in addressing informational frictions in firm-bank relations, especially with small firms.

Innovation, R&D and Internationalisation

According to the secrecy theory of firm-bank relationships, R&D-intensive and innovative firms would reveal a preference for exclusivity in banking relationships to avoid ultimate leakage of valuable proprietary information to product market competitors via multiple banks in loan-origination disclosures (Bhattacharya & Chiesa, 1995; von Rheinbaben & Ruckes, 2004; Yosha, 1995). However, the structural characteristics of the financial intermediary for this theory-motivated exclusive relationship are rarely investigated and less clear. Aristei and Gallo (2017) furnish premier evidence that R&D investment and firm innovativeness increase the proclivity for the choice of national banks and, confirming Ayyagari, Demirguç-Kunt and Maksimovic's (2012) proposition, foreign banks are the preferred choice of innovative firms, thus, motivating an in-depth empirical enquiry into the rationale underlying the matching of innovative firms and foreign banks. However, Aristei and Gallo (2017) furnish fresh unequivocal evidence that enterprises with contrasting market orientations exhibit different bank type preferences. Per this finding, the probability of engaging local (national/foreign) banks significantly decreases (increases) for internationalised firms. This is consistent with Ongena and Şendeniz-Yüncü's (2011) conjectures and Aristei and Gallo's finding on bank ownership type choice of firms for whom banks' availability of international networks is a key decision criterion.

Industry Diversification and Affiliation

The sparse empirical literature on this research genre suggest the existence of a robust systematic difference in bank type choices by firms with

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contrasting degrees of industrial diversification, measured as the number of industries a firm operates in (Ongena & Şendeniz-Yüncü, 2011). Ongena and Şendeniz-Yüncü assert an increasing likelihood for industry-diversified Turkish firms to be associated with state or foreign banks, while single-industry or industry-concentrated firms reveal a preference for domestic firms. This differentiated bank type choices on the basis of firms' placement on the diversified-concentrated industry continuum may be driven by a differential need for firm liquidity for financing different scopes of industrial activity, justifying the primacy of and the motivation for the formation of a primary relationship with a more liquid bank with other complementary structural characteristics.

Excepting Ongena and Şendeniz-Yüncü, the extant empirical literature on firms' bank type choices also exhibit either an exclusive focus on the manufacturing sub-sector of industry (see, e.g., Aristei & Gallo, 2017) or a predominant focus on the manufacturing and services sectors (see, e.g., Berger et al., 2008), including only sectoral controls for industry-level heterogeneities in banking choices in empirical models and failing to report impacts of firms' industry affiliation on their bank type choices. These unreported estimated impacts of sectoral controls not only fly in the face of evidence of joint significance of industry effects on firms' bank type choices (see, e.g., Aristei & Gallo), but also disable examination and explanation of differences in bank type choices of firms belonging to different industrial sectors.

Despite their empirical findings of a generally weak correspondence between Turkish firms' industry affiliation and their bank type choices, Ongena and Şendeniz-Yüncü (2011) document discernible patterns in the bank type

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choices of firms belonging to specific industrial sectors. They report robust evidence of an increasing (decreasing) likelihood of firms in the service industry to associate with privately-owned, large and domestic (state-owned) banks; more specifically, firms in the transportation sub-sector of the services industry disassociate with small-domestic-private and state banks, presumably due to their preference for large urban-based foreign banks. In sharp contrast, there is an increasing tendency for firms in the (wholesale and retail) trade industry to associate (dissociate) with small-domestic-private (foreign) banks due perhaps to domestic banks' dense geographical footprints which are intended to meet the diverse banking needs of such geographically diversified firms.

Similarly, while firms in the mining sub-sector of the manufacturing industry sort on foreign banks (perhaps due to the predominance of foreign ownership of such mining firms), those in the general manufacturing family exhibit an increasing affinity for small-domestic-private banks. Juxtaposing the latter evidence on the bank type choices of the generality of manufacturing firms against the additional finding of a lack of discernible patterns in agricultural firms' (those in production agriculture, forestry and fishing) bank type choices by Ongena and Şendeniz-Yüncü (2011), the most intuitive conclusion that emerges is that agro-based industrial firms' bank type choices remain an empirical puzzle. The predominance of agro-industrial firms in the industry structure of developing countries, especially those in SSA, their constrained access to bank financing due to banks' disinclination to agro-related productive activity, the general lack of evidence on their bank type preferences and the policy implications thereof motivate an empirical enquiry. Hence, the need to empirically ascertain the systematic matching of the characteristics of agro-

based industrial firms and their primary bank types (defined by a combination of their performance-cum-structural characteristics).

Empirical Discourse on Credit Relationship Intensity

To the best of my knowledge, except the ground-breaking study of Bartz (2016), there is a sparsity of empirical research into the determinants of credit relationship intensity. Since the credit concentration model takes into account the possibility of borrowing from a number of different banks one of which is a primary bank with a greater financing share, a novelty of this section of the study (which is a major point of departure from Bartz) is its recourse to the credit concentration model as the theoretical fulcrum to explain credit relationship intensity. This calls for a brief review of the empirical literature on credit concentration which synonymises as credit relationship intensity and, therefore, may be used interchangeably. Despite the availability of credible theoretical predictions of credit concentration in developing countries (see, e.g., Bris & Welch, 2005; Detragiache et al., 2000; Volpin, 2001), developed country contexts dominate the somewhat sparse research space for empirical investigation into the determinants of firms' degree of creditor concentration without regard for firms' sectoral or industry affiliation. It is in the light of this neglect for the potential differential effects of varied sector/industrial affiliations on credit concentration or intensity that Bartz's (2016) premier evidence on Kosovo is commendable.

Bartz (2016) posits that agricultural businesses maintain more intensive bank-borrower relationships relative to their non-agricultural peers in order to ease financial access in a study of the nexus between borrower opacity and

credit relationship intensity. This suggests agro-allied firms' relative proclivity for exclusive or concentrated banking relationships. However, lumping the generality of businesses in the agricultural industry into the reference category of business sector disallows identification of the kinds of agro-allied firms with greater credit relationship intensity. That notwithstanding, drawing inspiration from Bartz (2016) and Bard, Craig and Boehlje (2002), who also suggest agricultural firms' preference for intensive and durable banking relationships, this study is a marked departure from the prevalent industrial research environments and documents the first evidence on the determinants of credit relationship intensity in a developing SSA context.

The next sub-section gives a brief thematic review of the extant empirical discourse on the determinants of creditor concentration. Considering the arguably valid assumption that the degree of creditor concentration is a corporate financial strategic decision, it is unsurprising that firm-specific characteristics (i.e., demand-side factors) exert a crucial influence. Yet, the relevance of supply-side determinants such as environmental factors (i.e., the macroeconomy and banking market-specific characteristics) and bank-specific characteristics to credit concentration have also been cited. The forthcoming review, however, is bereft of the discourse on the evidence of the diverse effects of the legal and institutional environment and loan-related characteristics on credit concentration for the same reason as proffered elsewhere.

Environmental Factors

There is empirical evidence that emphasize the relevance of supply-side determinants of asymmetric multiple bank financing (i.e., credit concentration),

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positing that macroeconomic developments and region-specific banking market characteristics explain the concentration of corporate borrowing. For example, Ongena et al. (2012) conduct a dynamic investigation of the degree of German firms' debt concentration and assert the importance of macroeconomic conditions (business cycle volatility, inflation rate, stock market returns and annual real interest rate) in explaining corporate borrowing decisions. They also document that operating in regional banking markets where a firm's main relationship bank exerts market power (i.e., regional lender concentration) has a robust positive impact on firms' borrowing concentration. This finding suggests that the increased availability of banking options to firms located and operating in regions characterised by fiercer banking market competition incentivises a more evenly spread of borrowing across multiple lenders.

Bank-specific Determinants

Inspired by the extant theory (e.g., Carletti et al., 2007; Detragiache et al., 2000; Holmstrom & Tirole, 1997; Minetti, 2006), Ongena et al. (2012) extend Guiso and Minetti's (2010) ground-breaking investigation to document original evidence that firms' main banks' characteristics and qualities directly impact creditor concentration and also play an important role in the intensive margin. Their results, reinforcing the relevance of supply-side determinants of borrowing concentration, however, is a mixed bag. The positive correlation between the degree of concentration and relationship lender's profitability, confirming the Detragiache et al.'s model implication of bank liquidity challenges, suggests intuitively that firms' borrowing from their lead/main lenders increases in the latter's profitability. In sharp contradiction to the model

predictions of Holmstrom and Tirole (1997) and Guiso and Minetti (2010) who assert the insignificance of both regional and bank-specific proxies for monitoring costs, Ongena et al. obtain evidence of a negative relationship between relationship banks' monitoring costs efficiency and borrowing concentration, close in spirit to Carletti et al.'s model implications.

In addition, firms' response to bank capital adequacy, capable of driving firms' bank relationship structure due to banks' responsorial lending behaviour, is robustly significant, albeit with an inconsistency on the direction of causality with alternative concentration measures (Ongena et al., 2012). This throws the validity of the model implications of Carletti et al. (2007) and Minetti (2006) into a quandary. Furthermore, there are significant differences in the degree of borrowing concentration by firms with primary relationships with banks with different ownership structures as evidenced by an increase (decrease) in credit concentration when firms' main lender is a bank with special functions (state ownership) rather than a commercial bank. However, relationship banks' demographics (i.e., size) and fragility (i.e., asset quality) measures are consistently irrelevant in explaining concentrated borrowing (Ongena et al., 2012).

Firm-specific Attributes

Consistent with unanimous predictions of the theory underpinning asymmetric multiple-bank financing (see, e.g., Elsas et al., 2004; Guiso & Minetti, 2004, 2010; Minetti, 2006), firm-specific characteristics emerge as key demand-side determinants in empirical investigations of creditor concentration. In respect of the credit concentration effects of firm-level financials, the lack of

clarity on the effect of firm quality (defined in terms of profitability and default probabilities) on borrowing concentration in the empirical literature reflects the competing predictions in the theoretical literature. Guiso and Minetti (2010) find that firm quality (proxied as firm profitability and default probabilities) is consistently insignificant in explaining borrowing differentiation, consistent with their reorganisation incentives model predictions of firm quality irrelevance. In contrast, Godlewski and Ziane (2010) and Ongena et al. (2012) concur on the significant negative effect of firm quality (defined respectively in terms of firms' profitability and default probabilities), the former documenting significant differences in borrowing differentiation between high- and low-profit firms in support of the Bris and Welch (2005) and Bannier (2007) model implications. In robustness checks, Ongena et al. obtain evidence of a positive corporate profitability effect on borrowing concentration, consistent with implications of the Bolton and Scharfstein (1996) model and highlights the imperfection of profitability as a proxy for expected cash flows and firm quality.

The extant empirical evidence on the relevance of firms' capital structure as one of the key determinants of creditor concentration is, however, consensual. Godlewski and Ziane (2010) and Ongena et al. (2012) find a robust inverse correlation between financial leverage and borrowing concentration. In particular, high- and low-leveraged firms vary significantly in borrowing differentiation with the former (latter) being financed by a more diffused (concentrated) debt structure (Godlewski & Ziane). Intuitively, more leveraged or highly indebted or bank-dependent firms spread their borrowing more evenly across multiple lenders, pointing to the notion that, given an increased demand for more bank relationships, credit-risky firms increase borrowing dispersion.

Godlewski and Ziane further find an intuitively significant negative correlation between firm liquidity and lender concentration, again identifying a significant difference in creditor concentration between firms with contrasting levels of liquidity. Given the sufficiency of firms' capital structure and liquidity as proxies for firm quality, these results are in sync with theoretical arguments advanced in the conflict-signalling-agency model by Bris and Welch (2005) with regard to the optimality of credit concentration as a more credible signal of borrower quality.

The empirical evidence on the effects of various proxies for the degree of firms' overall informational transparency/opacity (particularly for measures of firm demographics—firm age and size) and the inherent credit risk on borrowing concentration are generally non-consensual. On firm age, for instance, Godlewski and Ziane (2010) and Guiso and Minetti (2010) disagree both on its economic significance and correlation with creditor concentration: the former (latter) paper finds a negative (positive) and significant (irrelevant) firm age effect. Godlewski and Ziane further demonstrate the existence of significant differences in creditor concentration between firms with contrasting ages, suggesting an extension of the relevance of the life-cycle or emancipation hypothesis in explaining the number of firms' banking relationships to creditor concentration due to their inverse correlation.

Consistent with ambiguous a priori effects on borrowing concentration (see, e.g., Elsas et al., 2004; Guiso & Minetti, 2004; Holmstrom & Tirole, 1997), firm size differences, also defining differences in the degree of informational opacity and borrowing behaviour, have a mixed and inconclusive empirical evidence, perhaps due to differences in operationalisation. Whiles Guiso and

Minetti (2010) (Godlewski and Ziane (2010)) assert a positive (negative) and significant firm size effect, pointing to significant differences in lender concentration between small and large firms, regardless of the direction of causality and the underpinning theory (i.e., life-cycle versus quality-signalling), Ongena et al. (2012) document the economic irrelevance of firm size in explaining creditor concentration. The generally mixed evidence on the direction of causality of the concentration effect of firm demographics (i.e., firm size and age), as proxies for informational transparency, is robust to alternative definitions of firms' informational transparency employed by Guiso and Minetti (2010) and Godlewski and Ziane (2010) who, however, concur on the economic significance of their respective measures. These generally inconsistent results for the creditor concentration impact of firms' informational opaqueness reflect the competition for validity of the conflicting theoretical predictions of the holdup, monitoring and reorganizational incentives literature.

This lack of unison extends to the evidence on the effect of asset value, albeit measured uniformly, on borrowing differentiation whereby, even after controlling for firm size differently, the positive correlation à la Guiso and Minetti (2010) is contested by Ongena et al.'s (2012) finding of asset value irrelevance. Beyond asset value, diverse proxies for asset liquidity (e.g., firm-industry sales co-movement, rural location, and asset intangibility), capturing asset liquidation value (i.e., value of firms' assets on resale or redeployment), have a consistently robust negative impact on creditor concentration (Guiso & Minetti, 2010). Whiles the conflicting findings on the asset value effect throw the validity of the predictions of Minetti (2006) and Guiso and Minetti's (2004) creditor reorganisation incentive theory into a limbo, the uncontested evidence

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for the asset liquidity effect supports the implications of a strand of the monitoring literature (e.g., Holmstrom & Tirole, 1997; Sufi, 2007).

Guiso and Minetti (2010) find that asset heterogeneity (i.e., variation in asset liquidation values that define the ease of asset redeployability) has a positive impact on borrowing concentration. Corroboratively, Ongena et al. (2012) furnish evidence of an inverse relationship between firm asset specificity /redeployability and creditor concentration, contrary to Elsas et al. (2004), but consistent with Bolton and Scharfstein (1996) and Guiso and Minetti's (2004) model predictions and implications. Generally, these results are in sync with the predictions of the reorganisation incentive theory of Minetti (2006) and Guiso and Minetti (2004) that postulates that prevention of asset-seizing misbehaviour of the informationally privileged main lender in the face of project discontinuance by less informed arm's-length multiple lenders confers optimality to higher asymmetry in financing/borrowing shares (i.e., increased credit concentration) by firms with more homogeneous assets.

Similarly, firms' diverse ownership structures capture differences in the quality of corporate governance practices and, hence, reflect the degree of informational opaqueness hypothesised to impact ambiguously on the degree of concentration (see, e.g., Elsas et al., 2004; Guiso & Minetti, 2004, 2010; Holmstrom & Tirole, 1997). In this regard, evidence on the ownership structure and corporate governance effects on borrowing concentration are consistently in favour of a negative correlation, in support of Holmstrom and Tirole (1997) and Guiso and Minetti (2004) model predictions, but with contrasting levels of significance. Ongena et al. (2012) corroborate Guiso and Minetti's (2010) finding of the irrelevance of the effect of ownership concentration (one of the

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proxies for banks' restructuring costs) by documenting evidence of a lack of systematic differences in borrowing concentration between firms of different ownership structures (proxied by legal form).

However, corporate governance surrogates of firms' ownership structure (i.e., managerial independence from shareholders and the number of shareholders) significantly explain lender concentration in Godlewski and Ziane (2010). They assert that not only are more independent and diffusely-owned firms financed by a diffused lending or debt structure, but there are also significant differences in debt concentration between firms with contrasting degrees of independence and ownership concentration. These results validate the implications of Volpin (2001, 2007) and Mahrt-Smith's (2005) models in which the design of ownership structure generates a trade-off between managerial discipline and discretion via the degree of aggregate monitoring intensity inherent in the nature of the debt structure (dispersion/concentration), specifically positing a direct correspondence between a concentrated debt structure and ownership concentration.

However, other measures of banks' restructuring costs (e.g., average duration of firm-bank credit relationships) are consistently inversely related to borrowing differentiation (Guiso & Minetti, 2010), in line with the predictions of the firm reorganizational incentive theory of Minetti (2006) and Guiso and Minetti (2004). This finding confirms their postulate that higher restructuring costs disincentivise borrowing concentration to discipline banks because the latter are discouraged from inefficient project continuation for eventual asset seizure. However, despite the theoretical role attributed to firms' innovativeness in shaping firm-bank credit relationship structure in the secrecy and innovation

literature (Bhattacharya & Chiesa, 1995; von Rheinbaben & Ruckes, 2004; Yosha, 1995), Guiso and Minetti (2010) document the empirical irrelevance of innovativeness to explaining borrowing differentiation.

Chapter Summary

This chapter detailed a contextual evolution of the global-game theoretic thoughts on firms' formation of strategic banking relationship and/or financing structure choices with varied model ingredients and lenses. A grand lesson discernible from the foregoing theoretical tour-de-force is that the structure of firms' banking relationship, particularly the NBR, is a corporate financial strategic decision underpinned by wide-ranging determinants including such macros as the financial system development, banking market structure and conduct, the external regulatory and socio-economic environment. Micro-determinants of firms' strategic banking choices include observable main bank-specific (i.e., operational, financial and demographic) characteristics, loan-specific characteristics, inter alia. However, two common strands of thought cutting across the varied theoretical landscape are the predominant effects of observable microeconomic firm-specific characteristics and motivations for sector-specific analysis of the structure of firms' banking relationships, especially in developing country milieus. Due to the wide applicability of their inherent predictions and implications, these theoretical frameworks are foundational to the analyses of the generality of firm-bank relationships. The emergence of this broad class of determinants of firms' strategic banking relationship choices from the lively theoretical debate has, therefore, inspired correspondingly wide empirical applications as evidenced by the chapter's

second section on empirical literature review. Overall, this chapter, therefore, contextualises and justifies the adoption and possible adaptations and extensions of some of these determining factors of firm-bank relationships in this study.

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CHAPTER THREE

RESEARCH METHODS

Introduction

This study generally explores how the characteristics of agroindustrial firms determine four key aspects of their banking relationships (as deliberate corporate strategies to boost financial services supply with favourable terms in the face of financial institutional disinclination to agro-allied finance). Specifically, it examines the significant firm-specific determinants of banking relationships (i.e., the number of banking relationships, state-owned banking and diversification preferences, primary bank type, and relationship intensity) of AIFs in Ghana. These four dimensions of banking relationships vary in data structure and thus motivate different sets of estimation procedures. The chapter, therefore, details integrated methods of study for the four pieces of empirical research, describing, inter alia, sources of the data types used, sampling and data collection procedures, operationalisation of variables, empirical models and related econometric tests. The chapter begins with a brief discussion of the motivations underpinning the choice of a research philosophical stance that governed all the study's methodological choices.

Research Philosophy and Approach

Research philosophical worldviews may be explored through the lenses of ontology, epistemology and (the all-encompassing) research paradigms; each domain has sub-components that may correspond with sub-components under other domains; and the nature of the phenomenon under enquiry determines sub-component choice and the inherent correspondence (Saunders, Lewis, &

Thornhill, 2015). The general principles and reasoning governing this study's methodological strategies/approaches were informed by the direct observability of the phenomena of interest and the analytical units that exhibit these phenomena. Regardless of formality and other relevant distinguishing features, firms are generally observable, objective, utility-maximising microeconomic entities with external reality and independent existence. These analytical units (i.e., firms) may, therefore, lend themselves to the acquisition of relatively objective, accurate and reliable datasets from careful measurement of relevant constructs of the four observable phenomena of concern in this study and their respective covariates. This conviction influenced the adoption of a largely objectivist perspective from the ontological domain (encompassing other perspectives as subjectivism and pragmatism).

The choice of the matching sub-component from the epistemological stance (involving positivism, realism, and interpretivism) was, however, more daunting because credit market outcomes, which influence the banking choices under investigation, are the product of complex multilevel (i.e., micro-, meso-, and macro) interactions. Beyond the aggregate impact of characteristics of meso- and macro-level realities on credit market outcomes and banking choices, this challenge emanated, more particularly, from the existence of manifest varieties of bank and firm (i.e., micro-level) characteristics (i.e., age, size, ownership, geographical footprints, etc.) and the potential capacity of these structural heterogeneities to induce diverse strategic institutional behaviours to influence credit market outcomes (à la Heil et al., 2017) and banking choices.

The study, however, settled on a post-positivist epistemological stance (i.e., critical realism) due to the imperative to examine the theory of potential

effects of bank and/or firm characteristics on firms' banking relationship formations and the resultant requirement of reducing these notions (i.e., the structural heterogeneities and firms' banking choices) into testable relationships from carefully measured constructs. The enquiry, thus, employed the tenets of the Campbellian school of critical realism (a variant of scientific realism), rather than those of its Bhaskarian rivals, because the former research epistemological variant permits the use of scientific methods for the examination of both observable and directly unobservable phenomena of the real world (Haig, 2013; Saunders et al., 2015). As this research emphasized empirical detection of the phenomena of interest, the verification of explanatory theory, and rational explanations of the phenomena (as a precursor to making a set of policy recommendations for change), the corresponding functionalist research paradigm suited this study. The study's central goal of theory verification, therefore, rationalized the choice of the hypothetico-deductive approach, a core feature of scientific realism, and thus defined the quantitative ("mono-method") character of the study.

Research Design

The adopted deductive approach ruled out any consideration for the set of idiographic research designs—case study, ethnography, grounded theory, archival research, phenomenology, narrative research, discourse analysis (Saunders et al., 2015). Similarly, inspired by Creswell (2014), the preference for the "mono-method" quantitative strategy of inquiry advanced a strong case for overlooking the variants of mixed research designs (i.e., multi-methods, mixed method (convergent parallel, explanatory and exploratory sequential,

embedded, transformative and multiphase designs) and mixed model). The study's goal of making relational attributions, thus, imposed a methodological choice from the broad set of nomothetic (i.e., experimental, quasi-experimental and non-experimental) research designs.

The study, however, opted for a non-experimental quantitative research design due to its inability to meet the stringent requirements of manipulation of intervention or conditions and randomised or non-randomised assignments associated with experimental and quasi-experimental research designs. The research objectives and approach motivated the adoption of a survey strategy from the generic pool of non-experimental quantitative research designs. Coupling the survey strategy with scientific sampling procedures permits the collection and analysis of a large amount of standardized data that may suggest possible associations between variables, and enables modelling these relationships, easy comparison and generation of general representative findings (Creswell, 2013; Saunders et al., 2015; Schutt, 2015). In sum, considerations of economy, versatility, efficiency and generalizability of findings, and the time order of the data structure (only a panoramic snapshot) of the four phenomena under consideration and the related firm characteristics motivated the adoption of a cross-sectional correlational (explanatory) non-experimental research design for the study.

Population and Sampling Frame

The study capitalised on the extant evidence on Ghana's agro-processing value addition prowess (Henson & Cranfield, 2009) and the current industrial development strategy policy focus on agro-industry (Ackah, Adjasi,

& Turkson, 2014; FAO, 2015; National Development Planning Commission, 2015) to focus on agro-industrial enterprises as the target analytical or observational units of the study. By the extant agro-industry definition, this sector is delineated by the technological transformations of and value addition to agricultural sector-originated raw materials and intermediate products beyond the farm gate and prior to eventual end use, with a key defining feature of perishability and supply/quality variability of traditional inputs (da Silva et al., 2009; FAO, 1997; Henson & Cranfield, 2009; United Nations, 2017). It must be noted, however, that, from the international statistical classification perspective, defining agro-industry and its activity composition is a vexed question, resulting in, at least, three schemes: (a) International Standard Industry Classification of All Economic Activities (ISIC), (b) Central Product Classification, and (c) Harmonised System. To skirt any arguments over activity composition, the study considered only those activities that are common to these three main classification systems.

For precision of identification, the relevant enterprises are subsumed under the broader manufacturing group (i.e., Section C) of the fourth (and latest) revision of the internationally recognised United Nations industry classification system, the *International Standard Industrial Classification of All Economic Activities* (ISIC) (United Nations, 2008), adopted by the Ghana Statistical Service (GSS) for enterprise surveys. Specifically, the range of the relevant firms are defined by divisions 10-17, 20 (groups 201 and 202, and their respective sub-classes of 2012 and 2021), 22 and 31 of the said section of this industry classification system. By this classification system, the agro-industrial enterprises targeted for the study are categorised under 11 divisions: food,

beverage, paper and paper products, wood and wood products, textiles, wearing apparel, furniture, tobacco, rubber products, footwear, leather and leather products. The rationale behind the study's purposive focus on such firms located and operating in Ghana's southern eco-regions was premised on evidence of overconcentration of industrial establishments and agro-industrial firms in this sub-region (Ackah et al., 2014; Dixie et al., 2014; GSS, 2015). Even though the characteristics of this accessible Southern-Ghana-located AIFs may reflect those of the target population in toto, there is a key limitation. The target population captures and reveals only the demand-side (i.e., firm) behavioural responses to supply-side (i.e., banking market) inefficiencies in agro-allied credit markets and may, therefore, present a biased perspective of the strategic interactions between both supply-side and demand-side participants in the credit market.

The first wave of the Integrated Business Establishment Survey (IBES), the premier, cross-sectoral non-household economic census, conducted by the GSS in 2014 facilitated the development of the sampling frame. The IBES gathered a variety of detailed firm-specific information on sector, location, size classification, year of commencement, ownership, legal and organisational form, principal and secondary activity, formality status, employment-related issues and contact details. According to the original principal frames, the dominant majority (91.9%) of industrial sector establishments (108,242) were in the manufacturing sub-sector (99,437) (GSS, 2015) that subsumes the targeted AIFs. However, the following exclusion filters were applied to zero in on the accessible population: (a) exclusion of northern-Ghana-based firms, (b) exclusion of firms outside the specified ISIC sections and divisions and for

whom the specified sectors were a secondary economic activity, (c) exclusion of informal firms (i.e., without formal banking relationships, professionally managed accounting records, and/or unregistered with the Registrar-General's Department (GSS, 2015)); (d) exclusion of defunct firms, (e) exclusion of firms reluctant to release financial data from initial contacts, and (f) exclusion of branches and subsidiaries without financial management autonomy. These exclusions, particularly via the formality criterion, reduced the relevant firms to 1, 241 about 25%, 11%, 13%, 38% and 13% of which were from the Ashanti, Central, Eastern, Greater Accra, and Western regions respectively, and largely represented the pattern of regional distribution of establishments in the industrial sector in GSS (2015).

Sample Size Determination and Sampling

The methodological discourse on a priori sample size determination has generated competing procedures from the equivalence, minimum-risk point estimation, statistical power analytic (PA), accuracy in parameter estimation (AIPE), and simulation-based (Monte Carlo) perspectives (see, e.g., Bacchetti, 2013; Beaujean, 2014; Kelley, 2013; Kelley & Maxwell, 2003). I utilized both traditional approaches (PA and AIPE) to eliminate inherent automatic trade-offs between accuracy and power to facilitate a robust simultaneous determination of existence, directionality and magnitude of firm characteristics effects. To this end, the study exploited the freely accessible *Methods for Behavioral, Educational, and Social Sciences* (MBESS) software package (Kelley, 2007, 2017) in R, an open source statistical programming language and environment,

for the threshold sample size determination from both the AIPE and PA estimation perspectives.

Two minimum required sample sizes were, thus, estimated, one from each tradition. Assuming at least 15 predictors and a standard Type 1 error rate of 5%, the minimum required sample size necessary to ensure that a meta-analytic literature-backed population squared multiple correlation coefficient of about 0.45 (see, e.g., Kelley & Maxwell, 2012; Kysucky & Norden, 2016) was sufficiently powerful (i.e., of a desired statistical power of 0.85) was ≈ 40 firms from the PA perspective. In sharp contrast (i.e., from the AIPE school), to garner a desired 95% degree of certainty that the 95% confidence interval width for the population standardized mean difference of 0.50 would be no larger than 0.30 units yielded a necessary sample size of 359 firms (which is consistent with Creswell's (2012) rough estimate of 350) to achieve the desired degree of accuracy. Despite the substantial disparity in the minimum necessary sample sizes from the two traditional schools (40 vs. 359), attributable to fundamental philosophical differences (Maxwell, Kelley, & Rausch, 2008), the study acceded to loud recommendations of several methodologists (e.g., Creswell, 2012; Kelley, 2008, 2013; Kelley & Maxwell, 2012) to employ the larger minimum required sample size (359) to address both issues of statistical power and accuracy. To ensure robust statistical analyses within the chosen tolerable margin of error, an assumed response rate of 70% yielded the actual sample size of ≈ 513 (= 359/0.7), rounded down to 500 firms due to resource constraints.

Sampling frame availability and the imperative of making statistical inferences informed the choice of a probability or representative sampling technique. As firms in the GSS' 2014 IBES principal frame are distinguished

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on the basis of their region of (main operational) location, a combination of (the grouping feature of) cluster and stratified random sampling was conducted due to the wide geographical dispersion of the accessible analytical units across the administrative regions, the natural presence of discrete regional clusters or strata of firms and the absence of periodic patterns in the sampling frame. As indicated in the introductory chapter and elsewhere in this chapter, the study's adoption of a southern Ghana eco-regional focus necessitated the exclusion of all AIFs in the northern part of Ghana. Though purposively selected, the five relevant southern Ghana administrative regions constituted one-half of the number of regions in Ghana (i.e., prior to sampling), remain the hub of AIF location and activity and, hence, largely accounted for firm heterogeneity and potential sampling error.

Given the variation in firms' regional dispersion, the regional basis of distinction was maintained for the 1,241 targeted firms, thus generating five naturally occurring regional clusters/strata comprising ≈ 310 ($= 25\% \times 1,241$), ≈ 137 ($= 11\% \times 1,241$), ≈ 161 ($= 13\% \times 1,241$), ≈ 472 ($= 38\% \times 1,241$) and ≈ 161 ($= 13\% \times 1,241$) firms from the Ashanti, Central, Eastern, Greater Accra and Western Regions respectively. The technique of the proportional variant of the adopted sampling procedure was applied to ensure exact representation of each stratum in proportion to its size in the targeted population (of 1,241 AIFs) and to further minimize, if not eliminate, any potential of sample distribution error on the basis of regional location. To this end, and also to obtain the actual sample size of 500 firms, 125 ($= 25\% \times 500$), 55 ($= 11\% \times 500$), 65 ($= 13\% \times 500$), 190 ($= 38\% \times 500$) and 65 ($= 13\% \times 500$) AIFs were expected to be drawn from the Ashanti, Central, Eastern, Greater Accra, and Western regional

cluster/stratum respectively. As firms in the GSS' 2014 IBES database are uniquely, numerically and sequentially pre-coded on a regional basis (with up to four-digits for the Western Region, four- to five-digits for the Central Region, and five-digits for the other three regions), it facilitated computer generation of the expected region-specific samples of randomly selected firms.

Data Types, Sources and Collection

The study employed two datasets: (a) a secondary dataset obtained from the Bank of Ghana (BoG), Ghana Association of Bankers (GAB) and the Ghana Statistical Service (GSS) on banking industry and bank-specific information, and on regional bank branch and population densities; and (b) a primary dataset on the sampled firms' attributes, opinions and attitudes (behaviour) regarding the four banking choices under consideration, obtained via a literature-inspired, self-developed, and largely closed-ended questionnaire due to the non-availability of these firm-specific information. As shown in Appendix A, the survey questions, intended to elicit the requisite information to address the research objectives, covered a wide variety of topics related to firm demographics and operational scope; ownership structure, legal status and corporate governance; CEO/managers' demographics and experience; sector, research, innovation and internationalisation behaviours; firm-bank relationship features; firms' choices of primary banks; relationship quality and strength; and credit contract characteristics and outcomes.

According to several methodologists (e.g., Cronbach & Meehl, 1955; Smith, 2005; Spector, 2012), construct validity of a questionnaire (the validity or adequacy of variable definitions and/or operationalisations to enable

meaningful interpretation of and inferences from research findings) is ascertained by several kinds of validation evidence: convergent, discriminant, factorial, criterion-related, content and face validity. To ensure construct validity, therefore, the study replicated ≈ 85% of the constructs and variables and their operationalisations from the wide-ranging literature (e.g., Aristei & Gallo, 2017; Berger et al., 2008; Gobbi & Sette, 2014; GSS, 2015; Ongena & Şendeniz-Yüncü, 2011; Ongena et al., 2011, 2012) in the development of the questionnaire. Beyond exploiting the literature review to aid careful definitions of the investigative items, the questionnaire underwent some refinements following a rigorous assessment of the adequacy, coverage (representativeness), structure and suitability of each investigative item and its measurement scale by a group of subject-matter reviewers.

To establish the validity and reliability of the remaining 15% of the investigative items seeking to quantitatively measure the relationship quality constructs and primary bank selection criteria, resource constraint (arising from the need to cover five southern Ghana regions) compelled a pilot-test of the questionnaire in the Cape Coast metropolis of the Central Region (one of the selected regional clusters) on 10 formal enterprises that dropped out of the regional sampling exercise. Appendix B contains a brief report on the pilot test of the questionnaire. Overall, throughout the study, the case for construct validity can be supported by three complementary issues: (a) the application of the theoretical frameworks and replication of measures of constructs in the empirical literature to inform the specification of hypothesized relationships among variables, (b) the positive outcomes of the application of exploratory factor analysis to the remaining 15% of the investigative Likert-type scaled

items to evaluate the measures' factorial validity (i.e., the factor structure among items of a multiple-item measure); and, (c) the many findings of significant statistical relationships among the measures/variables in both univariate and econometric analytical settings as hypothesised, thus establishing criterion-related validity.

Some pre-survey distribution contacts with sampled firms were made to seek institutional access and informed consent, and questionnaire were hand delivered to and collected between January and May, 2019 from owner managers, managers, finance officers and accountants and/or appointed representatives. Self-administration (i.e., questionnaire completion by these key corporate officials knowledgeable about firms' characteristics and banking relationships) and hand-collection of questionnaire, aided by several phone follow-ups, were necessary to ensure full disclosure of these subtle financial access-maintaining strategies, reduction in refusal-induced bias, data reliability and high response rate. Unsurprisingly, the questionnaire was completed and returned by 412 respondents, yielding a preliminary overall response rate of 82.4% (= 412/500), far exceeding a priori expectations. However, some further deletions, in respect of respondents with missing important information, resulted in 388 complete questionnaires, corresponding to a final complete response rate of 77.6% (=388/500), albeit masking regional variations.

Definitions and Measurements of Dependent Variables

This sub-section (itself in four parts) is dedicated to the descriptions, definitions, measurement and motivations for the choice of the four dependent variables corresponding to the four strategic banking relationships under

enquiry. These dependent variables include the number of banking relationships (NBR), state-owned banking (SOB) relationship formations and diversification choices, primary bank types and credit relationship intensity.

Number of Banking Relationships

To answer the first research question, this regressand (NBR) was operationally defined simply as the actual number of banks an AIF has a relationship with for cash management purposes. Exploitation of firms' responses to the (open) survey question (number 12) of Section E on firm-bank relationships (in Appendix A), requiring mention of the financial institutions with which a firm has a relationship, enabled measurement of this dependent variable of interest. Mismatched with banking theories that typically emphasize credit-based (lending) relationships, this measure is in keeping with favourable views on its inclusivity (of other classic banking services beyond lending) and broadness (Berger et al., 2008; Ongena & Smith, 2000b), and also with the trend in recent empirical research (see, e.g., Aristei & Gallo, 2017; Nifo et al., 2018; Ongena & Yu, 2017; Refait-Alexandre & Serve, 2016). As respondent AIFs had at least one banking relationship, this dependent variable is a count (non-negative integer-valued) variable left-truncated at one.

State-owned Bank Relationship and Diversification Choices

The general focus of the second research goal is to investigate the determinants of AIFs' state-owned banking choices. To this end, the study distinguished between two state-owned bank categories (i.e., sector-generic and sector-development state-owned banks (SOBs)). This categorisation, inspired

by Berger et al.'s (2008) innovation, was informed by the conviction that unique differences in establishment mandates, business models, competencies and competitive edges, corporate governance and history might engender different preferences of AIFs with different operational characteristics. In respect of AIFs' bank ownership-type choices, a generic SOB choice was identified and dummy-coded with one if a firm had a relationship with at least one state-owned bank for cash management transactions, and zero otherwise. This measurement was replicated for sector-development SOB (i.e., SDSOB) relationship formations (i.e., with SDSOB relationships equated to one, and zero otherwise). Both cases of operationalisation generated dichotomous regressands.

This form of operationalisation is, however, non-discriminatory of the two main regimes of a firm's number of banking relationships (i.e., exclusivity vs multiplicity). Thus, for the category of multiple-banked AIFs, bank ownership-type diversification is strictly observed if two or more of a firm's relationship banks differ in terms of the main economic agent in control (i.e., private versus state). In relation to AIFs' SOB diversification choices, this strict connotation was relaxed and limited only to the number of banking relationships for ease of identifiability and estimation. Thus, examining firms' responses to the (open) survey question (number 12) of Section E on firm-bank relationships (in Appendix A), SOB diversification choice was observed and dummy-coded with one if an AIF had at least two (i.e., multiple) banking relationships, at least one of which involved a state-owned bank, and zero otherwise (i.e., engaged in multiple banking relationships, but none of which involved a state-owned bank). The same dummy measurement was adopted to measure SDSOB diversification choices (i.e., with SDSOB diversification equated to one if an AIF had at least

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two (i.e., multiple) banking relationships, at least one of which was a sector-development state-owned bank, and zero otherwise, in which case a multiple-banked AIF had no relationship with a sector-development state-owned bank). Similarly, both measurements generated dichotomous regressands.

Primary Bank Types

The study's third, and penultimate, objective is to identify mechanisms that drive AIFs' primary bank type choices, with the ultimate goal of drawing out emergent patterns in the matching of the characteristics of AIFs with those of their primary bank types. In contrast to Berger et al. (2008) and Aristei and Gallo (2017), this research replicated Ongena and Şendeniz-Yüncü's (2011) comprehensive methodology for defining bank types based on a simultaneous combination of four defining bank characteristics. The bank type definitional methodology adopted in this aspect of the study, however, has two marked departures from Ongena and Şendeniz-Yüncü's (2011) approach that relate to the set of bank structural characteristics and primary focus. First, it supplanted banks' religious/secular orientation, which is a virtually non-existent characterization of banks in Ghana, with a contextually more relevant bank health/performance measure which is central to systemic stability, has assumed topicality in light of recent developments, and assumed to be a key determining factor in AIFs' banking choices. Second, dissimilar to Ongena and Şendeniz-Yüncü, who focus mainly on each firm's general portfolio of banks, this research focused specifically on each firm's self-reported primary bank within its banking pool because that revealed preference connotes relatively high utility and bank-switching cost with grave ramifications. This study, therefore,

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distinguished between four major bank characteristics that magnetize firms—health, size, nationality and ownership—and thus defined AIFs' primary bank types by the simultaneous characterization of its self-reported primary bank on the basis of these four defining characteristics.

The decreasing order of priority of sampled firms' banks in response to the relevant survey question (number 12 of Section E on firm-bank relationships (in Appendix A)) enabled a distinction between their primary and secondary providers of financial services. A firm's self-reported primary bank was, therefore, a particular bank that was accorded the highest priority (i.e., mentioned first in the decreasing order of firms' responses) in financial service provision or highest ranking on the basis of frequency of visitation for cash management transactions (e.g., short- and long-term borrowing, deposits and foreign exchange services, etc.).

Relying on Crowe's (2009) suggestion that, beyond profitability, asset quality and capital adequacy, banks' liquidity position was a sufficient characterisation of their operational health, the enquiry proxied bank health with liquidity stance. As a process of asset (and cash flow) and liability management aimed at maintaining banks' capacity to meet their immediate financial obligations (i.e., day-to-day cash and deposit withdrawal needs and legitimate loan demands), bank liquidity management has generated competing schools of thought on its measurement: asset, liability and balanced liquidity management schools. By intuition, however, an optimal bank liquidity measure must satisfy two key requirements: (a) pass the basic fiduciary test—public perception and confidence in a bank's capacity to ensure stable deposit inflows to empower its lending capacity and facilitate honouring of other immediate financial

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obligations, and (b) explicit recognition of the two largest markets of bank operations, that is, loans and deposit markets, representing, more generally, the asset and liability sides respectively.

On these bases, the study employed a balanced liquidity measure, the ratio of liquid assets to total deposits, where liquid assets encompass cash assets plus assets characterized by relative ease in conversion to cash (e.g., investment in government securities, quoted and unquoted debt and equity investments, equity investments in subsidiaries and associated companies). There are, however, recent revelations of the drawbacks of this measure, generating increasing clamour for more dynamic, inclusive and complete measures (see, e.g., Bai, Krishnamurthy, & Weymuller, 2018; Berger & Bouwman, 2009; Brunnermeier, Gorton, & Krishnamurthy, 2012). Despite these criticisms, the study remained confident in the optimality of this traditional bank liquidity measure on grounds of its adequate capture of banks' vulnerability to liquidity risks in correspondence to their funding sources, computational simplicity, ease of replication and widespread use by regulatory authorities, including the Central Bank of Ghana.

This research also deviated from the conventional usage of the totality of bank assets (comprising both volatile and slow-changing components) as a measure of bank size in the empirical finance literature on account of a simple logic. Banks' stakeholder value determination, operational performance and, ultimately, growth (in size) depend, in large measure, on their operational capabilities as manifested in the availability, liquidity, profitability and efficiency of resources with earning or income-generating capacity. Cognisant, though, of the relevance of other qualitative determinants of banks' operational

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capabilities, the study was driven by firms' arguably relative disinterest in banks' fixed assets as a driver of their primary bank type choices and the need for easy quantification of the availability of income-generating resources to employ the carrying amount of banks' operating assets, as opposed to total assets, as a proxy for bank size. Operating assets are those characterized by direct deployability to generate interest and related fee income and, thus, include cash and funds with the Central Bank of Ghana, liquid assets including treasury bills and bonds and investment securities and equity securities, net loans and advances and other assets that answer to the direct interest-and-fee-income generation criterion.

To simultaneously characterize each firm's self-reported primary bank on the basis of the four bank attributes (of health, size, nationality and ownership structure), the study created two contrasting groups of banks by dichotomizing those bank characteristics whose operational measures are continuous in nature (i.e., bank liquidity and size). To minimise the potential measurement bias that intertemporal volatility of liquidity may introduce in a snapshot cross-sectional dichotomization of bank liquidity, a three-year (2016-2018) industrial average of the operational balanced liquidity measure (i.e., ratio of liquid assets to total deposits) was used as a separating mechanism. Being less than one over the stated period and indicative of the high liquidity risk in the Ghanaian banking industry, the three-year industry average was, however, a fairer classifier and, hence, preferred to the more-or-less-than-one decision criterion by which the majority of banks would have been deemed unhealthy. For a fair capture of banks' liquidity position and their dichotomisation on the basis of their liquidity stance, liquid (illiquid) banks were defined as those whose corresponding three-

year (2016-2018) averages of their liquidity positions fell above (below) the separating industrial average. Liquid (illiquid) banks were, thus, dummy-coded with one (zero). Banks' liquidity stance is, therefore, limited to this period.

With regard to dichotomization of primary banks' size into contrasting small-versus-large bank sub-categories, the study used publicly available information furnished by PricewaterhouseCoopers (PwC) and the Ghana Association of Bankers (GAB) in their annual Ghana Banking Survey releases. To ensure data availability as well as easier and uniform measurements, "large" banks were those banks that, on the exclusive basis of their domestic operating assets, had enjoyed a consistent (i.e., seven times or more) appearance in the first quartile of banks since 2011 (inclusive), and coded with one; otherwise, they were deemed to be "small" banks and coded with zero. Similarly, this bank size categorization definition is applicable only over the period spanning 2011 to 2018 (i.e., before the creation of the Consolidated Bank of Ghana).

The two other defining bank characteristics that magnetise firms and are hypothesized to contribute to determining firms' choice of primary banks relate to their nationality in terms of the citizenship of the economic agent with majority share ownership (i.e., foreign or domestic) and ownership structure in terms of the main economic agent in control (i.e., private versus state). It is worthy of note that, even by nomenclature, bank nationality and ownership structures are dichotomous in nature, having two contrasting bank categories, namely, foreign versus domestic banks (for nationality) and private versus state banks (for ownership). With respect to operationalizing bank nationality, a primary bank was categorized as "foreign" and coded with one if it had foreign majority share ownership (i.e., more than 50% of its equity was under foreign

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individual and/or institutional ownership) and had operated in this category for two or more years (to account for nationality changes due to mergers and acquisitions); otherwise, it was classified as a "domestic" bank, coded with zero. To clearly distinguish between the two contrasting bank ownership structures, the study followed Ongena and Şendeniz-Yüncü (2011) who have defined it in terms of whether the majority (i.e., more than 50%) of equity is owned by private individuals and institutions (in which case it is a private bank, coded zero) or by the state (here, government-owned banks, indicated by one). Based on the survey's reference year of 2018, this preluded the recently created state-owned Consolidated Bank of Ghana.

The sequential assignment of each firm's self-reported primary bank into one of the two sub-categories of each of the four dichotomised bank characteristics generated the following six sample-specific mutually exclusive and exhaustive alternative primary bank types: (a) liquid-large-domestic-state (LLDS), (b) liquid-large-domestic-private (LLDP), (c) liquid-large-foreign-private (LLFP), (d) liquid-small-foreign-private (LSFP), (e) illiquid-small-foreign-private (ISFP), and (f) illiquid-small-domestic-state (ISDS). It is noteworthy, for instance, that all foreign banks are privately-owned financial institutions, leading to the complete absence of all bank types characterised simultaneously by state ownership and foreignness, aside their varying liquidity and size sub-categorisations. Such sample-specific degenerations in branches of the relevant bank characteristics, emanating from the absence of the opposite characteristic of an otherwise similar bank type, explain bank type derivations numbering less than 16 (Ongena & Şendeniz-Yüncü, 2011). For statistical

estimation purposes, each of these six primary bank types was measured as a dummy variable equal to one and the remaining five were indicated with zero.

Credit Relationship Intensity

The study's fourth, and final, goal relates to the empirical determination of the factors/correlates of AIFs' credit relationship intensity. Concerns over the direct observability of the strength of firm-bank relationship for appropriate measurement have resulted in a reliance on a variety of proxies in empirical studies (see Elsas (2005) and Ongena & Smith (2000a)) for early reviews on the pros and cons of the different measures). The current literature outlines five key dimensions that capture firm-bank relationship strength, namely, time (duration), distance, exclusivity, scope (i.e., cross-product synergies) and intensity (Bartz, 2016; Kysucky & Norden, 2016). To achieve positive relationship outcomes (e.g., loan price, volume, collateral and maturity, etc.) of firm-bank relationship strength, the key transmission mechanisms are the depth, precision and full disclosure of relevant information by the firm to potential financiers. However, Elsas (2005) suggests the poverty of relationship duration and exclusivity in fully capturing the informational depth underpinning durable firm-bank relationships. Whiles the (physical, organisational and/or informational) distance dimension of relationship strength has received marginal attention, due probably to its context dependency and improvement in information and communication technology (Duqi et al., 2017), data non-availability hampers the employment of the relationship scope proxy of relationship strength.

The ultimate stage of banking relationship formations where firm-bank informational frictions are believed to have been minimized relates to the intensity of firms' credit relationships with banks. The intensity dimension of firm-bank relationship strength has been variously measured in the empirical relationship lending literature (see, e.g., Bartz, 2016; Behr, Entzian, & Güttler, 2011; Bodenhorn, 2003; Gobbi & Sette, 2014; Schenone, 2010). In this study, the implications of two theoretical perspectives informed the operationalization of credit relationship intensity. A key implication of the secrecy or proprietary information disclosure theory is that the number of financial intermediaries to which a firm chooses to divulge proprietary information in order to obtain a corresponding number of shares of credit is assumed to reflects its degree of credit relationship intensity. Inasmuch as lending outcomes, particularly the extent of banks' credit exposures, directly reflect the depth and precision of firms' full disclosure of information (see, e.g., Bannier, 2007, Elsas et al., 2004; Guiso & Minetti, 2004), multiple disclosures of proprietary firm information to different lenders for credit transactions is assumed to be inimical to firms' best strategic interests. From this theoretical perspective, a single parcel/share of credit from an exclusive banking relationship, therefore, corresponds to a higher credit relationship intensity.

The second theoretical guide is the credit concentration theory which argues that firms borrowing from two or more lenders should concentrate a lion's share of their total bank debt in one main/lead bank which, in the event of a strategic default by the borrowing firm, assumes the responsibility of coordinating the efforts of the multiple creditors towards full loan recovery. Otherwise, coordination failure among multiple creditors after strategic default

may result in detrimental non-performing assets. Thus, any measure of credit relationship intensity should take into consideration both the number of current credit relationships with banks and the share of a firm's total bank debt stock that each current lender holds.

The study, therefore, measured credit relationship intensity as the Herfindahl-Hirschman Index of borrowing shares (normalized to one). This is computed as the sum of the squared shares of a firm's total debt provided by each bank from which the firm has currently borrowed:

$$HHI_i = \sum_{j=1}^{n} s_{ij}^2$$
  3.1

where s_{ij} equals the share of credit granted by bank j to firm i (i.e., loan amount granted by bank j to firm i divided by total bank loans extended to firm i). Evidently, borrowing concentration (the number of borrowing shares) is positively (inversely) related to credit relationship intensity.

Anticipating firms' understandable reluctance to disclose details of their liabilities required for this computation, the research designed a battery of sequential survey items to elicit AIFs' self-reported data on their borrowing shares. In survey question 14 of section E in Appendix A, AIFs were first asked "Has the firm currently borrowed from any financial institution?" Whiles monosyllabic binary responses would enable estimation of current credit relationship formation propensities, non-affirmative responses to this question determine the absence of current credit relationships which defines the left-censoring of the response variable of prime interest at zero. Conditional on an affirmative response, a follow-up question (number 15) enquired about the number of current credit relationships. Technically, the HHI of borrowing shares converges to one in the case of an exclusive current credit relationship,

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defining the right-censoring of the response variable of interest at one. Finally, conditional on having multiple (i.e., two or more) current credit relationships, the number and magnitude of the borrowing shares for the computation of the calculable (intermediate uncensored) part of the HHI was elicited via the following list item (in number 20 of section E of questionnaire): "Please, state the estimated financing shares (in fraction or percentage) of each of your current creditors in the firm's current total loans".

This all-encompassing measure of the intensity of firm-bank credit relationship, accounting not only for the existence or otherwise of a current credit relationship but also for both the number of current credit relationships and the variations/inequalities in the current borrowing (financing) shares that correspond directly with inequalities in the credit relationship intensity, has been greenlighted by Elsas (2005) and employed in empirical studies on debt/creditor concentration (see Godlewski & Ziane, 2010; Guiso & Minetti, 2004, 2010; Ongena et al., 2012). In the framework of multiple heterogeneous or asymmetric borrowing (financing) regime, the tendency of HHI to zero (one) signals the decrease (increase) in borrowing differentiation or concentration which, in this study, is equivalent to a decrease (increase) in credit relationship intensity. Thus, to the best of my knowledge, this is the premier empirical study investigating the correlates of AIFs' credit relationship intensity using borrowing concentration.

Definitions and Measurements of Explanatory Variables

A remarkable observation from the Literature Review section is the commonality of firm-specific characteristics determining various dimensions of

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firms' strategic banking choices. This second part of the variable measurement sub-section, therefore, presents an integrated description and measurement of the independent variables. Again, as the end goal was to identify a wide array of firm characteristics significantly driving the formation of each of the four strategic banking relationships, the empirical analysis deviated from a special focus on the empirical association of a specific variable of interest with any of the dimensions of firms' banking relationship structure. However, there were occasional references to the hypothesized correlation between a particular variable and a specific banking choice. Consequently, motivations for the choice of explanatory variables were derived from the predictions of the surveyed theoretical landscape, broad empirical priors and economic intuition. Seeking to (in)validate these conjectures and empirical evidence in a new research environment, the research encompassed a wide array of independent variables to isolate their relative effects.

The first conventional set of independent variables related to the broad class of observable microeconomic features of firms (i.e., internal firm-specific characteristics), consensually touted in both the theoretical and empirical literature as key drivers of firms' banking choices. In accord with this notion, measures of firm demographics, operational scope, ownership and management structures, financial performance and access to non-bank external finance, decision factors, banking relationship strength and quality, R&D and innovation, and industry affiliation were included to capture the varying effects of firms' internal characteristics on their banking choices.

In conformity with the extant literature's stance that firm demographics, as primary proxies for informational transparency, influence their banking

choices (i.e., number of banking relationships, bank diversification, bank type and relationship intensity), the study considered two major demographic characteristics, namely, size and age. Firm Size was measured as the natural log of the five-year (2014-2018) average of a firm's workforce, whiles Firm Age was defined as the natural log of the number of years since commencement of business (i.e., the difference between survey's reference year of 2019 and the year of business commencement). These logarithmic transformations were intended to foster reductions in any inherent skewness and the resultant measurement biases. To contribute to the ongoing empirical debate, instigated by Stein's (2002) model implications, on the differences in banking preferences of firms with contrasting demographic characteristics emanating from differences in the usage of information type (i.e., hard versus soft), the study included two dummy variables in another specification without the two demographic variables of age and size: (a) Large Firms, coded one for large firms (i.e., with 100 employees and above as per GSS (2015) definition) and zero otherwise; and, (b) Old Firms, coded one for old firms defined by GSS (2015) as those aged 14 years and above, and zero otherwise.

Even though any significant variations in banking choices of firms with contrasting demographic features may be explained by increasing differences in organisational complexity over time, such complexities may be influenced by firms' operational scope. In the spirit of Ongena and Şendeniz-Yüncü (2011) and Ongena and Yu (2017), the study argues that increased firms' organisational complexity arising from industry diversification and geographical dispersion determine firms' strategic banking choices. It, therefore, measured Industrial Diversification as a dummy variable of unit value if a firm owned and operated

secondary businesses unrelated to the defined agro-industrial sectors of interest to this study, and zero otherwise. Other original complementary measures of firms' operational scope included indicators for International Presence, equated to one for foreign-headquartered firms, and zero otherwise (motivated by Braggion & Ongena (2013)); and Free Zones enterprises, equated to one for free zone enterprises, and zero otherwise. Due to their ownership structure and operational requirements, these firms in Ghana are more likely to exhibit unique, yet unexplored, banking choices. The study, therefore, expected greater propensities for relationship multiplicity, bank diversification and primary LLFP bank associations.

Furthermore, international trade-oriented firms have different banking choices (in specific reference to the probability of relationship multiplicity, number of banking relationships and bank ownership diversification) from their domestic market-oriented counterparts (Aristei & Gallo, 2017; Nifo et al., 2018; Ongena & Smith, 2000b; Ongena et al., 2011). To test these links, the indicator of firms' market orientation differences was a categorical variable (Foreign Trade) equated to one if the firm had conducted any international trade activity (involving export and/or import) in the last five accounting years (2014-2018), and zero otherwise, expecting a more intense banking relationship and a rising probability of foreign-trade participants' primary association with LLFP banks.

Consistent with the motivations of the extant literature (e.g., Aristei & Gallo, 2017; Berger et al. 2008; Detragiache et al., 2000; Guiso & Minetti, 2004, 2010; Han, Storey, & Fraser, 2008; Volpin, 2001), the study also accounted for the effects of firm ownership and management structures that may capture differential corporate governance effects on various aspects of firms' banking

choices. Foreign Ownership of firm was a dummy variable equal to one if the firm's principal owner(s) (i.e., with majority equity share and greater controlling rights) had a foreign (non-Ghanaian) nationality and zero otherwise. Similarly, Family Ownership was a dummy variable equal to one if the firm was family-owned and managed, and zero otherwise. Inspired by Volpin's (2001) ownership structure theory, the study originally tested the effects on banking relationships of firms characterised by Ownership Concentration which, in the absence of data on equity ownerships, was measured as a dummy equated to one if the firm's manager was the principal owner or one with greater ownership and controlling rights, and zero otherwise. A surrogate for firms' informational opacity, ownership concentration is a complementary measure of restructuring cost (Guiso & Minetti, 2004, 2010; Volpin, 2001).

Again, the study explicitly assessed the effect of the quality and efficiency of the firm's corporate governance mechanisms (largely without empirical priors), proxied by two measures: (a) existence of a Board of Directors, coded one for an affirmative response, and zero otherwise; and, (b) Board Size, measured as the number of members of the firm's Board of Directors. Notwithstanding the intuitively positive association between board size and the degree of bureaucracy, a large board size may have ambiguous effects on banking relationships. However, the assumed effectiveness of the associated lengthy decision-making and monitoring, coupled with Braggion and Ongena's (2013) empirical finding of the relevance of board size to the determination of firms' NBR, motivated the expectation of an increasing probability of bank diversification, less intense banking relationships and an association with large and liquid banks.

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Another set of internal firm-specific explanatory variables assessed the role of measures of firm operational and financial performance, using estimates of financial ratios averaged over 2017-2018 to avoid endogeneity bias and obtain fairer measures, and measures of access to non-bank external finance on banking relationship formations. In this sense, return on assets (i.e., operating profits scaled by total assets, where operating profits were defined as earnings before interest, taxes, depreciation and amortisation (EBITDA)) was used to measure Firm Profitability. The ratio of total liabilities to total assets measured firms' capital structure or Financial Leverage (i.e., capturing the extent of operational dependence on external (bank) finance, indebtedness and, hence, credit risk). Firm leverage was further dichotomised (Firm Leverage1) and equated to one (zero) for firms whose leverage fell below (above) the sample average to explicitly distinguish between less (more) bank-dependent firms. With internal funding challenges, firms with a high demand for external (bank) finance are incentivised to engage in multiple banking relationships, bank nationality and ownership diversifications and more intense banking relationships.

Firm Liquidity, capturing firms' debt-servicing capacity, was measured by scaling the difference between current assets and inventories by current liabilities. The research also tested the banking relationship formation implications of firms' Refinancing Risk exposure, the inability (ability) to refinance or roll over maturing debt at reasonable (significantly high) interest rates and, hence, a proxy for financial constraints, computed as the ratio of current liabilities to total liabilities to reflect short-term debt preference (i.e., for those with shorter maturities). Firms' Fixed Asset Tangibility, measured as the

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(book) value of property, plant and equipment scaled by total assets, also captured the cumulative effects of firms' transparency, collateral pledgeability (credit risk), asset specificity or liquidation (resale) value (see, e.g., Guiso & Minetti, 2004, 2010; Ongena et al., 2012). Despite the mixed evidence on the role of group membership in determining various features of firms' banking choices (see, e.g., Aristei & Gallo, 2017; Berger et al., 2008; Detragiache et al., 2000; Nifo et al., 2018), the rifeness of such memberships in Ghana motivated a replication of tests of the strategic banking relationships implications of group memberships. Group Membership was measured as a dummy variable, coded with one if a firm responded in the affirmative to the question of whether or not it belonged to any business group, association or consortium, and zero otherwise, to assess the impact of access to external non-bank finance on firms' formation of strategic banking relationships.

Inspired by Ongena et al. (2011) and Aristei and Gallo (2017), who have demonstrated the relevance of decision factors (i.e., those determining the importance of their relationships with banks) to various dimensions of firms' banking choices, the study went beyond a replication of these studies to assess the significance to firms of these factors in the selection of their primary banks. It used Ongena et al.'s original measurement index of one to four, the highest score indicative of 'most important' (section F of questionnaire). The factors included bank consultancy and advisory services, range and quality of services, local/international branch networks, personal relationship, negotiation ease, market dominancy, bank location, suitability of bank image to corporate culture, handling and processing speed, price, and bank reputation. Drawing from the literature, these 12 original factors were augmented with bank specialisation in

firms' operational sector and understanding of business challenges (both motivated by Bard et al., 2002), bank promises and guarantees, and advances in information technology (motivated by Iturralde et al., 2010). But, the study advanced Ongena et al. and Aristei and Gallo's measure of these decision factors.

These indicators of decision-specific banking preferences have no theoretical roots, have just a couple of empirical priors and, most significantly, are directly unobservable. Since these preferences were only revealed via responses to the observed variables, the thesis employed latent variable modelling, specifically exploratory factor analysis (EFA), to investigate the underlying latent structure of bank preferences using responses to the 16-item decision factors (Section F of the questionnaire). The ultimate goal was to determine the optimal number and nature of relevant factors based on statistical and interpretability criteria for retention and analysis. To this end, a maximum likelihood (ML) factor extraction algorithm using the orthogonal varimax rotation approach was fitted to the data for an optimal solution.

A conclusive inferential statistical approach, ML-extracted parallel analysis results and associated plot determined a four-factor solution (Appendix C details the practical steps leading to this solution). These extracted factors were grouped into the following four interpretable factors: (a) corporate relationships (referring particularly to personal treatment and relationships, ease and success of (re)negotiations, and bank understanding of AIFs' business challenges); (b) bank efficiency and outreach (interpreted as availability of international branch network, advances in ICT, and procedural speed); (c) bank quality (interpreted as satisfaction with service range and quality, extensiveness

of local branch networks, dominancy and reputation); and, (d) bank culture (interpreted in terms of consultancy, image congruence, and promises and guarantees).

The extant literature (e.g., Farinha & Santos, 2002; Machauer & Weber, 2000; Nifo et al., 2018; Ogawa et al., 2007; Ongena & Smith, 2001; Ongena et al., 2011; Ziane, 2003) motivated an assessment of the effects of proxies of firm-bank relationship tightness or looseness (i.e., relationship strength and quality) on the dimensions of firms' banking choices relevant to this study. To this end, four fundamental variables that potentially influence credit market outcomes (e.g., credit availability/volume, price, collateral, maturity, etc.) and, hence, firms' banking choices due to their reflection of the degree of information opacity/transparency, were included. First was Exclusive Relationships, a dummy variable coded with one for single-banked firms, and zero otherwise. The number of firms' banking relationships was, however, not regressed on this variable for obvious reasons. Others included (a) the natural logarithm of Informational Distance (between firm and its primary bank's headquarters, in kilometres), inspired by Petersen and Rajan (2002), Guiso and Minetti (2010), Witte, DeVuyst, Whitacre and Jones (2015), Refait-Alexandre and Serve (2016), and Duqi et al. (2017) to capture banks' monitoring cost; (b) the share of primary bank relationship duration in the firm's total banking duration (SPBRD), motivated by Guiso and Minetti (2004, 2010) who, to the extent that shorter average durations connote poor quality of informational content, greater resource (time and effort) investment and investment opportunity costs in the event of firm reorganisation, regards this variable as complementing ownership

concentration in proxying for restructuring cost; and, (c) the Herfindahl-Hirschman index of the durations of firms' banking relationships (HHID).

Whiles the above relationship time-and-distance factors corresponding to hard, verifiable and quantifiable measures of relationship strength were motivated by the information-centric (screening and monitoring) theory of financial intermediation, Refait-Alexandre and Serve (2016) have imported the sociologically rooted concept of relationship quality (RQ) from the relationship marketing literature to pioneer a test of its banking choice implications for firms. To the extent that RQ is a strategic imperative in an informationally opaque, intensely competitive and volatile banking environment (characterised by opportunism and uncertainty) for service quality improvements (via information exchange), client retention and loyalty, the study assessed the general banking relationships implications of RQ. Unlike Refait-Alexandre and Serve, however, a more comprehensive theory-driven statistical operationalisation of RQ was adopted. For the sake of brevity, a brief discourse on the definitions, dimensions and determinants of RQ is relegated to Appendix D. These definitions and other literature-driven determinants and dimensions of these first-order constructs informed the development of a 22-item Likert-style RQ scale (section G of questionnaire) which was subjected to a ML-factor analysis with the ultimate dual goals of data reduction and extraction of RQ-representative factors. Based on the results of factor analysis (see Appendix E for details), RQ was proxied by the first and second principal ML-extracted factors interpreted respectively as: (a) trust and commitment, and (b) satisfaction with service quality.

The secrecy or confidential information disclosure theory of firms' banking relationships (see Bhattacharya & Chiesa, 1995; von Rheinbaben &

Ruckes, 2004; Yosha, 1995) also motivated tests of the banking relationship implications of indicators of firms' research and development (R&D) and innovation adoption behaviours. A Research & Development indicator assumed a unit value if the firm had invested in R&D in the last five years (2014-2018), and zero otherwise. The study further adopted Detragiache et al.'s (2000) three dummies of innovation adoption: (a) General Innovation, assumed the value one if the firm had introduced both new production methods and processes as well as new products in the last five years (2014-2018), and zero otherwise; (b) Process Innovation, took the value of one if the firm had introduced new production methods and processes in the last five years (2014-2018); and, (c) Product Innovation, coded with one if the firm had introduced either new products or significant changes to its existing products in the last five years (2014-2018).

As firms' industry/sectoral affiliation determines the availability and nature of banking services and banking preferences (Aristei & Gallo, 2017), the study also considered the inclusion of sub-sector measures to control for agro-industrial sub-sectoral heterogeneities in banking choices. A Food & Beverages sub-sector dummy equated to one to identify AIFs primarily operating in the food or beverages sub-sector, and zero otherwise, was, therefore, included. Following the extant literature (e.g., Berger et al., 2008; Detragiache et al., 2000; Neuberger et al., 2006; Neuberger & Räthke, 2009; Ongena et al., 2012), the study also tested the strategic banking relationships effects of measures of firms' primary banks' health, size, nationality and ownership in investigations that did not have any of these measures as the dependent variable. These dummy variables (i.e., Liquid Bank, Large Bank, Foreign Bank and State-owned Bank)

were defined exactly as under the preceding sub-section on the description of the primary bank type choice as a dependent variable.

Finally, the study controlled for several environmental factors: (a) Ashanti & Greater Accra regions, a dummy equated to one for firms located in the Ashanti or Greater Accra Regions, and zero otherwise; and, (b) natural logarithm of regional Population Density to proxy for rural versus urban areas of firms' location. This was informed by regional disparities in economic development (Cooke, Hague, & McKay, 2016; GSS, 2015) reflecting in a rural-urban dichotomy paralleled by spatial disparities in the location of manufacturing firms that favour the Ashanti and Greater Accra Regions (Ackah et al., 2014; GSS, 2015). The consequence is a regional disparity in financial development with a similar pattern due to the general urban bias of some class of banks. Regional location, therefore, determines the availability and nature of banking services and, hence, firms' banking choices (Berger et al., 2008; Ongena & Şendeniz-Yüncü, 2011).

Differences in local banking market conditions and banking services supply emanating from differences in regional bank branching preferences and regional disparities in banking market competition or market power may result in differences in the availability of only specific bank type alternatives for firm's choice. To account for this, the study included the second, and final, set of environmental explanatory variables to examine the roles of (measures of) the dimensions, composition, structure (i.e., competition vs concentration) of the local banking market. The study adopted each firm's politico-administrative region of main operational location as the local banking market because of the low firm-bank distance despite the evolution of information technologies and

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the assumption that firms' regional location is the main arena for inter-bank competition.

The measurement of banking market structure and conduct is a subject of much-heated controversy in both the theoretical and empirical literature, generating two main measurement approaches. The structural approach, underpinned by the traditional structure-conduct-performance (SCP) paradigm which justifies the use of concentration-based measures of competition, has come under intense criticism on grounds of lack of consistency and robustness by proponents of the non-structural approach, based on the New Empirical Industrial Organisation (NEIO) approach (see, e.g., Bikker, Shaffer, & Spierdijk, 2012; Bikker & Spierdijk, 2017; Boone, 2008; Boone, van Ours, & van der Wiel, 2007; Demsetz, 1973; Léon, 2014; Liu, Molyneux, & Wilson, 2013; van Leuvensteijn, Bikker, van Rixtel, & Sørensen, 2011) . However, due to the Central Bank of Ghana's inability to furnish data regarding the regional distribution of banking input/output (i.e., deposits and loans) required for deriving non-structural measures of regional banking competition, the study employed a more traditional SCP-inspired concentration measure, motivated by its wide application in academic research. Given the availability of only regional bank branch distribution data, the study employed the Herfindahl-Hirschman Index of Regional Bank Branch Concentration (HHIRBBC), defined as the sum of squares of each bank's market share of the total number of bank branches operating in the firm's region of location, as a measure of banking market competition.

Given that $HHIRBBC_{t,m} = \sum_i (MS_{i,t,m})^2$, where $MS_{i,t,m}$ is the market share of the ith bank in the mth market at time t; and, then, for the mth

market/region containing the i, j banks during the year t, the index was averaged over the 2016-2018 period to obtain a fair and stable representation of the nature of regional banking market structure. Following Aristei and Gallo (2017), the study complemented this regional banking market competition measure with two other measures of the institutional composition of the regional banking market system: (a) Large Bank Branch Density, measured as the number of large bank branches (bank size already defined); and, (b) Foreign Bank Branch Density, measured as the number of foreign bank branches (foreign bank already defined).

Econometric Methodology

Generally, cross-sectional limited response variable micro-econometric estimation techniques (with a dominant application of simple generalized linear models (GLiMs) and some sample selection correction models) were employed in the empirical identification of the firm-specific determinants of each of the four dimensions of AIFs' strategic banking relationships under investigation. All model estimations, model selection procedures, diagnostic tests and evaluations were conducted with R statistical programming language. For simplification of maximal estimation models involving over 30 explanatory variables (i.e., adopting the general-to-specific estimation approach), the study employed stepwise procedures, particularly the variant that combines backward elimination and forward selection, to check potential multicollinearity and undertake deletion of unnecessary/nuisance regressors to obtain parsimonious models.

Model Specifications for Number of Banking Relationships

As a zero-truncated positive integer-valued (i.e., count) response variable, the number of firms' banking relationships motivated estimation of the standard parametric specification for count data - Poisson regression, a generalized linear model (GLiM). With the estimation of the Poisson GLiM under the assumption that the response variable follows a Poisson distribution of parameter θ_n (the response variable's conditional mean and variance) and the distributional assumption of equidispersion (i.e., mean-variance equality), the probability of observing a value of y_n (the discrete random variable) in the cross-sectional context, given by the Poisson probability mass function, is:

$$P(y_n) = \frac{e^{-\theta_n} \theta_n^{y_n}}{y_n!} \qquad\qquad 3.2$$

Using the exponential mean parameterization of the relation between the mean parameter (θ) and the covariates (regressors) X enables the derivation of the Poisson regression model (Cameron & Trivedi, 2005). Thus, employing the logarithmic link, the usual Poisson parameter specification (equivalent to the regression model) is the exponential of the linear predictor:

$$E\,(y_i \mid x_i) = \theta_i = \exp(x_i \beta)\,, \qquad i = 1,\ldots, N \qquad\qquad 3.3$$

$$E\,(y_i \mid x_i) = \exp(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_n X_{ni}) \qquad\qquad 3.4$$

where y_i is independently distributed as a Poisson random variable (NBR), the x is a vector of covariates of NBR (grouped into internal and external firm-specific determinants) and β is a vector of coefficients (including the intercept) corresponding to the included covariates. Non-linear in parameters, Equation 3.2 and the resulting cross-sectional Poisson regression model (Equations 3.3 or 3.4) are most naturally and efficiently estimated using maximum likelihood.

The usual contravention of the restrictive assumption of equidispersion (i.e., mean-variance equality, reflecting in the empirical equality of residual deviance and residual degrees of freedom) underpinning Poisson estimations, leading to overdispersion/underdispersion, calls for rescaling where necessary. To check the robustness of the Poisson estimation results to more flexible alternative parametric count regression model estimations, the study re-estimated with the richer negative binomial regression model which permits overdispersion (variance > mean) in the dependent variable. The negative binomial model may be algebraically derived, drawing heavily from Cameron and Trivedi (2005) and Croissant and Millo (2019), with a mixture distribution approach, particularly with the Poisson-gamma mixture distribution. It assumes that the count random variable y_n follows a Poisson distribution of parameter θ_n (= $\alpha_n \lambda_n$, where $\lambda_n = e^{x'\beta}$ employing the logarithmic link) which is random because, despite λ_n being a completely deterministic function of the regressors ($\exp(X'\beta)$), α_n is a random variable component representing the overdispersion parameter. The conditional probability of y_n is:

$$P(y_n \mid x_n , \beta) = \frac{e^{-\theta_n} \theta_n^{y_n}}{y_n!} = \frac{e^{-\alpha_n \lambda_n} (\alpha_n \lambda_n)^{y_n}}{y_n!} \qquad 3.5$$

where $E[\theta|\lambda] = \lambda$ if $E[\alpha] = 1$ to maintain the Poisson model parameter interpretation. Integrating out this conditional probability with respect to the random (unobserved) component α_n under the assumption that it follows the gamma distribution yields the negative binomial model as a mixture density as:

$$P(y_n \mid x_n) = \left(\frac{\delta_n}{\lambda_n + \delta_n} \right)^{\delta_n} \left(\frac{\lambda_n}{\lambda_n + \delta_n} \right)^{y_n} \frac{\Gamma(y_n + \delta_n)}{\Gamma(y_n + 1)\Gamma(\delta_n)} \qquad 3.6$$

where, generally, $\delta_n = (\lambda_n^{2=k})/v$. As for the Poisson model, for a given value of α_n, $E(y_n \mid x_n) = V((y_n \mid x_n) = \theta_n = \alpha_n \lambda_n$; and as $E(\alpha) = 1$, the unconditional mean is $E_\alpha(\alpha\lambda_n) = \lambda_n$ and the unconditional variance, computed by applying the variance decomposition formula, is $V(y_n) = E_\alpha(\alpha\lambda_n) + V(\alpha\lambda_n) = \lambda_n + (1/\delta_n) \lambda_n^2$. In parametric count regression applications, there exist two standard variants of the negative binomial model conditional on whether in the general formula for δ_n $k = 1$ or 2, namely, negative binomial 1 (negbin or NB1) or negative binomial 2 (negbin or NB2) and both variants are straightforwardly estimated by maximum likelihood. The study employed the NB2 variant due to its flexibility and adaptability, demonstrated provision of good model fit to varied types of count data and wide empirical application. Still in the spirit of robustness checks, the models were refitted using the quasi-Poisson errors to account for potential overdispersion.

Model Specifications: State-owned Banking and Diversification

The econometric determination and analyses of the probability of SOB and SDSOB relationship formations and (SOB and SDSOB) diversification choices of AIFs were generally conducted by means of univariate binary response GLiMs. The general goal was to explain the effects of AIFs' characteristics on the response probability $P(y = 1|x)$, where y generally represents SOB choices and x is a vector of firm-specific characteristics as explanatory variables. Specifically, the primary interests were on the probability of SOB and SDSOB relationship formations (Equations 3.7 and 3.8 respectively), and SOB and SDSOB diversification choices (Equations 3.9 and 3.10 respectively):

$$P(SOB_i = 1|x) = G(\beta_0 + x\beta) \qquad\qquad 3.7$$

$$P(SDSOB_i = 1|x) = G(\beta_0 + x\beta) \qquad\qquad 3.8$$

$$P(SOB\ Diversification_i = 1|x) = G(\beta_0 + x\beta) \qquad\qquad 3.9$$

$$P(SDSOB\ Diversification_i = 1|x) = G(\beta_0 + x\beta) \qquad\qquad 3.10$$

where β_0 is the intercept; $x\beta = \beta_1 X_1 + \ldots + \beta_k X_k$; the βs are estimated coefficients corresponding to the explanatory variables (Xs); and G is an invertible non-linear distribution function that assumes values strictly between zero and one to constrain the estimated response probabilities strictly between zero and one. For estimation of each model (in Equations 3.7-3.10), the study experimented with four such non-linear distribution functions, namely, the standard cumulative logistic distribution function (corresponding to the logit model), the standard normal cumulative distribution function (for the probit model), the gumbel distribution (related to the complementary log-log model), and the standard Cauchy quantile function (for the cauchit model). These binary response models were estimated by maximum likelihood and the experimentation entailed a direct comparison of the performance of this variety of binary response GLiMs and the determination of the most appropriate link function among the lot using, inter alia, the minimum residual deviance criterion (equivalent to the highest log-likelihood value criterion).

However, some extensions to these binary model estimation frameworks were made to identify multiple-banked AIFs with SOB relationships. Given that SOBs are, in essence, domestic financial institutions, a key precondition for firms' bank ownership-type diversification choices is a relationship with at least one domestic bank plus a relationship with at least one other bank, regardless of its nationality and ownership type. This implicitly makes bank diversification

across nationality (i.e., foreign versus domestic) a necessary condition for firms'

bank ownership-type diversification choices. In addition, generally, the strict

notion of firms' bank diversification choices is fundamentally premised on the

condition of maintaining multiple banking relationships whereby all the banks

are not of the same nationality or ownership type. This enables identification of

undiversified banked firms as those having an exclusive banking relationship or

multiple banking relationships with banks of the same nationality or ownership

type.

The basic assumption governing this identification process, therefore, is

that firms' bank ownership-type diversification choices are the ultimate

outcome of a sequence of closely interrelated and interdependent choices. In

consequence, there is a high likelihood that the determinants of firms' bank

ownership-type diversification choices are common with the observable and/or

unobservable factors that drive the probability of firms' bank nationality-type

diversification choices and relationship multiplicity to begin with. This points

to the plausible non-randomness of the process of selecting the sub-sample of

state-owned-bank diversified firms from the full sample of firms and the

consequent inappropriateness of single-equation modelling to predict firms'

bank ownership-type diversification choices due to potentially biased estimates.

To explicitly address this selectivity concern, a three-step sequential selection

estimation process was adopted in a robustness check.

The first step of the sample selection process entailed observing firms'

number of banking relationships (i.e., single or multiple banking relationships)

from the total (randomly selected) sample of firms and constructing a binary

dependent variable *Multiplicity*, coded one if firm *i* has multiple (two or more)

banking relationships and zero otherwise, predicted by the first selection equation (Equation 3.11):

$$P(Multiplicity_i = 1 \mid X) = \alpha_1 + \beta_{F1} X_i^{F1} + \beta_{G1} X_i^{G1} + \varepsilon_{1,i} \qquad 3.11$$

where for the observation of firm i, the Xs with superscripts F and G and a common subscript i denote vectors of K covariates grouped into internal and external firm-specific characteristics, F and G respectively; ε is the error, α is the intercept, and the βs with subscripts F and G denote vectors of parameters associated with the covariates.

The second sample selection step focused exclusively on multiple-banked firms (i.e., those observed to have *Multiplicity* = 1). It involved observing those multiple-banked firms' bank nationality-type diversification choices (between foreign and domestic banks) and defining another indicator dependent variable *DomDIV*, dummy-coded as one if the multiple-banked firm had a relationship with at least one domestically-owned bank and zero otherwise. This measurement automatically deselects multiple-banked but bank-nationality-type undiversified firms without a relationship with a domestic bank (i.e., all multiple-foreign-banked firms) to focus exclusively on both bank nationality-type diversified and undiversified banked firms sharing a common distinguishing feature of having a relationship with at least one domestic bank. The second selection model (Equation 3.12), therefore, investigated the determinants of multiple-banked firms' bank nationality type diversification choices (i.e., estimated only on the sub-sample of multiple-banked firms):

$$P(DomDIV_i = 1 \mid X) = \alpha_2 + \beta_{F2} X_i^{F2} + \beta_{G2} X_i^{G2} + \varepsilon_{2,i} \qquad 3.12$$

The third, and final, step determined whether, conditional on engaging in relationship multiplicity and domestic bank diversification (i.e., *Multiplicity*

=1 and *DomDIV* = 1), a firm diversifies across domestic bank ownership type (i.e., between private domestic or state-owned banks). As state-owned banks vary by sector-specific mandates, this enabled the creation of two alternative outcome (binary) variables: (a) *SOBDiv*, coded one for multiple-banked firms relating with at least one state-owned bank, and zero otherwise; and, (b) *SDSODDiv*, dummy-coded with one for multiple-banked firms relating with a sector development bank, and zero otherwise. The corresponding outcome equations (of prime interest to the study) predicting agro-industrial firms' SOB and SDSOB diversification choices are:

$$P(SOBDiv_i = 1 \mid X) = \alpha_3 + \beta_{F3} X_i^{F3} + \beta_{G3} X_i^{G3} + \varepsilon_{3,i} \qquad 3.13$$

$$P(SDSOBDiv_i = 1 \mid X) = \alpha_3 + \beta_{F3} X_i^{F3} + \beta_{G3} X_i^{G3} + \varepsilon_{3,i} \qquad 3.14$$

Unlike Berger et al. (2008) and Aristei and Gallo (2017), who respectively employ univariate and bivariate (with sample selection) probit models, for joint estimation of the outlined sequential conditional selection process to allow for error correlation, the current study employed the trivariate binary response selection model. It assumes trivariate distributed latent errors, using a generic first- and second-order analytical derivative information maximum likelihood framework, estimated via a stable and efficient trust region algorithm. This is implemented via a generalised joint regression modelling framework which allows for Gaussian and non-Gaussian dependencies, arbitrary link functions and a high degree of flexibility in modelling covariate effects with and without double sample selection (see, e.g., Marra & Radice, 2017, 2019; Marra, Radice, Bärnighausen, Wood, & McGovern, 2017).

Due to the strong commonality among the regressors in the three-step selection estimation procedure, exclusion restrictions need to be imposed to

achieve and strengthen model identification and selection correction. This entails a priori identification and insertion of exclusive regressors in each model (i.e., in one model but excluded in others). To improve identifiability of the relationship multiplicity model (Equation 3.11), the study followed Aristei and Gallo (2017) by including a dummy variable Hard Information, dummy-coded with one for regular submission of quantitative data for risk assessment in credit transactions, and zero otherwise, in the relationship multiplicity model only. The logic behind this choice rests in the secrecy theory (see, e.g., von Rheinbaben & Ruckes, 2004; Yosha, 1995) that predicts high (low) propensity for relationship multiplicity for hard (soft) information-wielding firms to foster (limit) disclosure of proprietary information. Conditional on relationship multiplicity, hard information (broadly, transactional relationship technologies) is assumed to be insignificant in influencing firms' bank diversification choices.

Unique identification of the bank nationality type diversification model (Equation 3.12) is also sourced from a dummy variable Firm Leverage1, already defined in the sub-section for explanatory variables. The premise for this identifying instrument lies on the concurrence of empirical results (Aristei & Gallo, 2017; Berger et al., 2008) that firms' financial vulnerability (manifest in low profitability and external debt overdependence) influences their diversification choices among domestic (private and state) intermediaries. The outcome equations (3.13 and 3.14, for the state-owned and sector-development bank diversification models respectively) were identified by the natural log of Population Density. Per Berger et al.'s empirically proven hypothesis, rural and informationally opaque firms with limited private-sector credit access are the commissioned targets of SOBs.

Model Specifications for Primary Bank Type Choices

The penultimate set of empirical models is geared towards achieving the third research objective of identifying the internal and external firm-specific determinants of AIFs' primary bank type choices. Given the distinct, mutually exclusive and exhaustive, and polychotomous structure of the categorical dependent variable (i.e., AIFs' primary bank types) without a natural ordering of alternative categories or sequence of preferences, and with strictly primary bank type choice-invariant (but firm-specific) set of regressors, multinomial unordered choice modelling emerges as the natural econometric estimation approach. However, the study declined adoption of this estimation method for two main reasons: (a) the simultaneous estimation of multiple equations in the multinomial framework requires an even larger sample size than the relatively limited sample size for this study, and (b) the inability to estimably capture the significant determinants of choice of the base category primary bank type whose parameter normalisation to zero enables model identification in the multinomial framework.

To address these issues with an alternative estimation procedure, the study drew inspiration from Coxe, West and Aiken's (2012) assertion that the canonical multinomial choice modelling framework entails estimation of *(a-1)* simultaneously solved binary regression equations, where *a* is the number of categories in the outcome variable, having chosen one reference outcome category. The study, therefore, adopted binary response GLiMs, where the dichotomized response variable was dummy-coded as one for a specific primary bank type choice, and zero otherwise, and separately regressed each of the six primary bank types as a function mainly of internal firm-specific factors, albeit

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local environmental factors play a complementary role in the determination of firm-bank matching preferences. More formally, the binary response models estimating the effects of firm-specific characteristics (as determinants) on the probability of a specific primary bank type choice take the form:

$$P(LLDS_i = 1) = \beta_0 + Z' \gamma + \varepsilon_{1,i} \qquad\qquad 3.15$$

$$P(LLDP_i = 1) = \beta_1 + Z' \gamma + \varepsilon_{2,i} \qquad\qquad 3.16$$

$$P(LLFP_i = 1) = \beta_2 + Z' \gamma + \varepsilon_{3,i} \qquad\qquad 3.17$$

$$P(LSFP_i = 1) = \beta_3 + Z' \gamma + \varepsilon_{4,i} \qquad\qquad 3.18$$

$$P(ISFP_i = 1) = \beta_4 + Z' \gamma + \varepsilon_{5,i} \qquad\qquad 3.19$$

$$P(ISDS_i = 1) = \beta_5 + Z' \gamma + \varepsilon_{6,i} \qquad\qquad 3.20$$

where the βs are the intercepts; the vector Z stands for observable (internal and external) firm-specific factors that influence the choice of a specific primary bank type; the γs denote vectors of parameters associated with the covariates; and ε represent the error term. A series of experimentations by which maximum likelihood estimation of these models that regressed each of the six primary bank types as a function of AIFs' characteristics using the afore-mentioned four link functions and applying the minimum residual deviance or highest log-likelihood value criterion enabled the choice of the most appropriate link function for estimating each model.

Model Specifications for Credit Relationship Intensity

As the measure of credit relationship intensity (i.e., the Herfindahl-Hirschman Index of borrowing shares) is strictly non-negative, left-censored at zero, and is essentially continuously distributed over strictly positive values that

are right-censored at one, credit relationship intensity is a corner solution response variable. The fourth, and final, research objective of explaining AIFs' credit relationship intensity in terms of firm-specific characteristics as determining factors was, therefore, initially conducted via a Tobit regression model (a special case of censored regression models) expressed as:

$$y_i^* = x_i^T \beta + \varepsilon_i, \qquad \varepsilon_i \mid x_i \sim \text{Normal}(0, \sigma^2) \text{ i.i.d.}, \qquad 3.21$$

$$y_i = \max(0, y_i^*) \qquad\qquad 3.22$$

where the observed response, credit relationship intensity (y_i), is expressed in terms of an underlying latent variable (y_i^*); x is a vector of covariates (i.e., firm-specific characteristics); β is a vector of coefficients associated with the covariates; ε is the error term; and Equation 3.22 implies that the latent variable is observed if only positive, and zero otherwise (i.e., $y_i^* = y_i$ when $y_i^* > 0$; but $y_i = 0$ when $y_i^* \leq 0$). This Tobit model was estimated by maximum likelihood.

This prototypical (censored) Tobit model is, however, underpinned by the restrictive assumption of equivalence of the models generating the censoring mechanism (i.e., the initial decision on participation: $y_i = 0$ versus $y_i > 0$) and the uncensored portion of the response variable (i.e., the magnitude or extent of y_i) given that $y_i > 0$ (Wooldridge, 2002, 2010). To address this fragility of the Tobit regression model, two alternative estimation approaches were adopted. First, the tenable assumption that firms' current credit relationship formation decision and the consequent borrowing shares are two separate but intertwined common-factor-dependent stochastic processes rationalises the maximum likelihood estimation of a two-part (or double hurdle) model (see, e.g., Craig, 1971; Jones, 1989), separately assuming independent (or uncorrelated) errors

and dependent (or correlated) errors for comparison of statistical robustness. In this study, the hurdle (i.e., the first part or extensive margin) consisted in whether or not a firm has a current credit relationship (i.e., $y_i > 0$) and only identified the significant determinants (as firm characteristics) of the probability of firms' decision to establish a current credit relationship. The second part (or the intensive margin), of greater relevance and interest to this study, explained the extent/degree of credit relationship intensity, given that a firm has a current credit relationship, in terms of firm characteristics.

More formally (drawing from Wooldridge (2002, 2010)), for a corner solution outcome variable as credit relationship intensity, the estimated two-part model has the functional form:

$$P(y_i = 0 \mid x) = 1 - \Phi(x\gamma) \tag{3.23}$$

$$Log(y_i) \mid (x, y_i > 0) \sim \text{Normal } (x\beta, \sigma^2) \tag{3.24}$$

where y_i is the relationship intensity measure; x is a vector of observed firm characteristics; β is a vector of estimated coefficients associated with the firm characteristics (as covariates); $\gamma = \beta/\sigma$; Equation 3.23 stipulates the probability that credit relationship intensity (y_i) is zero or positive; and Equation 3.24 states that, conditional on credit relationship intensity > 0, $y_i \mid x$ follows a lognormal distribution. The flexibility of this framework resides in the simultaneous modelling of the censoring mechanism (i.e., the current credit relationship formation decision) via a binary response GLiM and the modelling of non-zero borrowing concentration using different distributional densities, thus permitting both non-participation and corner solutions (the two sources of zeros).

Second, the study followed the literature (e.g., Bartz, 2016; Detragiache et al., 2000; Guiso & Minetti, 2004, 2010; Ongena et al., 2012) to model AIFs'

credit relationship intensity as a two-stage stochastic decision process to account for selectivity bias via the Heckman two-stage sample selection model. First stage (or extensive margin) probit estimation of the selection equation modelled AIFs' current credit relationship formation propensities on the full sample of firms, where the binary variable Current Credit Relationship (CCR) was equated to one if the measure for credit relationship intensity > 0 was observed, and zero otherwise. And, conditional on having a current credit relationship (i.e., with strictly positive values of the credit relationship intensity measure), an OLS regression (of credit relationship intensity on firm characteristics) augmented by an estimate of an omitted regressor (inverse Mills ratio) was estimated on the truncated sample in the second stage (or intensive margin) as follows:

$$(CRI_i \mid x_i \mid CCR_i = 1) = x_{2i}\beta_2 + \sigma_{12}\lambda(x_{1i}\widehat{\beta_1}) + \varepsilon_i \qquad 3.25$$

where CRI is credit relationship intensity, x_{2i} is a vector of firm characteristics; β_2 is a vector of coefficients corresponding to the observed firm characteristics; $\widehat{\beta_1}$ is a vector of coefficients associated with firm characteristics (x_1) and obtained from the first-stage probit estimation; $\lambda(x_1\widehat{\beta_1}) = \phi(x_1\widehat{\beta_1})/\Phi(x_1\widehat{\beta_1})$ (i.e., the ratio of the standard normal population density function to the standard normal cumulative density function, each evaluated at $x_1\widehat{\beta_1}$) is the estimated inverse Mills ratio (i.e., the omitted regressor) computed from the selection equation (first-stage probit estimation); σ_{12} is the coefficient of the inverse Mills ratio; and ε is the normal error term for an OLS estimation. However, model evaluation and selection from the two alternative estimation approaches to the Tobit model were aided by the use of specification tests and model fit statistics.

Summary Statistics

The full discourse on the econometric estimation results in the next four chapters is preceded by a descriptive analysis of all the (dependent and independent) variables in the dataset used for the study. Table 1 details the basic descriptive statistics, involving the distribution of key measures of central tendencies and variability, of the dependent variables observed from the final sample of 388 agro-industrial firms with complete data. Except the first and last response variables (which are respectively count and censored in nature), the means of the remaining dummy variables are interpreted as percentages (due to the statistical axiom that the means of numbers in the bijective base-2 numeral system (using only zero and one, and their corresponding frequencies) are equivalent to the relative frequencies of the non-zero indicator).

Ranging between one and 10, the number of banking relationships averaged roughly around three (specifically ≈ 2.5), indicative of the dominant multiple-banking tendencies among the sampled AIFs. Besides, of the total sample of firms (388 observations), 149 (representing 38.4%) were identified as having a primary relationship with a healthy (i.e., liquid) bank against 239 (61.6% of) firms with illiquid primary banks. On bank size, 137 (251) of sampled firms, respectively representing 35.3% (64.7%) of the full observation, courted large (small) banks in their primary banking relationships. Whilst, 156 (40.2% of) sampled firms had primary foreign bank relationships versus 232 (59.8% of) firms with primary domestic/local bank relationships, with respect to bank ownership type, 41.2% (58.8%) of sampled firms maintained primary relationships with state (private) banks. On the whole, these descriptive results evidence considerably wide cross-firm variations in preference for primary

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banks defined separately, and hence narrowly, on these bank structural-cum-performance characteristics.

Table 1: *Summary Statistics of Dependent Variables*

Variable	Mean	Std. Dev.	Min.	Max.
Number of Banking Relationships	2.508	1.476	1	10
Liquid Bank	0.384	0.487	0	1
Large Bank	0.353	0.479	0	1
Foreign Bank	0.402	0.491	0	1
State Bank	0.412	0.493	0	1
Sect. Dev SOB	0.229	0.495	0	1
Multiple-banked with State Bank	0.518	0.475	0	1
Multiple-banked Sect. Dev SOB	0.361	0.495	0	1
ISDS	0.320	0.467	0	1
ISFP	0.220	0.263	0	1
LLDP	0.110	0.180	0	1
LLDS	0.168	0.291	0	1
LLFP	0.082	0.275	0	1
LSFP	0.100	0.301	0	1
HHI (of Borrowing Concentration)	0.479	0.411	0	1

Source: Field survey (2019)

The sample also contained 51.8% and 36.1% of multiple-banked agro-industrial firms with relationships with sector-generic and sector-development-specific state-owned banks respectively. Besides, primary relationships with ISDS, ISFP and LLDP banks were maintained by 32%, 22% and 11% of the sampled firms, the rest of which had primary relationships with LLDS (16.8%), LLFP (8.2%) and LSFP (10%) banks. The mean Herfindahl-Hirschman Index of Borrowing Concentration was 47.9%, indicative of a slightly weak relationship intensity which somewhat controverts Bartz's (2016) evidence of agribusinesses' high relationship intensity.

Table 2 displays summary statistics of the internal and external firm-specific characteristics employed as independent variables for the study. It is worthy of note that Table 2 does not present the descriptive statistics of the six ML-extracted factors (trust and commitment, and service quality corporate relationships, bank efficiency/outreach, bank quality, and bank culture) as they are statistically meaningless. As is evident from the table, the mean firm had a workforce of 141 employees, varying between five and 2,897 employees, with large firms (i.e., those with 100 or more employees) comprising 35% (=136) of the sample. Ranging between five and 113 years old since business commencement (calculated from 2019), sampled firms had a mean age of ≈ 20, pointing to a slight old firm dominance (53%) of total observations. Only 27% of sampled firms had diversified into non-agro-industrial sectors. The means of Foreign Ownership, Family Ownership, and Concentrated Ownership suggested that the sample was clearly dominated by locally-owned (70%), non-family-owned (92%) and dispersedly-owned (58%) enterprises. Due to the slight dominance of old firms, it came as no surprise that 55% of sampled firms were governed by an administrative Board of Directors comprising of a mean of two members (Board Size), albeit with wide variations from zero to 11.

Furthermore, respondent firms had an average profitability of 12.32% (within a range of -7.08% and 87.58%), average liquidity of 102.4% (in a range of ≈ 36% to 238%) and mean leverage of 62.49% within 10.13% and 228.35%. The mean of 0.61 for SPBRD shows that the duration of relationships with primary banks contributed a greater share of the total duration of firms' banking experience. Clearly, the minimum share (for some firms) was way below the mean share, while the maximum share indicated that some firms exhibited

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perfect or complete concentration of the entire duration of their banking experience in exclusive banking relationships since business commencement. The mean of the Herfindahl-Hirschman Index of Duration Concentration (0.59)

Table 2: *Summary Statistics for Independent Variables*

Variable	Mean	Std Dev.	Min.	Median	Max.
Firm Size	141.04	289.76	4.75	62.60	2897.20
Large Firms	0.35	0.48	0.00	0.00	1.00
Firm Age	20.28	15.99	5.00	15.00	113.00
Old Firms	0.53	0.50	0.00	1.00	1.00
Industry Diversification	0.27	0.45	0.00	0.00	1.00
International Presence	0.12	0.32	0.00	0.00	1.00
Free Zone	0.11	0.34	0.00	0.00	1.00
Foreign Trade	0.47	0.50	0.00	0.00	1.00
Foreign Ownership	0.30	0.46	0.00	0.00	1.00
Family Ownership	0.08	0.41	0.00	0.00	1.00
Concentrated Ownership	0.42	0.49	0.00	0.00	1.00
Board of Directors	0.55	0.50	0.00	1.00	1.00
Board Size	2.37	2.34	0.00	3.00	11.00
Firm Profitability	12.32	9.44	-7.08	10.13	87.58
Firm Liquidity	102.40	18.85	35.62	101.95	238.00
Firm Leverage	62.49	15.25	10.13	63.44	228.35
Firm Leverage1	0.47	0.50	0.00	0.00	1.00
Refinancing Risk Exp.	58.58	14.88	29.48	57.24	100.00
Fixed Asset Tangibility	60.22	11.85	21.72	60.02	91.37
Group Membership	0.74	0.44	0.00	1.00	1.00
Hard Information	0.55	0.50	0.00	1.00	1.00
Exclusive Relationship	0.34	0.47	0.00	0.00	1.00
Informational Distance	118.11	106.66	1.00	90.00	420.00
SPBRD	0.61	0.30	0.06	0.53	1.00
HHI Duration Concent.	0.59	0.31	0.11	0.50	1.00
Research & Dev.	0.43	0.50	0.00	0.00	1.00
General Innovation	0.38	0.49	0.00	0.00	1.00
Process Innovation	0.46	0.50	0.00	0.00	1.00
Product Innovation	0.50	0.50	0.00	0.00	1.00
Food & Beverages	0.55	0.50	0.00	1.00	1.00
Ashanti & Greater Accra	0.69	0.46	0.00	1.00	1.00
Population Density	193.64	53.31	105.40	202.00	263.70
HHI RBB Concentration	0.09	0.06	0.05	0.08	0.22
Large Bk. Branch Dens	127.50	92.40	26.00	72.00	232.00
Foreign Bk Branch Dens	173.40	141.62	12.00	82.00	334.00

Source: Field survey (2019)

was indicative of a slightly long total banking duration, masking wide cross-firm variations. Regarding AIFs' R&D and innovation tendencies, the means suggested that firms that, in the last five years (2014-2018), had invested in R&D, adopted process innovation, product innovation and general (both process and product) innovation respectively comprised 43%, 46%, 50% and 38% of the sample.

With respect to sampled firms' regional characteristics, the Ashanti and Greater Accra Regions were the main locations of 69% of the sample firms whose regional locations were characterised by an average population (density) per square kilometre of about 194 people. For regional banking market characteristics, the low mean of the Herfindahl-Hirschman Index of Regional Bank Branch Concentration (0.09), indicative of competitive regional banking markets, was consistent with the result that 69% of the firms in the sample were located in competitive regional banking markets (i.e., the Ashanti and Greater Accra Regions). Overall, the regional banking markets of sampled firms were constituted by an average of 127 large and 173 foreign bank branches.

Chapter Summary

This chapter detailed the rationale behind the study's methodological choices, ranging from the guiding philosophy, research design, population description, sampling procedure to variable descriptions. It also specified and justified the adopted microeconometric estimation procedures and ended with the presentation of the descriptive statistics of the variables.

CHAPTER FOUR

DETERMINANTS OF THE NUMBER OF BANKING RELATIONSHIPS:

EVIDENCE FROM GHANA'S AGROINDUSTRIAL SECTOR

Introduction

This study generally investigates how agroindustrial firms' internal and external characteristics explain the formation of key banking relationships as strategic responses to financial services supply constraint. In line with the study's first specific objective of ascertaining the effects of such firms' characteristics on their choice of number of banking relationships, this chapter presents and discusses the empirical results of the internal and external determinants of the number of banking relationships maintained by AIFs in Ghana. The discourse on the empirical results of the econometric estimations is preceded by a brief report on the preliminary analyses.

Preliminary Analysis

Table 3 presents results of univariate tests (of differences in the medians in the number of banking relationships maintained by AIFs with contrasting observed characteristics) conducted using the Wilcoxon-Mann-Whitney test. Columns (2) and (3) show the Mann-Whitney U (M-W U) and Wilcoxon W (Wilc. W) values respectively, whiles the corresponding Z statistic and overall p-values are indicated in columns (4) and (5) respectively. As is evident from Table 3, the p-value of Bank Liquid motivates the failure to reject the null hypothesis of equality of median number of banking relationships between AIFs with primary liquid banks and those with primary illiquid banks. However, except Bank Ownership, which portends marginal statistical significance (at the

10% level) of the median difference in the number of banking relationships maintained by AIFs with primary private banks and those with primary state banks, all the observed firm groups dichotomised along a particular firm characteristic show robust significant differences in the choice of their number of banking relationships.

Table 3: *Univariate Analysis of Variables by NBR*

Variable		Obs. (1)	M-WU (2)	Wilc. W (3)	Z (4)	*p*-value (5)
Firm Size:	Small	251	1913.5	33539.5	-14.934	0.000
	Large	137				
Firm Age:	Young	181	6422.0	22893.0	-11.528	0.000
	Old	207				
Inter. Presence:	No	342	4133.0	62786.0	-5.394	0.000
	Yes	46				
Foreign Trade:	No	207	2606.0	24134.0	-15.101	0.000
	Yes	181				
Foreign Own.:	No	273	10140.0	47541.0	-5.685	0.000
	Yes	115				
Conc. Owner:	No	226	10571.0	23774.0	-7.327	0.000
	Yes	162				
Group Members.:	No	99	6262.5	11212.5	-8.618	0.000
	Yes	289				
Food & Bev:	No	173	16237.5	31288.5	-2.218	0.027
	Yes	215				
Bank Liquid:	No	239	16730.5	27905.5	-1.032	0.302
	Yes	149				
Bank Size:	Small	251	10879.5	42505.5	-6.171	0.000
	Large	137				
Bank Own.:	Private	228	16501.5	29381.5	-1.650	0.099
	State	160				

Source: Field results (2019)

For example, there is a significant difference in the median number of banking relationships maintained by AIFs with contrasting demographic characteristics (i.e., size (small and large) and age (young and old)), hinting of a potential validation of one of two competing hypothesis (emancipation or quality-signalling). Similar significant differences in the median number of banking relationships are observed for AIFs with contrasting market orientations

(domestic- or foreign-trade), primary banks' size (small or large) and nationality (locally- or foreign-owned). The validity of these preliminary test results is tested with count data regression models.

Count Data Regression Results and Analysis

Table 4 reports estimated results of the empirical analysis of the determinants of AIFs' choice of their number of banking relationships. To check the robustness of the results to alternative model estimations, the dataset was subjected to three different parametric count data regression model estimations, namely, the Poisson model and the more flexible negative binomial and quasi-Poisson models. The standard errors were sandwiched to account for potential biases arising from heteroscedasticity and autocorrelation. Models (1) and (2) in Table 4 present results of the sandwich-adjusted Poisson model estimations of the determinants of AIFs' choice of their number of banking relationships. In Model (1), measures of firms' demographic characteristics of size and age are in log levels, sharply contrasting their dichotomous measurements in Model (2). The aim of the latter operational form was to ascertain the statistical significance or otherwise of the percentage difference in the mean number of banking relationships maintained by AIFs with contrasting sizes (i.e., small vs. large) and ages (i.e., young vs. old), ceteris paribus.

Models (3) and (4) in Table 4, on the other hand, display results of the sandwich-adjusted negative binomial model estimations of the determinants of AIFs' choice of their number of banking relationships with the same respective substitutions for the different measures of firm size and age as in the Poisson case. Appendix F shows results from similar quasi-Poisson model estimations.

Table 4 generally presents the (sample average of) marginal effects from the count data model estimations. In parenthesis, under the marginal effects, are the z-statistics which, in Appendix F, are also in parenthesis, but beneath the estimated regression coefficients for the quasi-Poisson model.

Table 4: *Determinants of AIFs' Number of Banking Relationships*

Variable	Model (1)	Model (2)	Model (3)	Model (4)
Firm Size (Large Firm)	0.169	0.210	0.169	0.210
	(2.976)***	(2.768)***	(2.976)***	(2.768)***
Firm Age (Old Firm)	0.183	0.172	0.183	0.172
	(3.271)***	(3.290)***	(3.271)***	(3.290)***
International Presence	0.222	0.1796	0.222	0.1796
	(2.368)**	(1.691)*	(2.368)**	(1.691)*
Foreign Trade	0.113	0.1293	0.113	0.1293
	(1.534)	(1.817)*	(1.534)	(1.817)*
Foreign Ownership	0.121	0.141	0.121	0.141
	(2.011)**	(2.105)**	(2.011)**	(2.105)**
Concentrated Owners.	0.050	0.003	0.050	0.003
	(1.106)	(0.064)	(1.106)	(0.064)
Ref. Risk Exposure	0.013	0.014	0.013	0.014
	(4.766)***	(4.681)***	(4.766)***	(4.681)***
Fix. Asset Tangibility	0.007	0.008	0.007	0.008
	(1.209)	(1.344)	(1.209)	(1.344)
Group Membership	0.112	0.088	0.112	0.088
	(1.789)*	(1.367)	(1.789)*	(1.367)
Share of Primary Bank	-3.350	-3.440	-3.350	-3.440
Relationship Duration	(-20.30)***	(-19.22)***	(-20.30)***	(-19.22)***
Service Quality	0.046	0.072	0.046	0.072
	(1.162)	(1.775)*	(1.162)	(1.775)*
Food & Beverage	0.106	0.073	0.106	0.073
	(2.453)**	(1.600)	(2.453)**	(1.600)
Liquid Bank	-0.083	-0.090	-0.083	-0.090
	(-1.536)	(-1.483)	(-1.536)	(-1.483)
Large Bank	0.097	0.152	0.097	0.152
	(1.803)*	(2.581)***	(1.803)*	(2.581)***
State-owned Bank	0.208	0.198	0.208	0.198
	(4.134)***	(3.791)***	(4.134)***	(3.791)***
Population Density	0.207	0.170	0.207	0.170
	(2.617)***	(2.211)***	(2.617)***	(2.211)***
Res. Deviance (*p*-val.)	0.991	0.931	0.979	0.928
Log likelihood	-530.08	-531.8	-530.08	-531.8
Likelihood ratio (16)	297.39***	293.97***	297.39***	293.97***
Wald test (16)	16.5***	16.17***	16.49***	16.17***
Prob > χ^2	0.000	0.000	0.000	0.000
No. of Observations	388	388	388	388

Source: Field results (2019)

The statistical significance levels of the observed determinants across all estimations are indicated by the number of asterisks, where three (***) asterisks indicate significance at the 1% level or less, two (**) at the 5% level, and one (*) at the 10% level. Interestingly, after the sandwich adjustments, the directions, magnitudes and significance of the z-statistics and the marginal effects are identical across all estimations with the same observed firm characteristics, thus attesting to the consistency of the estimation results. Further, altering the measurement of the demographic characteristics (age and size) leaves the direction of impact of the observed characteristics unaltered, another indicator of the consistency of the results. However, such alterations in the measurement of the demographic characteristics lead to some variations in statistical significance and economic relevance of some observed factors. Specifically, it neutralized the initial relevance of Group Membership and Food & Beverage, elevated Foreign Trade and Service Quality into marginal significance and dampened (accentuated) the significance of International Presence (Large Banks). This leaves the significant impacts of Foreign Ownership, Refinancing Risk Exposure, Share of Primary Bank Relationship Duration (SPBRD), State-owned Bank and Population Density robust across all model estimations. However, because the likelihood ratio test of alpha and the Cameron and Trivedi test complementarily upheld the equidispersion assumption underlying the standard Poisson model whose residual deviances, in addition, entered with the highest p-values the following interpretations and discussions are based on the Poisson GLiM results (i.e., models (1) and (2)).

The results indicate that, regardless of the measurement form, firms' demographic characteristics of size and age generally have positive and

statistically highly significant effects on the number of banking relationships. In Model (1), an increase in firm size and firm age by 1% is respectively associated with ≈ 17 and 18 percentage points increase in the mean NBR. These results are corroborated by evidence of an equally statistically highly significant percentage difference in the mean NBR maintained by small versus large AIFs and by young versus old AIFs [Model (2)]. Specifically, the mean NBR maintained by large and old AIFs is respectively 21% and 17% greater than that maintained by their small and young counterparts. This confirms that AIFs with sharply contrasting size and age classes have significant differences in their penchant for multiple banking relationships. These findings are consistent with several prior empirical evidence (e.g., Aristei & Gallo, 2017; Nifo et al., 2018; Refait-Alexandre & Serve, 2016; Ongena & Yu, 2017). This generally validates the applicability of the emancipation (or life cycle) hypothesis, rather than the quality-signalling hypothesis, in explaining AIFs' choice of their number of banking relationships.

In relation to the "polygamous" banking behavioural effect of AIFs' operational scope, International Presence exerted a statistically significant positive effect on the mean NBR. Internationally present AIFs' mean NBR was ≈ 22% higher than that of their internationally absent counterparts, validating Braggion and Ongena's (2013) observation of a century-old increasing probability of a transition to the multiple banking regime by internationally present firms. Focusing on the actual number of banking relationships as a point of departure, this study's finding upholds Braggion and Ongena's hypothesis that relationship multiplicity may be rationalised by the increasing, more sophisticated and geographically diverse credit and service demands by

internationally present AIFs. As heralded in the univariate analysis and consistently statistically significant (at the 5% level) across all the estimated models, foreign ownership corresponded with a higher number of banking relationships. Foreign-owned AIFs had an $\approx 12\%$ greater mean NBR than their locally owned counterparts. Contrary to Aristei and Gallo's (2017) results, this finding is in sync with Berger et al.'s (2008) original empirical evidence and argument that transparent and quality-instrument-wielding foreign-owned firms' penchant for relationship multiplicity is driven by an increasing requirement for both domestic and international cash management services for their complex operations (see also Berger et al., 2003).

With regard to the effect of financial health, the mean NBR significantly (at the 1% level across all estimations) increased by at least 1.3 percentage points for a percentage point increase in AIFs' refinancing risk exposure. This signals that financial constraint arising from the inability (ability) to refinance or roll over maturing debt at reasonable (significantly high) interest rates drives the propensity for relationship multiplicity. This result is consistent with several extant theoretical predictions. First is the incomplete contract theoretical prediction of relationship multiplicity for firms anticipating and desirous of avoiding potential hold-up problems (Niinimäki, 2015; Rajan, 1992; Sharpe, 1990; von Thadden, 2004). Second, Thakor's (1996) noisy screening model predicts the evolution of relationship multiplicity as an adaptive response to potential credit rationing. In addition, according to the firm risk diversification hypothesis (Cosci & Meliciani, 2002; Farinha & Santos, 2002) incumbent main banks' refusal or reluctance to increase their exposure to firms due to the latter's poor past performance incentivises both relationship multiplicity to mitigate

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firms' financial constraints and risk-sharing among banks. It also fits very well with Carletti (2004) and Bris and Welch's (2005) model predictions of attractiveness of multiple-bank relationships for poor quality firms.

Contrary to prior evidence on the statistical and economic irrelevance of business group membership to explaining the multiple-banking phenomenon (Aristei & Gallo, 2017; Detragiache et al., 2000; Nifo et al., 2018), well-connectedness (as in Berger et al. (2008)) increased the mean NBR, albeit marginally significant. Well-connected AIFs had an ≈ 11% higher mean NBR than AIFs without business group membership. Two complementary arguments may explain this group membership effect: (a) a lack of or limited access to intra-group financial resources and liquidity increases firms' overdependency on bank finance, necessitating relationship multiplicity; and, (b) conditional on the group membership mechanism being a channel for state-guaranteed development finance from different banks, having a formal relationship with such banks as a sine qua non for accessing such funds increases the number of banking relationships.

Despite the empirically dominant positive nexus between relationship duration and both relationship multiplicity propensities and the actual number of banking relationships (see, e.g., Farinha & Santos, 2002; Machauer & Weber, 2000; Ogawa et al., 2007; Ongena & Smith, 2001), the share of AIFs' primary banks' duration in their total banking experience (duration) entered negatively and is highly significant (at the 1% level) with large marginal effects. Seemingly consistent with the Dewatripont and Maskin (1995) model prediction for a competitive banking market, this finding, which is robust to alternative model estimations, is coherent with some empirical papers (e.g., Guiso & Minetti,

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2004; Ziane, 2003). Interestingly, this is the solitary correlate of NBR with a significant negative effect. This shows the critical importance of durability of relationships between AIFs and their primary banks and the consequent improvements in the quality of informational flow in such durable relationships to building firms' loyalty to primary banks and discouraging multiple banking relationships.

Despite providing a crude signal of the relative strength/quality of AIFs' banking relationships to ensure refinancing opportunities, especially in a competitive banking regime, this result masks profound policy implications consistent with theoretical predictions. In the general macroeconomic context of increasing lending rates (insensitive to market competition and monetary policy dictates), adverse selection and Winner's Curse (especially for risk-ridden agro-related enterprises), the intense interaction consequent to an improved firm-bank relationship strength portends informational capture and firm lock-in. The resultant loss of bargaining power, paving the way for bank exploitative tendencies and credit supply hold-up (see incomplete contract theoretical predictions of Greenbaum et al. (1989), Rajan (1992), Sharpe (1990) and von Thadden (2004)) comes with positive bank profit implications but stalled or adverse firm growth and overall development outcomes in the absence of investible projects with positive net present values.

Another fresh evidence is that, significant at the 5% level, AIFs operating primarily in the food and beverages sub-sector have a 11% greater mean NBR than their counterparts operating in other agro-industrial subsectors. This novel finding upholds the predictions of the Bolton and Scharfstein (1996) model according to which firms operating in sub-sectors subject to business

cyclicality due to production seasonality have a greater propensity for engaging in multiple banking relationships. Business cyclicality potentially results in impairment of repayment capacity, informs financial institutional disinclination to agro-related finance, and rationalises ex ante relationship multiplicity propensities, especially for undiversified AIFs, to mitigate potential credit supply frictions.

Consistent with Ongena and Smith's (2000b) ground-breaking evidence and subsequently inspired papers (e.g., Berger et al., 2001; Neuberger et al., 2008; Ongena et al., 2012; Volpin, 2001, 2007), primary relationships with large banks corresponded to a significantly higher mean NBR. Specifically, AIFs in primary relationships with large banks had at least 10% greater mean NBR than their counterparts in primary small bank relationships. However, this result is contrary to the predictions of Detragiache et al.'s (2000) bank liquidity risk diversification theory according to which the relationship multiplicity probability increases in bank fragility (here proxied by bank size); conditional on multiple banking, the theorem posits a positive impact of relationship banks' fragility on firms' NBR. It is also discordant with the monitoring intensity and diversification theoretical predictions of Carletti (2004) and Carletti et al. (2007) who espouse the suboptimality (optimality) of relationship multiplicity (exclusivity) as bank size increases (decreases) for monitoring reasons. At least two mutually inclusive arguments may explain this empirical finding: (a) large banks' provision of wide-ranging services with relatively higher screening costs incentivises loan parcellation (i.e., partial funding of many borrowing firms) that creates unmet credit supply gaps, provoking multiple-banking decisions; and, (b) large banks' exploitation of their comparative advantage in the usage

of transactional technology (impersonal arm's-length interactions involving "hard" information) is not well-suited to informationally opaque AIFs.

Similar to Berger et al.'s (2008) original evidence, but controverting the direction of their result, the study documents consistently strong statistical significance (at the 1% level) and substantial magnitudes of marginal effects of ≈ 21% of AIFs' main banks' ownership structure on their NBR. Specifically, AIFs in primary relationships with state-owned banks had 21% higher mean NBR than their counterparts in primary relationships with private (domestic and foreign) banks. In tandem with Ongena et al.'s (2012) finding, this result may be rationalised by two complementary strands of arguments from the firm-bank relationship and state ownership literature: (a) state-owned banks' financial fragility incentivises credit-constrained AIFs to maintain "polygamous" banking relationships to avert project refinancing discontinuation from credit hold-up (à la Detragiache et al.'s (2000) bank liquidity risk diversification theory), and (b) state-owned banks' awareness of their systemic indispensability to the banking industry and AIFs, and their relative long-term distress-proofness due to strong government backing drive their adoption of arm's-length impersonal transactional relationship styles which are at variance with the close working relationship expected by agribusinesses (Bard et al., 2002; Bartz, 2016).

Finally, the statistically significant positive effect of population density, the solitary external or environmental control, shows that the mean number of banking relationships increased by 21 percentage points with a 1% increase in population density, pointing to urban-based AIFs association with relationship multiplicity. Assuming a positive correspondence between population density

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and both contributions to national output and banking market development, population density may serve as a composite, but noisy, proxy for regional economic development and banking market competition. On the premise of the tenability of this assumption, this result may be extended into two implications: (a) a positive nexus between local/regional economic development and relationship multiplicity, sharply contrasting Aristei and Gallo (2017) and Nifo et al.'s (2018) empirical evidence; and, (b) the NBR increasing in regional banking market competition, in tandem with the Dewatripont-Maskin model implications, and corroborated by several empirical priors (e.g., Aristei & Gallo, 2017; Mercieca et al., 2009; Nifo et al., 2018; Ongena & Smith, 2000b; Volpin, 2001). Albeit intuitive, these conjectural extensions, however, require empirical validation for inferences.

Summary

Generally, AIFs' internal characteristics (size, age, international presence, ownership structure, refinancing risk exposure, group membership, share of primary bank relationship duration, sub-industry affiliation, and primary banks' size and ownership) and external characteristics (regional population density) are statistically and economically relevant in determining their number of banking relationships. Evidently, the main covariates of AIFs' NBR emerge from their internal characteristics; and the singular variable with a remarkably significantly negative effect is the share of firms' primary banks' duration in their total banking duration. This highlights the primary importance of intertemporal improvement in informational flow and quality in sustained firm-bank interactions to AIFs' loyalty to their primary banks.

CHAPTER FIVE

EFFECTS OF FIRM CHARACTERISTICS ON STATE-OWNED

BANKING CHOICES

Introduction

This research generally uncovers the significant internal and external determinants of agro-industrial firms' strategic banking relationship formations in Ghana. Resolving the study's second specific question, this chapter presents and discusses the empirical results relating to the internal and external determinants of AIFs' state-owned banking (SOB) relationship formations and diversification choices. A brief discourse on the results of univariate analysis precedes the main focus of this empirical chapter.

Univariate Analysis

This preliminary analysis was conducted via a *t*-test of significance of the difference in means of the observed firm characteristics of two relevant sets of AIFs (i.e., those with SOB relationships vs. those without such relationships) to generate tentative findings that harbingered results from binary response GLiM estimations. Table 5 reports the comparative (mean difference) test results. Columns (2) and (3) respectively show the means and mean differences of the observed variables for the two groups. Column (4) presents the corresponding *p*-values for the mean differences. Except Firm Profitability and Research & Development, all the observed explanatory variables (excluding the maximum-likelihood extracted factors representing decision-specific bank preferences) were statistically highly significant (at the 1% level) in influencing AIFs' SOB choices. Specifically, for example, free zone AIFs constituted 17%

(5%) of firms with (without) SOBs, motivating the tentative conclusion that free zone AIFs have a greater proclivity for SOB relationship formation. Thus, the signs and statistical significance of the actual values of the mean differences correspond to the direction of (change in) probability of association of a particular firm characteristic with SOB choices. Similarly, significantly greater propensities for SOB choices are observed for free zone, foreign-trade-oriented, large-boarded and well-connected AIFs. In contrast, foreign-owned, single-banked, urban-based AIFs and those whose durations of their relationships with their primary banks `command a greater share of their total banking duration (SPBRD) were significantly less likely to make SOB choices. Test results for the subsequent predictive model analyses may (in)validate these initial provisional findings.

Table 5: *Univariate Analysis of Variables by SOB Choices*

Variable		Obs. (1)	Mean (2)	Mean Diff. (3)	*p*-value (4)
Free Zone	With SOB	255	0.17	0.120	0.000
	Without SOB	133	0.05		
Foreign Trade:	With SOB	255	0.60	0.389	0.000
	Without SOB	133	0.21		
Foreign Own.:	With SOB	255	0.25	-0.144	0.003
	Without SOB	133	0.39		
Board Size:	With SOB	255	2.68	0.908	0.000
	Without SOB	133	1.77		
Firm Profit.:	With SOB	255	12.79	1.375	0.211
	Without SOB	133	11.42		
Group Members.:	With SOB	255	0.83	0.241	0.000
	Without SOB	133	0.59		
Exclusive Rel.:	With SOB	255	0.23	-0.321	0.000
	Without SOB	133	0.55		
SPBRD:	With SOB	255	0.52	-0.240	0.000
	Without SOB	133	0.76		
Res. & Dev.:	With SOB	255	0.40	-0.070	0.243
	Without SOB	133	0.47		
Pop. Density:	With SOB	255	5.20	-0.084	0.006
	Without SOB	133	5.28		

Source: Field survey (2019)

GLiM Analysis: State-owned Banking Relationships

Columns (1) and (3) of Table 6 respectively report heteroscedasticity- and autocorrelation-robust z-statistics (in parenthesis) under parameter coefficients from probit model estimations of the determinants of AIFs' state-owned banking (SOB) and sector-development state-owned banking (SDSOB) relationship formations. The statistical significance levels of the observed determinants are indicated by the number of asterisks, where three (***) asterisks indicate significance at the 1% level or less, two (**) at the 5% level, and one (*) at the 10% level. Columns (2) and (4) present the estimated (sample average of) marginal effects on probability levels of regressor variations corresponding to the model outputs in columns (1) and (3) respectively.

The discussion of the estimated results is preceded with a brief note on model adequacy. The study transcended rudimentary deviance significance tests (showing *p*-values of 0.99 and 0.98 for the models in columns (1) and (3) respectively to signal robust fits) to apply four additional key model adequacy tests. First is McFadden's Pseudo-R^2, a relative gain measure. According to McFadden (1974, 1978), values of this model fit index ranging from 0.2 to 0.4 represent very good model fit. The values were ≈ 0.5 and ≈ 0.4 for the SOB and SDSOB relationship formation models respectively, confirming robust model fits by McFadden's standards. Secondly, correct classification rates (corresponding, on the flipside, to classification error rate) determined from confusion matrices comparing predicted probabilities with actual outcomes for the respective models indicated $\approx 84\%$ and $\approx 81\%$ correctly specified (against $\approx 16\%$ and $\approx 19\%$ misclassified) observations in the SOB and SDSOB relationship formation models respectively.

Table 6: *Determinants of AIFs' State-owned Banking Choices*

Variable	Gen-SOB	Gen-SOB MarginEff	SD-SOB	SD-SOB MarginEff
	(1)	(2)	(3)	(4)
Firm Age (log)			0.213	0.048
			(1.409)	
Industry Diversification			0.486	0.110
			(2.459)**	
Free Zone	0.705	0.133		
	(2.132)**			
Foreign Trade	0.978	0.185		
	(3.162)***			
Foreign Ownership	-0.673	-0.127	-0.733	-0.166
	(-2.662)***		(-2.799)***	
Board of Directors			1.026	0.232
			(2.635)***	
Board Size	-0.109	-0.021	-0.367	-0.083
	(-2.004)**		(-3.957)***	
Firm Profitability	-0.025	-0.005	-0.015	-0.004
	(-2.361)**		(-1.484)	
Group Membership	0.463	0.088		
	(2.062)**			
Efficiency & Outreach	-0.814	-0.154	-0.373	-0.084
	(-5.689)***		(-2.771)***	
Bank Quality	0.772	0.146	0.554	0.125
	(6.420)***		(4.986)***	
Bank Culture	0.282	0.053	0.474	0.107
	(2.452)**		(4.267)***	
Exclusive Relationships	0.692	0.131	2.730	0.618
	(1.490)		(3.883)***	
Informational Distance			0.145	0.033
			(2.158)**	
Share of Pry Bank Rel. Duration	-3.263	-0.617		
	(-3.670)***			
HHI of Banking Duration			-6.847	-1.55
			(-5.270)***	
Research & Development	-0.505	-0.096		
	(-2.583)***			
Food & Beverage			0.795	0.180
			(4.607)***	
Population Density	-0.830	-0.157	-2.488	-0.563
	(-2.552)**		(-5.841)***	
Reg. Bank Branch Concentration			-6.713	-1.520
			(-3.420)***	
McFadden Pseudo R^2	0.471		0.409	
Correct Classif. Rate	0.835		0.807	
Area under ROC	0.918		0.897	

Source: Field results (2019)

This evaluation approach is, however, not a perfect summary of model

fit as it involves an arbitrary choice of a 0.5 cutoff for the predicted probabilities

and, hence, does not distinguish between predictions of 0.6 and 0.9, for example. Overall predictive accuracies of the models were obtained from accuracy and receiver operating characteristics (ROC) curves which evaluated model performance at every conceivable cutoff. The predictive power of each model was determined by the total area under the ROC, that is AUC, which specified the proportion of correctly classified observations as a performance index. As indicated by Appendix G, which displays the accuracy and ROC curves of each model, the AUCs, ranging from 89.7% to 91.8% for the SDSOB and Gen-SOB models respectively, represent sufficient model fits to permit discussion of the results.

A core establishment and operational mission of SOBs in developing economies is to serve "priority" enterprises which have been grossly neglected by private (domestic and foreign) banks. Such firms' supposed informational opacity and consequent high credit risk arising from certain peculiarities (e.g., size, age, ownership/governance structures, physical distance from bank's headquarters, locational and banking market characteristics, etc.) require high monitoring intensity and costs which disincentivise their patronage by private banks. The theoretically informationally opaque class of small, young, locally-owned, poorly governed, rural and informationally distant AIFs and those in concentrated regional banking markets are, therefore, expected to maintain SOB relationships to discount the mission drift argument against SOBs.

The results, however, indicate the conspicuous irrelevance of the firm size effect and statistical insignificance of the firm age effect on state-owned (both sector-generic and sector-development) banking relationship formations. This evidence of lack of clarity of the age and size structure of AIFs served by

SOBs disables any arguments for or against the mission drift hypothesis. In contrast, three measures of AIFs' operational scope entered significantly. Partly consistent with prior evidence (e.g., Ongena & Şendeniz-Yüncü, 2011) and significant at the 5% level, non-agro-industry diversified AIFs had an ≈ 11 percentage points higher likelihood of maintaining a sector-mandated SOB relationship. Exploitation of the benefits of their strategic relationship with sector-mandated SOB(s) to engage in such inter-industry diversification to dampen liquidity volatility and spur firm growth incentivises non-agro-industry diversified AIFs' SDSOB choices.

Furthermore, statistically significant at the 5% and 1% levels respectively, free zone and foreign-trade-oriented AIFs had ≈ 13 and ≈ 19 percentage points higher propensity than their counterparts in maintaining relationships with SOBs, regardless of their mandated operational sector. In relation to the latter finding, while Aristei and Gallo (2017) posit that internationally active Italian manufacturing firms prefer the generality of national banks, this empirical evidence gives clear specificity on the ownership structure of the kinds of national banks serving AIFs. On the face of it, these novel findings appear counterintuitive on account of the ownership structures and market destinations of the products of the AIFs in question. However, two mutually inclusive speculative arguments may rationalize these nexuses. First, SOBs' relatively deeper rural and peri-urban banking market penetration permits exploitation of SOB relationship formations as vehicles for discharging compensatory and financial contracts relating to rural-sourced production inputs, rural employment and conveyance. In addition, foreign banks' characteristic disinclination to agro-related finance isolates SOB relationships

as the optimal local banking channel to foster AIFs' internationalization drive, especially for the locally-owned genre.

The marginal effects corresponding to the consistently highly significant (at the 1% level) negative coefficients of Foreign Ownership in both models put closure on the above speculative argument. They indicate ≈ 13 and ≈ 17 percentage points reduction in the likelihood of foreign-owned AIFs' general state-owned and sector-development SOB banking relationship formations respectively. While this result may be rationalized by foreign-owned AIFs' preference for private (especially foreign-owned) banks because of ownership compatibility and the latter's comparative advantage in processing "hard" information and upholding confidentiality of proprietary firm information, the implication that locally-owned AIFs have a strategic preference for SOB relationships discredits the mission drift argument. In sync with previous empirical evidence (e.g., Aristei & Gallo, 2017; Berger et al., 2008; Ghosh, 2016), the consistency of these results reflects the dominance of firms' ownership structure over their industry/sector affiliation in their bank ownership type choices.

Moreover, there are two corporate governance-related findings with implications linked to the mission drift hypothesis. Firstly, board-governed AIFs had a highly significant (at the 1% level) 23 percentage points greater likelihood of maintaining SDSOB relationships. This significant association seems to be a sequel to strategic corporate policy in light of the cognizance of the positive credit market outcomes (e.g., credit availability, lending rate, etc.) of state usage of sector development bank(s) as vehicles of priority sector development finance. However, if the presence of a governing directors' board

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signifies informational transparency, then this result implies SDSOBs' lower likelihood of serving informationally opaque AIFs and validation of the mission drift argument against SDSOBs. Secondly, however, a unit increase in board size had consistently significant (at the 5% and 1% levels) ≈ 2 and ≈ 8 percentage points lower likelihood of relating with sector-generic and sector-specific SOBs respectively. On the premise of a positive correlation between board size and informational transparency (see, e.g., Braggion & Ongena, 2013), two key implications are evident: (a) improvement in informational transparency and firm quality (inherent in large-board-governed firms) increase AIFs' propensity for relationships with privately-owned (domestic/foreign) banks, in sync with Berger et al. (2008); and (b) the generality of SOBs serving informationally opaque AIFs with weak corporate governance structures is a counterargument to the mission drift conjectures. On the basis of the significant difference in magnitude of marginal effects, the general observation is that SOBs tend to serve well-governed AIFs, upholding the mission drift thesis.

Additionally, AIFs' financial condition and access to external (non-bank) finance influenced their SOB choices. Consistent with empirical priors (e.g., Berger et al., 2008; Ghosh, 2016), low profitability and business group belongingness significantly (at the 5% level) drove AIFs into relationships with SOBs, increasing the likelihood of such relationships by ≈ 0.5 and ≈ 9.2 percentage points respectively. While the negative firm profitability effect signals private (domestic and foreign) banks' cherry-picking behaviour and/or SOBs' accommodation of unhealthy AIFs at the expense of their own health due to their core establishment mandate, it is aptly symptomatic of the nature of the firm-bank relationships predicted by the soft-budget constraint hypothesis.

Proxying access to external (non-bank) finance, business group membership is increasingly becoming a distinguishing feature of AIFs' networking and, as a contemporary channel for development finance in the "second coming" of the traditional directed finance paradigm, the group membership effect appears a logical finding.

Another set of novel and insightful results pertains to the consistent effects of the Aristei-Gallo-inspired ML-extracted factors proxying measures of decision-specific bank preferences on AIFs' sector-generic and sector-specific SOB choices. The results show highly significant (at the 1% and 5% levels) $\approx$ 15 and $\approx$ 8 percentage points reductions in the propensity for sector-generic SOB and SDSOB relationships respectively for AIFs attributing importance to their primary banks' efficiency and outreach (collectively interpreted as availability of international branch networks, advances in ICT, and procedural speed). Again, unlike Aristei and Gallo (2017) who posit that Italian manufacturing firms emphasizing banks' availability of international networks prefer the generality of national banks, this result gives clarity on the ownership structure of the kinds of national banks serving AIFs. Further, the consistently highly significant, large and positive marginal effects corresponding to the coefficients of Bank Quality indicate that AIFs' emphasis on primary banks' quality (in terms of satisfaction with service range and quality, extensiveness of local branch networks, market dominancy, and reputation) increased the proclivity for relationships with the generality of SOBs and SDSOBs by $\approx$ 15 and $\approx$ 13 percentage points respectively. Similarly, AIFs emphasizing primary banks' culture (in relation to consultancy, suitability of image, and promises and

guarantees) have ≈ 5 and ≈ 11 percentage points greater likelihood of SOB and SDSOB relationship formations respectively.

Berger, DeYoung, Genay and Udell's (2000) home-field (global) advantage (disadvantage) hypothesis attributes domestic (including state-owned) banks' inefficiency to relatively limited international banking market exposure, technology adoption lag and limited access to a technologically savvy, adaptable and well-educated workforce. However, these banks' comparative advantage resides in the possession of sufficient and better knowledge of the local economy, banking market and clientele arising from their first-mover habit and wide geographic footprints. Coupling these arguments with sector-specific consultancy expertise of SOBs and the congruence of AIFs' business lines and image with those of SOBs, the spirit of Berger et al.'s hypothesis rationalizes these ground-breaking evidence on the effects of decision-specific bank preferences on AIFs' sector-generic and sector-specific SOB choices in toto.

Unsurprisingly, the SOB choice effects of two observed measures of AIFs' banking relationship strength did not only have the expected directional signs but were also statistically distinct from zero. Significant at the 1% level, sector-specific SOBs were more likely to serve single-banked AIFs, indicating the closeness and strength of their working relationship, in sync with the spirit of Bard et al. (2002) and Bartz's (2016) premier evidence for agribusinesses. Corroboratively, informationally distant AIFs had a significant ≈ 3 percentage points higher likelihood of maintaining SDSOB relationships. Given the general indispensability of banking services for firms and the urban bias of private (domestic and foreign) banks vis-à-vis the wide geographic footprints of

relatively available SOBs, this finding is intuitive, points to the informational opacity of AIFs that SOBs serve, and discounts the mission drift argument.

However, the concordant and highly significant effects of two additional, but more nuanced and complementary, indicators of relationship strength moderate the obvious implications of the preceding results. These relate to the result that the propensities for SOB and SDSOB relationship formations decreased in AIFs' primary banks' share of total banking duration (consistent with univariate results) and in duration concentration respectively. Whiles the primary banks' relationship duration share effect reflects an emergent pattern of AIFs' short (long) primary state (private) banking relationships, the duration concentration effect signifies a lower propensity of AIFs' with generally longer banking relationship durations to associate with SDSOBs. Juxtaposing the latter result with the SDSOB relationship effect of AIFs' relationship exclusivity, the overall picture hints of AIFs' predominant engagement in long, exclusive SDSOB relationships.

At variance with Aristei and Gallo's (2017) empirical evidence of R&D-oriented Italian manufacturing firms' choice of large national banks, the results also specified the ownership structure of the type of national banks preferred by R&D-oriented AIFs. Such AIFs were less likely to associate with SOBs, significantly (at the 1% level) reducing the likelihood of such relationships by ≈ 10 percentage points. Given the robust positive correspondence between R&D orientation and innovativeness, this result appears to be a logical corollary of the existing evidence on innovative firms' preference for cherry-picking foreign banks (Aristei & Gallo, 2017; Ayyagari et al., 2012) which target potentially growth-oriented and profitable firms. Evidently, due primarily to shared values

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and congruence of their business lines and image with those of SDSOBs, AIFs with primary activity in the food and/or beverage sub-agro-industrial sector unsurprisingly had a highly significant (at the 1% level) 18 percentage points greater likelihood of maintaining SDSOB relationships, further weakening the mission drift hypothesis.

The validity of the mission drift argument is further obfuscated by the direction, significance and marginal effects associated with the estimated coefficients of the environmental controls. The respective marginal effects corresponding to the highly significant (at the 5% and 1% level) negative coefficients of Population Density portended ≈ 16 and ≈ 56 percentage points lower probability of urban-based AIFs maintaining sector-generic and sector-mandated SOB relationships (in line with univariate results). The implication that SOBs are more likely to serve rural-based AIFs accords with Berger et al.'s (2008) evidence against the mission drift argument. Given the relative availability of SDSOBs in concentrated regional banking markets vis-à-vis private (domestic and private) banks, it is counterintuitive, however, that the Herfindhal-Hirschman Index of Regional Bank Branch Concentration entered negative and statistically significant (at the 1% level) to signal that AIFs based in concentrated (uncompetitive) regional banking market are less likely to be associated with SDSOBs, in support of the mission drift argument.

GLiM Results: State-owned Banking Diversification Choices

Table 7 shows the empirical results of binary response GLiM estimations of the likelihood of AIFs' SOB and SDSOB diversification choices. Columns (1) and (3) of the table respectively present (sample average) marginal

effects from logit and probit estimations of the determinants of AIFs' SOB and

SDSOB diversification choices. The z-statistics (in parenthesis under columns

Table 7: *Determinants of AIFs' SOB Diversification Choices*

Variable	Gen-SOB (Logit) (1)	Gen-SOB 3rd Stage (2)	SDSOB (Probit) (3)	SDSOB 3rd Stage (4)
Industry Diversification			0.076 (2.001)**	0.094 (2.081)**
Free Zone	0.141 (2.111)**	0.128 (2.034)**		
Foreign Trade	0.228 (3.799)***	0.221 (3.823)***		
Foreign Ownership	-0.151 (-3.199)***	-0.146 (-3.072)***	-0.160 (-3.356)***	-0.191 (-3.202)***
Board of Directors	0.037 (0.6504)	0.035 (0.639)	0.166 (2.285)**	0.200 (2.277)**
Board Size	-0.019 (-1.576)	-0.017 (-1.464)	-0.060 (-3.799)***	-0.074 (-3.592)***
Group Membership	0.119 (3.511)***	0.119 (3.521)***		
Efficiency & Outreach	-0.072 (-2.408)**	-0.072 (-2.551)**	-0.034 (-1.443)	-0.042 (-1.413)
Bank Quality	0.058 (2.815)***	0.060 (2.908)***	0.075 (3.438)***	0.086 (3.611)***
Bank Culture	0.030 (1.502)	0.030 (1.612)	0.059 (2.663)***	0.074 (2.904)***
Informational Distance			0.002 (0.150)	0.003 (0.184)
HHI of Banking Duration			-1.378 (-7.395)***	-1.670 (-6.687)***
Research & Development	-0.080 (-2.162)**	-0.080 (-2.220)**		
Innovation	0.106 (2.178)**	0.108 (2.386)**		
Food & Beverage			0.135 (3.641)***	0.163 (3.707)***
Population Density			-0.224 (-3.546)***	-0.270 (-3.445)***
Large Bank Branch Density	-0.000 (−1.544)	-0.000 (-1.657)*		
Error Corr. (2nd - 3rd)		0.141*		0.109*
Likelihood Rat. Test	220.56***		240.31***	
McFadden Pseudo R^2	0.471		0.409	
Correct Classif. Rate	0.893		0.854	
Area under ROC	0.905		0.906	

Source: Field results (2019)

(1) and (3)) below the marginal effects are heteroscedasticity- and autocorrelation-consistent. Columns (2) and (4) of Table 7 respectively report heteroscedasticity- and autocorrelation-robust z-statistics under marginal effects self-computed for the third-stage trivariate (probit) selection model estimations of the determinants of AIFs' SOB and SDSOB diversification choices (i.e., corresponding to columns (1) and (3) respectively). These computations were premised on the rule of thumb that the quotients of probit coefficients scaled by 2.5 are a close approximation of the marginal effects on probability (Wooldridge, 2002). Beyond the McFadden's Pseudo-R^2 (of ≈ 0.5 and ≈ 0.4 for the SOB (logit) and SDSOB (probit) diversification models respectively) and the correct classification rates ($\approx 89\%$ and $\approx 85\%$ in the SOB (logit) and SDSOB (probit) diversification models respectively), the models' overall predictive powers, obtained from accuracy and receiver operating characteristics (ROC) curves (shown in Appendix H), portended sufficient model fits to permit discussion of the results. This empirical discourse is, however, preceded by two noteworthy observations.

First, there is a strong correspondence of the direction and statistical significance of the determining factors of SOB and SDSOB diversification choices to those of SOB and SDSOB relationship formations respectively, especially for the latter, confirming earlier observations that AIFs engage in "polygamous" banking relationships for myriad reasons already discussed. The speculative rationalizations of the estimated results on the respective probabilities of SOB and SDSOB relationship formation, therefore, remain valid for the results for SOB and SDSOB diversification propensities. Secondly, the small values and marginal significance of the error correlation coefficients,

reported at the base of Table 7 for the trivariate models (i.e., columns (2) and (4)), weakly supported the initial conjecture of the close relationships among the decisions of relationship multiplicity, domestic bank diversification and SOB/SDSOB diversification for multiple-banked AIFs with SOB diversification tendencies.

This result somewhat discounted the appropriateness of the joint (simultaneous) selection estimation framework and this may be attributed to the inherent double incidental sample truncation process that further reduced an already limited sample size for the estimation of the outcome model. The study, however, takes consolation in two merits of this approach. First, the positivity of the error correlation coefficients signals the relevance and co-movement of the determining variables explaining these three joint decisions. Secondly, with the exception of Large Bank Branch Density, which now assumed marginal significance (in the SOB diversification choice model), the direction and significance of the regressors in the third stage of the trivariate selection models were qualitatively identical to those in the single equation models. This signifies negligible sample selection bias and attests to the consistency and validity of the single equation model outputs. This was the basis for choosing to discuss the single-equation binary response GLiM estimation results (i.e., in columns (1) and (3)).

In both cases (i.e., SOB and SDSOB diversification), however, various indicators of AIFs' operational scope, ownership structures, decision-specific bank preferences, and relationship strength influenced AIF's SOB diversification choices. And, while measures of AIFs' access to external (non-bank) finance, R&D orientation and innovation behaviour drove only SOB

diversification choices, measures of corporate governance structures, sub-industry affiliation and rural-urban location (an external control) determined SDSOB diversification choices. In relation to operational scope, and consistent with the results for SDSOB relationship formation, SDSOB diversification probability increased in AIFs' out-of-industry diversification by $\approx$ 8 percentage points and this result was statistically significantly different from zero at the 5% level. Again, in accord with results for SOB relationship formations, free zone AIFs had a significant (at the 5% level) $\approx$ 14 percentage points greater likelihood of making SOB diversification choices than their counterparts. Highly significant (at the 1% level), AIFs' internationalization drive increased their SOB diversification propensity by $\approx$ 23 percentage points, in accord with the results for SOB relationship formation. Contrary to Aristei and Gallo's (2017) evidence, this result is unsurprising as internationalized AIFs' complex international financial service needs are best met by large (see Berger et al., 2008), agro-inclined SOBs with longstanding international cash management expertise.

With robust consistency and statistical significance across all estimations, foreign ownership intuitively reduced SOB and SDSOB diversification proclivity, as in Berger et al. (2008) and Aristei and Gallo (2017), by $\approx$ 15 and 16 percentage points respectively. In harmony with the results for SDSOB relationship, board-governed AIFs had a significant (at the 5% level) $\approx$ 17 percentage points greater SDSOB diversification propensity, whiles large-board-governed AIFs had $\approx$ 6 percentage points lower SDSOB diversification likelihood, again confirming the informational opacity of AIFs served by SDSOBs. In terms of the effect of external (non-bank) financial access, well-

connected AIFs (i.e., business group belongingness) had an ≈ 12 percentage points greater SOB diversification probability than their unconnected counterparts. Incongruent with Aristei and Gallo's (2017) evidence, this result is partly consistent with Berger et al.'s (2008) evidence, and highlights the utility of exploiting such networking mechanisms to access state-guaranteed development finance.

The general SOB diversification effects of decision-specific bank preferences, inspired by Ongena et al. (2011) and Aristei and Gallo (2017), present another set of groundbreaking results in the bank diversification literature. While emphasis on primary banks' efficiency and outreach significantly (at the 5% level) reduced AIFs' SOB diversification probability by ≈ 7 percentage points, SOB and SDSOB diversification proclivity significantly (at the 1% level) and consistently increased in the attribution of importance to bank quality by ≈ 6 and ≈ 8 percentage points respectively. In addition, AIFs' insistence on primary banks' culture significantly increased the likelihood of SDSOB diversification by ≈ 6 percentage points. As indicated earlier, these novel findings may be rationalized by the predictions and implications of Berger et al.'s (2000) home-field (global) advantage (disadvantage) hypothesis of domestic bank performance.

As in the results for SOB relationship formations, duration concentration effect on SDSOB diversification likelihood was negative and highly significant (at the 1% level), implying that AIFs with long banking relationship durations tend to diversify across SDSOB(s). Research and innovation behaviours also entered significantly (at the 5% level), but with contrasting effects (negative and positive respectively) on SOB diversification propensity (which decreased by ≈

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8 percentage points and increased by ≈ 11 percentage points respectively). Further, consistent with a priori expectations and prior evidence, and significant at the 1% level, AIFs with primary economic activity in the food and beverage agro-industrial sub-sector were ≈ 14 percentage points more likely to diversify across SDSOBs. Finally, as the solitary significant external control, rural-based (urban-based) AIFs intuitively had ≈ 22 percentage points greater (lower) SDSOB diversification propensity, again disaffirming the mission drift argument.

Summary

In general, measures of internal characteristics (operational scope, ownership and corporate governance structures, financial performance and external non-bank financial access, decision-specific bank preferences, relationship strength, R&D and industry affiliation) and external characteristics (regional population density and banking market structure and conduct) influence SOB relationship formations. Interestingly, with the exception of the effects of measures of corporate governance structures, financial performance and relationship strength, the same broad set of measures of firm-specific characteristics (as above) motivate AIFs' general SOB diversification choices. Furthermore, generally, the close similarities observed between the determining factors (and their corresponding directions and significance) of AIFs' SOB and SDSOB relationship formations do not resurface for their SOB and SDSOB diversification choices. This highlights the notion that, in the latter context, observable differences in sector-generic and sector-specific SOBs (e.g.,

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establishment mission, business models, shared firm-bank values and image,

competencies, etc.), do condition the varied choices of different kinds of AIFs.

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CHAPTER SIX

FIRM CHARACTERISTICS AND PRIMARY BANK TYPE CHOICES

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Introduction

This study generally investigates firm characteristics as determinants of (four major dimensions of) AIFs' strategic banking relationship formations. In line with the study's third objective, this antepenultimate chapter presents and discusses the empirical results relating to the effects of agro-industrial firms' (internal and external) characteristics on their primary bank type choices. The ultimate goal is to unearth the driving mechanisms that underpin the emergent patterns, if any exists, in the matching of the characteristics of AIFs and those of their primary bank types. The main discussion is heralded by a brief discourse of tentative findings from preliminary analyses.

Preliminary Analyses

This section briefly discusses comparative statistical test results of preliminary analyses of the matching of AIFs' characteristics with their primary bank types (defined in terms of their primary banks' liquidity, size, nationality and ownership). These statistical tests were conducted separately for each of the six categories of primary bank types and entailed comparisons of means of the characteristics of AIFs in a primary relationship with a specific primary bank type (= 1) to means of the same characteristics of all other AIFs in primary relationships with any one of the remaining five primary bank types (= 0). The preliminary analysis was, therefore, conducted via univariate *t*-tests of the statistical significance of the actual values of the differences between the means of some firm characteristics (variables) used in this empirical chapter, assuming

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unequal variances. The ultimate objective was to generate initial univariate comparison test findings that highlight tentative patterns of matching of primary bank-firm characteristics that harbinger and benchmark those to be validated in binary response GLiM estimations.

Table 8 displays the univariate comparative mean difference test results. In parenthesis, beneath the reported means of characteristics (i.e., explanatory variables) of firms in primary relationship with a specific primary bank type, are the differences between the reported means and those of characteristics of firms in primary relationships with other primary bank types. The statistical significance level of the mean differences is indicated by the number of asterisks, where three (***) asterisks indicate significance at the 1% level or less, two (**) at the 5% level, and one (*) at the 10% level. In Table 8, generally, for positive (negative) mean differences in parentheses, the mean of a particular characteristic of firms in (not in) primary association with a specific bank type is higher than that of the same characteristic not in (in) primary association with that bank type; and subtraction (addition) of the absolute value of the mean difference from (to) the unparenthesised mean, therefore, results in the mean of the particular characteristic of firms not in primary relationship with that bank type.

For example, for dummy variables under LLDS in Table 8, 47.2% of AIFs with concentrated ownership are in primary LLDS bank relationships while 41.2% (= 0.472 – 0.060) of AIFs with concentrated ownership are not in primary LLDS bank relationships. Similarly, 8.3% of industrially diversified AIFs are in primary LLDS bank relationships whiles 29.2% (= 0.083 + 0.209) of industrially diversified AIFs are not in primary LLDS bank relationships.

Table 8: *Univariate Analysis of Variables by Primary Bank Types*

Variable	LLDS	LLDP	LLFP	LSFP	ISFP	ISDS
Firm Size (log)	4.309 (−0.037)				4.258 (−0.091)	4.162 (−0.265)***
Firm Age (log)	2.779 (0.024)	2.226 (−0.550)***		2.454 (−0.337)***	2.573 (−0.200)	
Industry Diversification	0.083 (−0.209)***					0.323 (0.073)
International Presence			0.407 (0.315)***	0.139 (0.025)	0.214 (−0.107)	0.008 (−0.160)***
Free Zone		0.076 (−0.056)				
Foreign Trade				0.461 (−0.006)	0.414 (−0.057)	
Family Ownership			0.625 (0.034)			
Concentrated Ownership	0.472 (0.060)					
Board of Directors					0.586 (0.037)	
Board Size	2.472 (0.111)	0.615 (−1.817)***				
Firm Profitability	10.823 (−1.649)			15.724 (3.785)**	10.240 (−2.247)*	
Firm Liquidity				101.696 (−0.782)	99.870 (−2.734)	100.378 (−2.972)
Firm Leverage				69.836 (8.165)*	60.546 (−2.103)	

Table 8 (continued)

Variable	LLDS	LLDP	LLFP	LSFP	ISFP	ISDS
Exclusive Relationship						0.347 (0.013)
Informational Distance	151.972 (37.330)**					127.798 (14.245)
Share of Primary Bank Relationship Duration			0.403 (−0.223)***			
Herfindahl-Hirschman Index of Banking Duration						0.579 (0.020)
Research & Development		0.385 (−0.042)				0.347 (−0.115)**
Innovation				0.385 (0.001)	0.448 (0.069)	0.331 (−0.078)
Process Innovation		0.231 (−0.239)*		0.487 (0.029)		
Product Innovation		0.231 (−0.276)*	0.781 (0.309)***		0.517 (0.021)	
Food & Beverage			0.719 (0.179)***	0.513 (−0.593)	0.483 (−0.077)	
Ashanti & Greater Accra Regions	0.013 (−0.146)		0.750 (0.067)			
Population Density			5.271 (0.051)			5.183 (−0.060)*
Regional Bank Branch Concentration			0.076 (−0.012)		0.078 (−0.011)	
Large Bank Branch Density		106.077 (−22.166)				114.177 (−19.580)*
Foreign Bank Branch Density		144.615 (−29.787)				

Source: Field results (2019)

Such derivations can be replicated for continuously measured variables (firm characteristics) with interpretations based on levels and the appropriate units of measurement. The signs and statistical significance of the actual values of the mean differences indicate the direction of (change in) probability of the tentative association between a particular firm characteristic and the specific primary bank type.

On these bases, the results in Table 8 suggested that primary LLDS bank relationships were less (more) likely to be maintained by industrially diversified (informationally distant) AIFs. Secondly, primary LLDP bank relationships were predominant among AIFs that were young, had weaker corporate governance structures (i.e., high probability of having slim board memberships), and were less likely to be innovative (process- and product-wise). Furthermore, primary LLFP bank relationships were predominant among AIFs that had international presence, had shorter relationship durations (with their primary banks), were product innovative and operated primarily in the food and beverages sub-sector of the agro-industry. Moreover, young, profitable and highly leveraged AIFs were more likely in primary relationships with LSFP bank types. Also, less profitable AIFs were most likely to couple up with ISFP bank types in primary relationships. The final emergent pattern, with respect to internal characteristics, relates to the matching of AIFs' characteristics to primary ISDS bank type choices. As the significant mean differences indicate, primary ISDS banking relationships were preferred by small (defined by mean workforce), internationally absent (i.e., home-headquartered) and research-shy AIFs. In terms of environmental characteristics, such AIFs' main operational locations were in relatively sparsely populated regions (scarcely in the Greater

Accra and/or Ashanti Region), where lower large bank branch densities defined the concentrated (uncompetitive) banking markets.

Overall, the univariate comparisons reveal a complex pattern of associations of firms' internal and external characteristics with their primary bank type preferences, in harmony with Ongena and Şendeniz-Yüncü's (2011) evidence for Turkey. The real validity of these tentative inferences was, however, determined by the degree of correspondence of these emergent patterns of the matching of primary bank-AIF characteristics to empirical results from predictive regression models.

Binary Response GLiM Results: Primary Bank Type Choices

Binary choice regression modelling of each of the six alternative primary bank types on internal and external firm-specific characteristics with four separate link functions (i.e., logit, probit, complementary log-log and cauchit) were evaluated to aid appropriate link function selection for each binary primary bank type choice model. For such model evaluations, a quantitative comparison of the information-based model selection indices (e.g., the Akaike information criterion (AIC) and the Bayes information criterion (BIC)) and, most importantly, the residual deviance and fitted log-likelihood informed the choice of much better-behaved models in terms of lower AIC, BIC, deviance and higher fitted log-likelihoods. These comprised models with complementary log-log (for LLDS, ISFP and ISDS), probit (for LLDP), and logit (for LLFP and LSFP) link functions. Columns (1) to (6) of Table 9 present estimated (sample average of) marginal effects from the binary choice model estimations of the

Table 9: *Determinants of AIFs' Primary Bank Type Choices*

Primary Bank Type Binary Response Model	LLDS (C-loglog)	LLDP (Probit)	LLFP (Logit)	LSFP (Logit)	ISFP (C-loglog)	ISDS (C-loglog)
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Firm Size (log)	0.010				-0.023	-0.060
	(0.654)				(-0.876)	(-2.1317)**
Firm Age (log)	-0.015	-0.034		-0.122	-0.109	
	(-0.824)	(-2.390)**		(-3.476)***	(-2.795)***	
Industry Diversification	-0.088					0.108
	(-2.851)***					(2.8182)***
International Presence			0.052	-0.073	-0.068	-0.221
			(1.788)*	(-2.013)**	(-1.949)*	(-3.546)***
Free Zone		0.033				
		(0.893)				
Foreign Trade				0.097	0.100	
				(2.262)**	(2.238)**	
Family Ownership			0.057			
			(1.919)*			
Concentrated Ownership	0.031					
	(1.440)					
Board of Directors					-0.004	
					(-0.132)	
Board Size	0.014	-0.011				
	(2.361)**	(-2.1632)**				
Firm Profitability	-0.000			0.003	0.004	
	(-0.189)			(2.570)**	(3.122)***	

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Table 9 (continued)

Primary Bank Type Binary Response Model	LLDS (C-loglog)	LLDP (Probit)	LLFP (Logit)	LSFP (Logit)	ISFP (C-loglog)	ISDS (C-loglog)
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Firm Liquidity				0.001 (1.605)	0.001 (1.499)	-0.002 (-3.0218)***
Firm Leverage				0.001 (1.687)*	0.001 (1.453)	
Corporate Relationship				-0.024 (-1.918)*	-0.033 (-2.489)**	0.060 (3.898)***
Efficiency & Outreach	-0.055 (-4.264)***		0.088 (3.893)***	0.117 (5.725)***	0.119 (6.595)***	-0.223 (-8.778)***
Bank Quality	0.044 (3.303)***			-0.099 (-5.658)***	-0.095 (-5.899)***	0.075 (4.058)***
Bank Culture	-0.018 (-1.652)*	-0.021 (-2.459)**	0.048 (2.793)***	-0.042 (-3.247)***	-0.043 (-3.169)***	0.084 (4.614)***
Exclusive Relationship						0.163 (2.5620)**
Informational Distance	0.018 (2.158)**					0.053 (3.3679)***
Share of Primary Bank Relationship Duration			-0.322 (-1.779)*			
Herfindahl-Hirschman Index of Banking Duration						-0.352 (-2.980)***
Research & Development		0.066 (2.6243)***				-0.062 (-2.055)**
Innovation				-0.134 (-3.403)***	-0.149 (-3.755)***	0.057 (1.815)*
Process Innovation		-0.036 (-2.506)**		0.134 (3.460)***		

Table 9 (continued)

Primary Bank Type	LLDS	LLDP	LLFP	LSFP	ISFP	ISDS
Binary Response Model	(C-loglog)	(Probit)	(Logit)	(Logit)	(C-loglog)	(C-loglog)
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Product Innovation		-0.037	0.067		0.154	
		(-1.901)*	(2.352)**		(3.989)***	
Food & Beverage			0.045	-0.047	-0.043	
			(1.588)	(-1.842)*	(-1.518)	
Ashanti & Greater Accra Regions	0.013		-0.226			
	(0.620)		(-2.276)**			
Population Density			0.255			-0.259
			(1.979)**			(-3.776)***
Regional Bank Branch Concentration			-0.806		0.000	
			(-1.866)*		(0.736)	
Large Bank Branch Density		-0.003				0.001
		(-1.623)				(3.6841)***
Foreign Bank Branch Density		0.002				
		(1.634)				
Log likelihood	-92.457 (df=12)	-43.014 (df=10)	-72.215 (df=11)	-66.425 (df=14)	-65.915 (df=17)	-116.33 (df=16)
AIC	184.91	106.03	168.43	160.85	165.83	264.664
Res. Deviance (*p*-Val.)	0.979	0.998	0.999	0.999	0.983	0.999
Likelihood Ratio Test	54.817***	27.829***	76.553***	120.29***	121.31***	253.55***
McFadden Pseudo R^2	0.229	0.244	0.346	0.475	0.479	0.521
Correct Classification Rate	0.907	0.966	0.917	0.930	0.869	0.874
Area under ROC Curve	0.838	0.925	0.906	0.938	0.888	0.934

Source: Field results (2019)

probability of the six different primary bank type choices. Column (1) of Table 9, for example, displays the marginal effects from complementary log-log model estimation of the determinants of AIFs' choice of an LLDS primary bank type (= 1) over any one of the remaining five primary bank types (= 0). Beneath the marginal effects are heteroskedastic- and autocorrelation-robust z-statistics in parenthesis. The statistical significance levels of the observed determinants are indicated by the number of asterisks, where three (***) asterisks indicate significance at the 1% level or less, two (**) at the 5% level, and one (*) at the 10% level. Model fit statistics for each model are reported at the bottom of the column corresponding to each primary bank type model.

Beyond rudimentary deviance significance tests, three key model adequacy measures were assessed. First was McFadden's Pseudo-R^2, a relative gain measure. According to McFadden (1974, 1978), values of this model fit index ranging from 0.2 to 0.4 represent very good model fit. The study's McFadden's Pseudo-R^2 ranged from ≈ 0.2 to ≈ 0.5, showing robust model fits by McFadden's standards. Model evaluation was further conducted by the determination of correct classification rate (or classification error rate on the flipside) from a confusion matrix comparing predicted probabilities with actual outcomes. The rates of correct classification ranged from $\approx 87\%$ to $\approx 97\%$, indicative of very high model fits. Overall predictive accuracies of the models were obtained from accuracy and receiver operating characteristics (ROC) curves which evaluate model performance at every conceivable cutoff. The predictive power of each model was determined by the total area under the ROC, that is AUC, which specifies the proportion of correctly classified observations as a performance index. As indicated by Appendix I, which

displays the accuracy and ROC curves of each model, the AUCs, ranging from ≈ 84% to 93%, confirmed model adequacy to permit discussion of results from the binary model estimations.

The significantly unique correspondence of a 1% increase in AIFs' size to a 6 percentage points lower propensity for a primary ISDS bank relationship (in line with the univariate results) has grave, though, conflicting implications. In the more manifest implication, large AIFs' relative dissociation from primary ISDS bank types hints of such bank types' huge loss (in terms of the benefits of large client size) to other available bank types due possibly to large AIFs' operational scope, market orientation, regional characteristics (location and banking market structure) and other latent reasons. The latent implication of ISDS banks primarily serving small, theoretically informationally opaque AIFs reaffirms the firm-bank size matching hypothesis of relationship banking involving predominant usage of soft information. This result, albeit carrying mixed blessings, counters the SOBs' mission drift argument, as in Berger et al. (2008), but also carries the risk of opaque AIFs oddly coupling with unhealthy SOBs in primary relationships.

The propensities for primary LLDP, LSFP and ISFP bank relationships significantly decreased respectively by ≈ 3, ≈ 12 and ≈ 11 percentage points with an increase of 1% in AIFs' age. While these results are partly consistent with Ongena and Şendeniz-Yüncü's (2011) evidence for Turkey, two contrasting points are worthy of note about these consistent results: (a) the relatively low relevance of primary banks' health (liquidity) status, size structure and nationality type; and, (b) the consistency of the link between primary banks' ownership structure (i.e., private vs state) and AIFs' age. In the

latter context, the robust negative firm age effect points to young (old) AIFs'
dominant preference for private (state-owned) banks for primary relationships,
regardless of these banks' health, size, and nationality structure, affirming the
mission drift argument. While an empirical validation of this implication has
been pioneered by Berger et al. (2008) and points to matured AIFs' recognition
of the optimality of primary state-owned banking relationships, it carries the
additional implication of the odd coupling of young, informationally opaque
AIFs with relatively agro-averse private banks.

   Similar to Ongena and Şendeniz-Yüncü's (2011) evidence, Industry
Diversification had inconsistent effects on AIFs' primary bank type choice.
Non-agro-industry diversified AIFs had an ≈ 9 (≈ 11) percentage points lower
(greater) likelihood of primary relationship formations with LLDS (ISDS)
banks. Given the equally high statistical significance (at the 1% level) of both
results and such AIFs' consistent choice of SOBs, it appears the adoption and
practice of different relationship technologies by healthy and large SOBs vis-à-
vis unhealthy and small SOBs explain this result. Thus, healthy and large SOBs'
impersonal arm's-length transactional relationship technology disincentivises
primary associations with AIFs that have diversified out of the agro-industrial
sub-sector. Such AIFs are rather magnetised into primary relationships with
unhealthy and small SOBs due to the latter's close personal relationship-based
approach documented to be preferred by agro-allied businesses (Bartz, 2016;
Bard et al., 2002). But, this result has an alternative rationalization from the
liquidity standpoint. Primary association with ISDS banks, especially those with
an establishment mandate of serving such "priority sector" firms carry liquidity
risks. It appears the inter-industry diversification-induced liquidity more than

compensates the liquidity risks inherent in primary ISDS banking relationships to rationalise such associations.

Superficially counterintuitive is the consistent statistically significant negative International Presence effects on the probability of primary LSFP, ISFP and ISDS bank type choices, reducing the propensities for such firm-primary bank type associations by ≈ 7, ≈ 7 and ≈ 22 percentage points respectively. Unsurprisingly, the reduction in the likelihood for the formation of such relationships was greatest for primary ISDS bank types (≈ 22 percentage points), signalling internationally present AIFs' profound disinclination to domestic (state) banks, especially the unhealthy (illiquid) and small class, presumably due to the mismatch between these firms' greater liquidity needs and such banks' financial capabilities. It appears, in addition, that the specific combination of the disfavoured foreign banks' health and size characteristics does not augur well for such AIFs' international operational scope which is best served by liquid and large foreign-owned banks. This argument is supported by the finding that internationally present AIFs had a significant, albeit marginal, ≈ 5 percentage points greater propensity to maintain primary associations with LLFP bank types, consistent with the univariate revelations. However, but indubitably consistent with intuition, foreign trade-oriented AIFs had an ≈ 10 percentage points greater propensity for primary LSFP and ISFP bank relationships, pointing to the optimality of primary relationships with foreign banks, regardless of their health and size structure, for international business transactions (Aristei & Gallo, 2017; Ongena & Şendeniz-Yüncü, 2011).

AIFs' ownership and corporate governance structures also drove their primary bank type choices. Partially inconsistent with Aristei and Gallo (2017),

family-owned firms had a roughly 6 percentage points greater likelihood of maintaining primary LLFP bank relationships. This result requires further empirical investigations as the controlling family's characteristics (e.g., nationality, education, etc.) and other firm-specific characteristics may conspire to drive this banking choice. Similarly, the effect of a unit increase in Board Size, a key corporate governance surrogate, was distinct from zero at the 5% significance level, and increased (decreased) the likelihood of a primary LLDS (LLDP) bank type choice by ≈ 1 percentage point. With the identical statistical significance and primary banks' health status, size and nationality type as well as the nearly equal marginal effect of these primary bank choices, the conflicting directional impact of Board Size may be explained by the different ownership types (i.e., state vs private) of the primary (LLD) bank type. Thus, AIFs' preference for LLDS over LLDP primary bank relationships is the strategic outcome of lengthy decision-making inherent in bureaucratic boards that recognize the enduring benefits of state-owned banking relationships (see, Berger et al., 2008). This novel finding extends Braggion and Ongena's (2013) empirical evidence on the relevance of firms' board size to explaining their NBR choice to its relevance to explaining their primary bank type choices.

Another set of original pieces of empirical evidence relates to the different primary bank type choice effects of different metrics of AIFs' financial health. Profitable AIFs had 0.3 and 0.4 percentage points greater likelihood of maintaining primary relationships with LSFP and ISFP banks respectively. This points to well-performing AIFs' preference for small foreign banks, regardless of the latter's health status, probably to cash in on foreign banks' international networks and assistance in foreign market entry, and attests to the cherry-

picking behaviour of foreign banks (Aristei & Gallo, 2017; Berger et al. 2008). This represents an optimal firm-bank coupling for well-performing AIFs with foreign market orientations and thus corroborates the evidence on the market orientation effect on primary LSFP and ISFP bank type choices. A highly significant (at the 1% level) negative firm liquidity effect, portending a 0.2 percentage point reduction in liquid AIFs' propensity for primary ISDS bank types, was confirmatory of the criticality of bank health to healthy AIFs whose size structure and documented preference for foreign banks (Berger et al., 2008) underpin their lower affinity to SOBs. Seeming also to invalidate the inter-industry diversification-liquidity risk argument in favour of AIFs' primary ISDS bank type choice, this finding, however, leaves an open empirical question on the diversification-liquidity interaction effects on AIFs bank type choices. Perverse, though, was the finding, albeit of marginal significance, of highly leveraged AIFs' primary association with cherry-picking, agricultural finance-averse LSFP bank types. But, this finding may be rationalised by the possibility that such AIFs' leverage may have originated from such banks' high propensity of extending hefty credit facilities to transparent firms (Berger et al., 2008).

Another original set of revealing results, motivated by prior research (Aristei & Gallo, 2017; Ongena et al., 2011) and with key policy implications, pertains to the contrasting effects of four maximum likelihood-extracted factors representing decision-specific bank preferences on primary bank type choices. First, attributing importance to corporate relationships (referring particularly to personal treatment and relationships, ease and success of (re)negotiations, and bank understanding of AIFs' business challenges) reduced the probability for primary relationships with LSFP and ISFP bank types by ≈ 2 and ≈ 3 percentage

points respectively. In absolute contrast, emphasis on corporate relationships increased AIFs' proclivity for ISDS bank types in primary relationships by 6 percentage points and this association had superior significance (at the 1% level). This result gives credence to arguments and predictions in prior research (see, e.g., Bard et al., 2002; Bartz, 2016) that agro-related businesses form close relationships with credit institutions with an in-depth understanding of their unique business challenges. A cursory view of the ingredients of the primary banks' characteristics under consideration highlights the evidence that AIFs' demand for close corporate relationships is met by and influences their choice of small state-owned banks, regardless of the latter and foreign banks' liquidity status.

Second, with high statistical significance (at the 1% levels), AIFs that emphasize bank efficiency and outreach (i.e., availability of international branch network, advances in ICT, and procedural speed) had an ≈ 6 and ≈ 22 percentage points lower proclivity of coupling up primarily with LLDS and ISDS bank types respectively. These pieces of coherent results sharply contrast another set of unequivocally consistent findings where, with similarly robust statistical significance, the propensity for primary LLFP, LSFP and ISFP bank types increased by ≈ 9, ≈ 12 and ≈ 12 percentage points respectively for AIFs emphasizing bank efficiency and outreach. Two noteworthy features of these contrasting results relate to the irrelevance of the primary bank's health status and size structure vis-à-vis the pivotal importance of its nationality and ownership type. Specifically, SOBs, a systemically important sub-class of domestic banks, are dropped in the pecking order for foreign banks when AIFs' preference for bank efficiency and outreach matters.

Third, however, there is a reversal of this somewhat neat pecking order in the evidence on the primary bank type choice effects of AIFs' insistence on primary banks' quality (interpreted as satisfaction with service range and quality, extensiveness of local branch networks, dominancy and reputation). With AIFs' emphasis on bank quality decreasing the penchant for primary LSFP and ISFP bank associations by ≈ 10 percentage points but increasing the likelihood for primary LLDS and ISDS bank type choices by ≈ 4 and 8 percentage points respectively (all at the 1% significance level), it is manifestly clear that AIFs reveal a preference for SOBs, regardless of the latter's health and size, over foreign banks when primary banks' quality is of essence.

The home-field (global) advantage hypothesis of differential domestic (foreign) bank performance (Berger et al., 2000) may be invoked to explain AIFs' revealed/stated preference for primary banks with different nationality and ownership structures when corporate relationships, bank efficiency and outreach, and bank quality matter. This hypothesis suggests efficiency loss for domestic banks due to their limited international banking market exposure, technology adoption lag and limited access to technologically savvy, adaptable and well-educated workforce. It suggests also, however, that these inefficiencies are overcome with better knowledge of the local economy and banking market, evidenced by their first-mover advantage, wider geographical footprints and client proximity. The urban bias of foreign banks' branch network expansion and their lack of tailor-made agribusiness financial services, therefore, inure to the competitive advantage of domestic banks, particularly SOBs.

Fourth, and in contrast to the above, there is little by way of consistency and emergent patterns in the primary bank type choices of AIFs that attribute

importance to the primary banks' culture (interpreted in relation to consultancy, congruence of image, and promises and guarantees), despite its consistent statistical significance across all estimations. While the importance of primary banks' culture decreased the likelihood of primary LLDS, LLDP, LSFP and ISFP bank type choices by ≈ 2, ≈ 2, ≈ 4 and ≈ 4 percentage points respectively, LLFP and ISDS banks were ≈ 5 and ≈ 8 percentage points more likely to primarily serve AIFs that emphasize their primary bank's bank culture.

The effects of measures of the difference in AIFs' NBR regime (i.e., exclusivity vs. multiplicity) and relationship strength were also variously significantly distinct from zero and, to a large extent, exhibited a dominant pattern. Specifically, at the 5% and 1% significant levels, there was ≈ 16 and ≈ 5 percentage points greater probability of ISDS bank types primarily serving single-banked and informationally distant AIFs respectively. This positive exclusivity effect signals single-banked AIFs' strong working relationship with and commitment/loyalty to ISDS bank types arising, perhaps, from satisfaction with the latter's service range and quality. A similar direction, modest statistical significance (at the 5% level) and marginal effect (of ≈ 2 percentage points) for Informational Distance offered strong support for the preliminary univariate results that informationally distant AIFs were more likely to engage in primary LLDS banking relationships. Relationships with informationally distant AIFs impose high monitoring intensity and cost requirements on banks for mitigation of information asymmetry and its attendant ills. This underpins the typical urban bias of private (domestic and, mostly especially, foreign) banks. However, SOBs' core establishment/operational mandate, consequent wide geographical spread of their branches and relative availability make primary relationships

with LLDS and ISDS bank types an indispensable choice for informationally distant AIFs. Generally, irrespective of their financial health and size structure, SOBs were the preferred choice of single-banked and informationally distant AIFs, discounting the mission drift argument over SOBs' target clientele.

Corroboratively, and with unique correspondences, both the Share of Primary Banks' Relationship Duration and the Herfindahl-Hirschman Index of Relationship Duration entered negatively and significantly at the 10% and 1% levels respectively for LLFP and ISDS primary bank types, the former result validating the preliminary observation. These results signified that AIFs with longer durations of relationship with their primary banks and those with generally shorter durations corresponded uniquely to ≈ 32 and ≈ 35 percentage points lower likelihood of maintaining primary relationships with LLFP and ISDS banks respectively. In a nutshell, these original pieces of evidence underscore AIFs' longer and ostensibly closer banking relationships with SOBs and corroborate Berger et al.'s (2008) empirically tested and proven hypothesis of foreign banking relationship fragility, a phenomenon here attributed to foreign banks' characteristic aversion to agriculture-related risks. Bard et al. (2002) and Bartz's (2016) expectations of closer agro-related business-bank relationships may, therefore, be fulfilled with SOBs.

Indicators motivated by the secrecy theory also entered significantly, but at varied levels and with different directional effects. The probability of primary LLDP (ISDS) bank type choice increased (decreased) by ≈ 7 (≈ 6) percentage points for R&D-oriented firms, largely indicative of research-oriented AIFs' affinity for LLDP banks in primary relationships. Per the results in relation to innovation adoption, generally innovative AIFs exhibited a clear disinclination

(inclination) towards LSFP and ISFP (ISDS) in primary relationships. However, the various effects of specific dimensions of firm innovation behaviour present a more revealing pattern of firm-bank matching. Contrasting process-innovative AIFs' ≈ 4 percentage points lower likelihood of primary association with LLDP bank types with their 13 percentage points greater propensity for primary relationships with LSFP bank types revealed their indisputable preference for LSFP bank types. A similar comparison highlighted product-innovative AIFs' preference for LLFP and ISFP over LLDP bank types in primary relationships. On the whole, the latter set of fresh evidence (on the specific dimensions of innovation) affirms both anecdotal and empirical evidence on foreign financial intermediaries' support for innovative firms (see, e.g., Aristei & Gallo, 2017; Ayyagari et al., 2012). Being competitive and growth-oriented, innovative AIFs with brighter business prospects may be targets of the cherry-picking strategy of foreign banks which, additionally, may also be more adept at innovative project evaluation and finance, and protection of proprietary business information.

Finally, with respect to internal firm-specific characteristics, the sub-sectoral affiliation effect was relevant in explaining primary bank type choices of AIFs, similar to Ongena and Şendeniz-Yüncü (2011). AIFs with primary activity in the food and beverage subsector were ≈ 5 percentage points less likely to have LSFP banks in primary relationships. This is due, presumably, to incongruity in firm-bank sector specialization and such firms' greater exposure to agro-related covariant risk less capably managed by foreign banks in general, but especially by those which are extremely averse to even calculated liquidity risks.

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With respect to effects of measures of environmental controls (i.e., external firm-specific characteristics), first, AIFs' regional affiliation played a significant role in determining their primary bank type choices. Specifically, and partly inconsistent with the spirit of Ongena and Şendeniz-Yüncü's (2011) evidence, AIFs with main operational locations in the Ashanti or Greater Accra Regions had ≈ 23 percentage points lower propensity for primary associations with LLFP banks due, possibly, to sector specialisation incongruities. Given this negative Ashanti or Greater Accra locational effect vis-à-vis these regions' relatively high population densities, the equally significant (at the 5% level) positive population density effect (increasing the likelihood of primary LLFP bank relationships by ≈ 26 percentage points) was surprisingly contradictory and counterintuitive. Besides the strict basis of this result, netting out the marginal effects (2% = 26% − 23%) on the principle of additivity of marginal effects (Cameron & Trivedi, 2005) motivates the conclusion, albeit tentative, that urban-based AIFs generally have a higher likelihood of forming primary LLFP bank relationships. This may be attributed to foreign banks' typical urban bias and aggressive cherry-picking behaviour in these densely populated regions. Interestingly, the validity of this educated conjecture was cemented by two additional significant findings.

First was the highly significant 26 percentage points lower propensity of urban-based AIFs maintaining primary relationships with ISDS bank types, implying rural-based AIFs' penchant for primary ISDS bank relationships, presumably due to ISDS bank types' relatively higher rural branch network. This implication weakens the SOBs' mission drift argument. Second was the negative effect of the measure for regional banking market structure and

conduct, Herfindahl-Hirschman Index of Regional Bank Branch Concentration. Albeit marginally significant (at the 10% level), the ≈ 81 percentage points reduction in the likelihood of primary LLFP bank relationship formations by AIFs in concentrated (or uncompetitive) regional banking markets implies that, in competitive regional banking markets, as in the Ashanti or Greater Accra regions, primary LLFP bank relationships emerge as dominant firm preferences. Yet, the negative banking market concentration effect on firms' LLFP bank type choice is not perverse as concentrated regional banking markets in Ghana are largely composed of domestic (private and state-owned) banks. Unsurprisingly, AIFs in large-bank-branch-dominated regional banking markets have a greater proclivity for primary ISDS bank relationship formations as revealed by the univariate results. Such regional banking markets may be dominated by large banks' impersonal arm's-length transactional banking technology which is at variance with agro-allied firms' need for a close relationship-based banking strategy better deployed by small, risk-tolerant SOBs serving "priority" firms. These banking market-related findings jointly discount the mission drift thesis.

Summary

The empirical discourse reveals that a whole gamut of determining internal and external firm-specific factors influence AIFs' propensity for each specific primary bank type, suggesting that different AIF types engage different primary bank types. Amidst the complexity of the matching of AIF and their primary banks' characteristics are some outstanding emergent patterns. Firstly, old (young) AIFs exhibit a dominant preference for state (private) banks for primary relationships, irrespective of the primary banks' health status, size

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structure and nationality type. Inter-industrially diversified AIFs have a greater proclivity for primary ISDS bank relationships. In addition, internationally present AIFs' profound disinclination towards domestic banks may be explained by their affinity for primary liquid and large foreign bank relationships for international business. Corroboratively, international trade-oriented AIFs also prefer primary foreign bank relationships, regardless of the foreign banks' liquidity status. Again, AIFs with bureaucratic boards prefer primary LLDS bank relationships. Moreover, affirming the criticality of primary banks' health status and foreign banks' cherry-picking behaviour, well-performing AIFs dissociate with ISDS banks but prefer small foreign banks in primary relationships, regardless of the latter's health.

Also, whiles the propensity for primary relationships with SOBs increases in AIFs' insistence on primary banks' close corporate relationships and quality, AIFs' preference for primary banks' efficiency and outreach drives them into primary relationships with foreign banks, regardless of the primary banks' health and size structure in both cases. Furthermore, and unsurprisingly, AIFs maintain longer and ostensibly closer primary banking relationships with state-owned banks, while foreign banks are in primary relationships with process- and product-innovative AIFs. Food-beverage sector AIFs also exhibit a significant disassociation with primary LSFP banks despite the latter's excellent health and convenient size. Again, urban-based (rural-based) AIFs have a greater likelihood for primary LLFP (ISDS) bank relationship formations. Last but not least, primary LLFP bank relationships emerge as the dominant firm preference in competitive regional banking markets.

CHAPTER SEVEN

FIRM CHARACTERISTICS AND CREDIT RELATIONSHIP INTENSITY

Introduction

Generally, this study investigates the effects of agroindustrial firms' internal and external characteristics (as determinants) on four main dimensions of strategic banking relationship formations. This penultimate chapter presents and discusses the empirical results of the estimated effects of such firms' internal and external characteristics on the intensity of their credit relationships, in line with the study's fourth objective/question.

Empirical Regression Results and Analysis

Table 10 displays estimated results of the empirical analysis of the determinants of AIFs' credit relationship intensity. Despite the inconsistency of regression results from OLS estimation of censored or truncated data, the study linearly regressed credit relationship intensity on both internal and external firm-specific characteristics as a baseline model for comparison with alternative model estimations. Results of this benchmark specification are reported in column (1). Motivated by the censored structure of the dependent variable, two ML-based Tobit models were estimated with the relatively robust Broyden, Fletcher, Goldfarb and Shanno (BFGS) optimisation algorithm, one with Box-Cox (B-C) and the other with inverse hyperbolic sine (IHS) transformations of the regressand to correct for nonnormality, as consistent estimation and inference are premised on a strong reliance on distributional assumptions. Vuong specification tests for strictly non-nested models, facilitating model evaluation and selection analysis according to the Kullback-Leibler information

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criterion (KLIC), were used to discriminate between the two Tobit models with

different functional forms.

Table 10: *Determinants of AIFs' Credit Relationship Intensity*

Variable	OLS (1)	IHS Tobit (2)	Participation IHS-DH (3)	Outcome IHS-DH (4)
Industry Diversification	0.123 (2.999)***	0.358 (2.904)***	0.546 (3.193)***	0.277 (2.645)***
International Presence	-0.116 (-1.934)*	-0.308 (-1.648)	-0.424 (-1.637)	-0.247 (-1.480)
Foreign Ownership	0.097 (1.869)*	0.293 (1.874)*	0.409 (1.888)*	0.216 (1.609)
Concentrated Ownership	-0.069 (-1.521)	-0.209 (-1.641)	-0.336 (-1.955)*	-0.161 (-1.528)
Board Size	-0.023 (-2.321)**	-0.067 (-2.184)**	-0.080 (-1.952)*	-0.052 (-2.149)**
Firm Leverage	0.009 (2.925)***	0.029 (3.006)***	0.042 (7.053)***	0.024 (9.893)***
Corporate Relationship	0.052 (1.835)*	0.151 (1.757)*	0.304 (3.427)***	0.125 (2.487)**
Trust and Commitment	0.064 (2.840)***	0.231 (3.153)***	-0.069 (-0.806)	0.090 (1.762)*
Foreign-owned Bank	-0.134 (-2.941)***	-0.417 (-2.954)***	-0.541 (-2.833)***	-0.326 (-2.711)***
Population Density	-0.296 (-3.392)***	-0.849 (-3.102)***	-1.262 (-3.621)***	-0.687 (-3.249)***
Regional Bank Branch Concentration	-1.163 (-2.756)***	-3.394 (-2.645)***	-4.299 (-2.582)***	-2.677 (-2.579)***
Sigma (σ)				14.128***
Theta (θ)			0.026**	
Rho (ρ)			0.301**	
Wald/F-test	9.715***	71.86***	27.304***	
R^2 (Adj. R^2)	0.22 (0.20)	0.43 (0.415)	0.58 (0.543)	
LR Test	97.053***	98.677***	243.41***	
Log-likelihood	-156.84	-372.24	-383.94	
Uncensored Obs.		128		
Total Obs.	388	388	388	

Model Specification Tests	Test Type	Test Statistic	*p*-Value
Box-Cox Tobit vs IHS Tobit	Vuong (nonnested)	-2.5013	0.0083
Dep. IHS SH vs IHS Tobit	LR (nested)	47.212	0.0062
IHS Tobit vs Dep. IHS DH	Vuong (nonnested)	-4.6342	0.0000

Source: Field results (2019)

According to the model specification tests (bottom of Table 10), the null

hypothesis of model equivalence soundly failed to be accepted (z = -2.5013, *p*-

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value = 0.0083), indicating the IHS transformed Tobit model's outperformance of the alternative B-C specification. The log-likelihood ratio (LR) test (i.e., Vuong test for nested models) assessing the relevance of error correlation in comparing the predictive ability of the dependent (error correlated) IHS single-hurdle (SH) selection model vis-à-vis the IHS Tobit model from the standard chi-square distribution also revealed a preference for the latter model (χ^2 = 47.212, p-value = 0.00617). Estimation results for the IHS Tobit model are, therefore, presented in column (2). While different nested and strictly non-nested Vuong specification (unreported) tests of BC- and IHS-transformed double-hurdle (DH) models with and without error correlation revealed a preference for the dependent (error correlated) IHS DH model, the latter model was triumphant over the IHS Tobit model (z = -4. 6342, p-value = 1.792e-06).

The superior fit of the dependent IHS-DH model (R^2 = 0.58) coupled with the documented predominance of the first step over the second step and inefficiency of the popular Heckman two-stage sample selection model (Cameron & Trivedi, 2005; Carlevaro, Croisaant, & Hoareau, 2013) and, most importantly, the significantly high correlation between the inverse Mills ratio and the other regressors in the latter model (indicative of the presence of selectivity bias) motivated a discrimination against the Heckman estimation approach. Columns (3) and (4), therefore, respectively present the estimated results of the participation equation and credit relationship intensity (measured as borrowing concentration) levels from the dependent IHS-DH model. Heteroscedasticity- and autocorrelation-robust t-values are in parenthesis below the estimated coefficients. The statistical significance levels of the observed determinants across all estimations are indicated by the number of asterisks,

where three (***) asterisks indicate significance at the 1% level or less, two (**) at the 5% level, and one (*) at the 10% level.

A noteworthy feature of the various estimation results for the variable of interest (i.e., columns (1), (2) and (4)) is the consistency of the signs of the estimated coefficients of the regressors. Beyond that, however, accounting for nonnormality of borrowing concentration in the Tobit model resulted in a loss of statistical significance of only the coefficient for International Presence relative to the baseline OLS specification and increased the predictive power of the IHS Tobit model, ceteris paribus. Moreover, ignoring error correlation and the double censoring mechanism in both the benchmark and IHS Tobit models weakened their explanatory power and revealed some inconsistent variations in the significance of some covariates in comparison with the IHS DH model (i.e., column (4)). Such model misspecifications, for example, elevated some variables into marginal significance (specifically, International Presence in the OLS model and Foreign Ownership in both the OLS and Tobit models), dampened the relevance of Corporate Relationship (in both the OLS and Tobit models), and amplified the significance of Trust and Commitment (in both the OLS and Tobit models). Aside these inconsistencies, the statistical significance of eight firm characteristics, namely, Industrial Diversification, Board Size, Firm Leverage, Corporate Relationship, Trust and Commitment, Foreign-owned Bank, Population Density and Regional Bank Branch Concentration were robust to alternative model estimations.

There is a positive and highly significant (at the 1% level) industry diversification effect on credit relationship intensity. Beyond the statistical significance, however, the estimated increase in credit relationship intensity has

modest economic relevance. With a sample average HHI of borrowing concentration of $\approx 48\%$, AIFs that have diversified out of their primary agro-industrial activities into non-agro-industrial businesses increased the HHI of borrowing concentration (hence credit relationship intensity) by $\approx 58\%$ (= $(0.277/0.48) \times 100$). This evidence of a positive effect is at variance with the reorganisation incentives model predictions and empirical results of Guiso and Minetti (2004, 2010) who obtain a significant negative asset heterogeneity effect on borrowing differentiation. These contrasting effects may be attributed to differences in theoretical contexts, study environment (developed industrial vs. developing agro-industrial countries), estimation method and, most crucially, definition and measurement of functional diversity.

Guiso and Minetti's (2004, 2010) usage of number of production sites seemingly incompletely, hence weakly, captures industrial diversification as a measure of functional diversity (i.e., different industrially unrelated production lines), arguably a better reflection of heterogeneity in pledgeable productive assets. In this regard, the high liquidity requirement of managing functionally diversified economic activities coupled with high transaction costs of multiple credit relationships to rationalize information-asymmetry-mitigating debt concentration choices (à la Bris & Welch, 2005), increasing AIFs' credit relationship intensity. This interpretation is also much in line with the debt concentration (or credit relationship intensity) implications of the secrecy theory (Bhattacharya & Chiesa, 1995; von Rheinbaben & Ruckes, 2004; Yosha, 1995). In this case, the need to avoid disclosures of proprietary information to multiple lenders motivates firms oriented towards product development and innovation to maintain exclusive and, hence, more intensive credit relationships.

The negative and significant Board Size effect tells of the role of quality corporate governance structures and firm transparency in explaining feeble credit relationship intensity. The transmission mechanism is not far-fetched. Braggion and Ongena's (2013) evidence of a positive board size effect on the number of banking relationships offers the evident implication of large-boarded AIFs exploiting their informational transparency to engage in diffused multiple credit relationships. This translates into lower borrowing concentration and credit relationship intensity. This suggests that improved corporate governance quality and borrower transparency reduce credit relationship intensity. Besides, if corporate governance quality reflects or translates into shareholders' right protection, this result corresponds with Godlewski and Ziane's (2010) evidence. Given the direct correspondence between corporate governance quality and traditional proxies of informational transparency (firm age and size), this finding also corroborates Bartz's (2016) novel finding of a significant nexus between borrower opacity and credit relationship intensity. Contrary to prior empirical literature on credit concentration (e.g., Godlewski & Ziane, 2010; Ongena et al., 2012), credit relationship intensity highly significantly increased in firms' financial leverage via a more concentrated borrowing structure. Debt concentration in exclusive or few credit relationships to minimize multiple disclosures of proprietary information may drive this significant positive firm leverage effect.

Furthermore, and most intuitively, AIFs' attribution of importance to corporate relationships (i.e., personal relationships, (re)negotiation ease and success, and primary banks' understanding of firms' business challenges) was significantly positively related to credit relationship intensity. This third novel

finding explicitly affirms claims in prior research of agribusinesses' preference for close banking relationships and the relevance of decision factors to firms' banking relationship formations (Aristei & Gallo, 2017; Bard et al., 2002; Bartz, 2016; Ongena et al., 2011). Unsurprisingly corroborative, the ML-extracted factor of trust and commitment, representing firm-bank relationship quality, is observed to positively drive credit relationship intensity, albeit with marginal statistical significance. Advancing Refait-Alexandre and Serve's (2016) evidence on the significant role of relationship quality (proxied by antecedents and consequences of trust) on firms' number of banking relationships, this ground-breaking result suggests trusting and committed AIFs' predominant choice of exclusive or concentrated credit relationship(s). By simple intuition, trust and commitment collectively encourages exclusive banking relationships which mitigate informational frictions, reduce the credit risks of adverse selection and moral hazard to facilitate large credit exposures in exclusive relationships, deepening credit relationship intensity.

Another fresh finding of crucial importance relates to the impact of AIFs' primary banks' nationality status on credit relationship intensity. The estimated negative and highly significant coefficient of Foreign-owned Bank suggests that AIFs in primary foreign-bank relationships have weaker credit relationship intensity relative to their counterparts in primary relationships with banks of a contrasting nationality status (i.e., domestic/local banks). Beyond the statistical significance, the estimated coefficient has some economic relevance. Specifically, ceteris paribus, the mean borrowing concentration (the credit relationship intensity) level of AIFs with primary foreign bank credit relationship was, on average, significantly less than that of those with primary

domestic bank credit relationships by 0.326 (i.e., ≈ 68% (≈ 64%) of the sample mean (median) borrowing concentration level). From the financial institutional perspective, foreign banks' lack of (or insufficient) knowledge of the local banking market conditions and local clientele base, à la Berger et al.'s (2000) "host-field" disadvantage hypothesis of foreign bank performance, may underpin this negative association.

Yet, theoretical and empirical literature subsequent to Berger et al.'s (2000) paper suggest plausible transmission mechanisms to explain this link. The premise of these arguments is the documented informationally transparent (large, older, etc.) firms' preference for foreign banks due to the latter's urban bias and comparative advantages in the usage of transactional lending technologies (i.e., processing of "hard" information) and making huge credit advances (see, e.g., Berger et al., 2008; Stein, 2002). The appropriateness of these alternative explanations of the inverse relation between credit relationship intensity and AIFs' primary foreign-bank relationship, therefore, lies in the predominance of the definitionally old age of the sampled firms.

First, the finding is in sync with Berger et al.'s (2008) empirically validated hypothesis of foreign bank-firm relationship fragility manifested in firms' elevated propensities for "polygamous" banking relationships and higher actual number of banking relationships as insurance mechanisms against foreign banking service withdrawal. The negative impact of the latter mechanism on credit relationship intensity is, therefore, mediated by multiple and dispersed or diffused credit relationships. Second, one of the key pillars of Berger et al.'s hypothesis is the Carletti-inspired conjectured differences in bank monitoring intensity originating from differences in bank nationality type. In

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this sense, the finding is also complementarily consistent with the notion that foreign (domestic) banks' high (low) monitoring intensity, reflecting in their intolerance (tolerance) of poor loan repayment performance and non-performing assets, and high (low) repayment enforcement pressure rationalize a less (more) intense credit relationship with foreign (domestic) banks.

Third, the result also concurs with empirically validated predictions of bank monitoring theories that implicitly explain credit relationship intensity via the structure of credit relationships maintained by informationally transparent firms that require less intense bank monitoring (Guiso & Minetti, 2004, 2010; Ongena et al., 2012). In this context, easy recognition of valuable assets (i.e., low monitoring cost) and the palpable risk of loss of valuable assets in firm (legal) reorganisation are sufficient disciplinary devices that induce lower debt concentration (lower credit relationship intensity) to invoke lower creditors' monitoring intensity. Overall, this final original evidence suggests that, regardless of firms' informational transparency/opacity and banks' monitoring costs/intensity, credit relationship intensity appears to be a function of the legal environment (e.g., creditors' right protection and judicial efficiency).

The two external controls (AIFs' regional characteristics) relating to firms' location and regional banking market conditions play highly significant complementary roles in determining credit relationship intensity. Evident from the negative coefficient of Population Density, AIFs located in densely (sparsely) populated regions or urban-based (rural-based) AIFs have a lower (higher) credit relationship intensity. This may be attributed to differences in internal characteristics (and inherent transparency/opacity implications), local or regional economic and banking market development and the consequent

differences in credit supply. In particular, the relatively developed (undeveloped) urban (rural) banking markets with marked differences in the number of financial institutions accords wider (limited) opportunities to maintain multiple credit relationships that theoretically have an inverse relationship with borrowing concentration and credit relationship intensity. This evidence, however, contradicts that obtained by Guiso and Minetti (2004, 2010) who adopt a rural location proxy of asset liquidation value to validate their creditors' reorganizational incentives model prediction of lower borrowing differentiation (i.e., lower credit relationship intensity, in this study).

Finally, and seemingly contradicting the implications of the differences in regional banking market development mechanism to explain the Population Density effect, regional concentration of bank branches was negatively related to firms' borrowing concentration (and, hence, credit relationship intensity) and statistically distinct from zero (at the 1% level). Given the theoretically inverse relation between banking market concentration and competitive conduct, this result implies that AIFs with main operational location in regional banking markets characterised by low (high) competition exhibit low (high) credit relationship intensity. This runs counter to the views of the pioneering set of theories (and its empirical proponents) on the incompatibility between banking market competition and bank-firm relationship strength (due to high bank-switching tendencies), and even to those expressed in the debt concentration literature (see, e.g., Chan, Greenbaum, & Thakor, 1986; Bartz, 2016; Ongena et al., 2012; Petersen & Rajan, 1995). This evidence, thus, submits to the views of a competing school of thought (Boot & Thakor, 2000; Dell' Ariccia & Marquez, 2004; Degryse & Ongena, 2007; Freixas, 2005; Kysucky & Norden, 2016) that

shoring up firm-bank relationship strength via "exclusive relationship loans" (i.e., increased credit relationship intensity) is a product differentiation strategy to rein in profitability decline associated with increased banking market competition.

Summary

Contrary to the evidence from the solitary literature on determinants of credit relationship intensity (Bartz, 2016), this study, on account of the mean credit relationship intensity level, obtained novel evidence of a slightly weak credit relationship intensity for agro-industrial firms in Ghana. A major point of departure, though, is the identification of the empirical drivers of credit relationship intensity for such agro-industrial firms. These include such internal firm-specific factors as the operational scope, corporate governance surrogates, financial performance, trust and commitment, and primary banks' nationality. Firms' regional characteristics (viz., population density and banking market structure) were also significant determining factors of credit relationship intensity.

CHAPTER EIGHT

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Despite the myriad of corporate policies purported to mitigate financial services supply constraints, the agricultural banking and finance literature is almost virgin on the nature of agro-allied enterprises which adopt some of these crucial financial access-enhancing strategies. Using different cross-sectional microeconometric modelling approaches, this study generally explored how agro-industrial firms' characteristics explain the formation of key banking relationships as strategic responses to financial services supply constraints in Ghana. Specifically, it examined the firm-specific drivers of four main dimensions of AIFs' banking relationships. The following research questions guided the study: (a) what internal and external firm-specific characteristics explain AIFs' choice of the number of banking relationship? (b) what internal and external firm-specific characteristics determine AIFs' state-owned banking relationship formation and diversification choices? (c) what internal and external characteristics explain AIFs' choice of primary bank types? (d) what internal and external firm-specific characteristics drive AIFs' credit relationship intensity? This final chapter presents an integrated overview of the entire study, providing a summary of the results, conclusions for derivations of policy implications/prescriptions, and directions for further research.

Summary

Revisiting a well-documented financial phenomenon among core industrial firms in advanced economies, the first research question ascertained

the prevalence or otherwise of "polygamous" banking relationships among AIFs in Ghana and unearthed the firm-specific factors explaining this dimension of corporate banking choices. The study revealed the prevalence of relationship multiplicity among AIFs in Ghana and results of diverse count model (i.e., Poisson, negative binomial and quasi-Poisson) estimations were unanimous in the identification of AIFs' internal characteristics as significant determinants of the number of banking relationships. These NBR drivers, in broad terms, included measures of firm demographics, operational scope, ownership structure, financial performance, access to external (non-bank) finance, relationship strength, sub-industry affiliation and relationship banks' structural features. With several implications, AIFs' external/regional characteristics (specifically, population density of region of operational location) was also statistically and economically relevant in explaining their "polygamous" banking relationships. In particular, with the solitary exception of the relationship strength measure (Share of Primary Bank Relationship Duration), the overall significant positive effects of both internal and external factors on AIFs' number of banking relationships are remarkable.

Inspired by the recent spike in government ownership that signals the optimality of state-owned banking relationship formations against the backdrop of arguments of state-owned banks' mission drift in Ghana, the second research question drove an empirical investigation to uncover the diverse effects of AIFs' internal and external characteristics on their choices of state-owned banking relationship formation and diversification. Estimations from binary response GLiM regression models, corroborated by incidental sample truncation model results, revealed the significant relevance of both internal and external firm-

specific characteristics to explaining these strategic banking relationship choices. In general, measures of internal characteristics (operational scope, ownership and corporate governance structures, financial performance and external non-bank financial access, decision-specific bank preferences, relationship strength, R&D and industry affiliation) and external characteristics (regional population density and banking market structure and conduct) influenced SOB relationship formations. Interestingly, except measures of corporate governance structures, financial performance and relationship strength, the same broad set of measures of firm-specific characteristics motivated AIFs' general SOB diversification choices.

In pursuant of the third research objective of unearthing emergent patterns in the strategic matching of AIF and primary bank type characteristics, the estimation results from binary response GLiM models (with different link functions—cauchit, complementary log-log, probit and logit estimations) revealed that, in broad terms, primary bank type choices were determined by both internal and external firm-specific characteristics. In general, determinants of primary bank type choices included such internal factors as firm demographics, operational scope, ownership and corporate governance structures, financial conditions, research and innovation behaviour, decision-specific bank preferences, NBR regime choice, relationship strength, and industry affiliation. The broad external firm-specific primary bank type choice determinants included regional affiliation, urban-versus-rural location (population density), regional banking market structure, conduct and institutional composition. The dominant research findings suggested, for example, that old AIFs with bureaucratic boards had a dominant preference for

SOBs for primary relationships, while internationally present, international trade-oriented and well-performing AIFs had a greater proclivity for primary foreign bank relationships. Also, whiles the propensity for primary relationships with SOBs increased in AIFs' insistence on primary banks' close corporate relationships and quality, AIFs' preference for primary banks' efficiency and outreach drove them into primary relationships with foreign banks, regardless of the primary banks' health and size structure in both cases.

The empirical identification of the significant firm-specific determinants of the optimal firm-bank credit relationship intensity—the fourth research objective—was conducted via benchmark OLS, IHS-transformed Tobit and double-hurdle regression models. The statistical significance of internal (i.e., Industrial Diversification, Board Size, Firm Leverage, Corporate Relationship, Trust and Commitment, Foreign-owned Bank) and external (i.e., Population Density and Regional Bank Branch Concentration) firm-specific characteristics were robust across these alternative model estimations to explain credit relationship intensity. Specifically, except AIFs' board size and primary banks' ownership structure, all the other aforementioned internal firm-specific factors had significant positive relationship intensity effects, contrasting the significant negative relationship intensity effects of the above-mentioned external factors.

Conclusions

Overall, the examined strategic banking relationship formations (i.e., the NBR, SOB relationship formation and diversification choices, primary bank type choice and credit relationship intensity) were explained, to a very large extent, by the internal characteristics of AIFs in Ghana, albeit their external

characteristics played minor complementary roles. In all cases, the study produced some seemingly counterintuitive results have been rationalized in the preceding empirical chapters. Yet, there were unexpected findings which may generally be attributed to the study's limited sample size. The revisitation of the advanced-country-dominated theoretical and empirical research into the financial phenomenon of relationship multiplicity in the agro-industrial space in a developing country context produced some remarkably unexpected results. Albeit consistent with a priori expectations in respect of their signs, some internal firm characteristics (e.g., Foreign Trade Orientation, Concentrated Ownership, Fixed Asset Tangibility, Service Quality and Liquid Banks) entered statistically insignificant in explaining the NBR maintained by AIFs. These unexpected findings mirror the extant mixed evidence on some these variables (Concentrated Ownership and Fixed Asset Tangibility) in the literature.

These deviations notwithstanding, the original finding that the mean AIF in Ghana has three banking relationships provides fresh empirical endorsement of several theoretical predictions of relationship multiplicity in the agro-allied industry of developing or emerging economies characterized by low judicial efficiency and increasing banking market competition amidst persistent systemic fragility. This first aspect of the study contributes to the firm-bank relationship literature on the NBR by offering five fresh major insights into the nature of AIFs in developing countries that may regard relationship multiplicity as an optimal corporate policy strategy to boost financial services supply: (a) AIFs with high refinancing risk exposure, (b) AIFs whose primary banks have a lower share of the firms' total banking duration, (c) AIFs with primary activity in the food and beverage sub-sector of agro-industry, (d) AIFs with primary

state-owned banking relationships, and (e) AIFs located in densely populated regions, which parallel relatively high regional economic development and banking market competition. Besides, this is the first study to uphold the applicability of the life-cycle or emancipation theory in explaining the positive firm size and age effects on the number of banking relationships among agro-industrial firms in a developing country context.

In light of the emerging evidence on wide-scoping benefits of state-owned entities and the optimality of SOB relationships, especially for "priority sector" firms, against the backdrop of a paucity of empirical evidence on this subject-matter, the second aspect of the study (regarding SOB relationship formation and diversification choices) also produced some unexpected results. These respectively include the irrelevance and statistical insignificance of firms' demographic characteristics of size and age on both SOB relationship formation and diversification choices, regardless of the bank's mandated operational sector, and the irrelevance of Exclusive Relationships (a proxy for relationship quality) to SOB diversification choices. Yet, the significant results of the second aspect of this study are pregnant with interesting insights on the wide-ranging nature of actual (and potential) AIF beneficiaries of SOBs' soft-budget constraints. This assorted class of SOB-linked AIFs are characterized by varying degrees of informational opacity and, on the balance of probabilities, there is mixed evidence on the SOBs' establishment mission drift hypothesis.

Overall, close similarities (in direction and significance) were observed between AIF's characteristics determining their (a) generic SOB and SDSOB relationship formations, (b) generic SOB relationship formation and generic SOB diversification choices, and (c) SDSOB relationship formation and

diversification choices. However, the same parallels could not be drawn for the significant determinants of AIFs' generic SOB and SDSOB diversification choices, motivating the conclusion that observable differences in sector-generic and sector-specific SOBs (e.g., in establishment mission, business models, shared firm-bank values and image, sector-related competencies, etc.) do condition the varied SOB choices made by different kinds of AIFs.

The arguably premier enquiry to empirically identify the significant firm-specific determinants of the corporate strategic choice of primary bank types defined simultaneously by performance-cum-structural characteristics similarly produced some perverse findings including, inter alia, highly leveraged AIFs' primary association with LSFP bank types. This third stanza of the study revealed a robust correspondence between AIFs' characteristics and those of their primary bank types, signalling evidently that different AIF types engage different primary bank types. The study's major contributions to the extensive firm-bank relationship literature relate to (a) the simultaneous characterization of firms' self-reported primary banks by four structural-cum-performance characteristics that magnetise all enterprises, regardless of their sector affiliation; (b) the uncovering of a broad array of varied firm-specific mechanisms that motivates strategic primary alliances with the defined bank types, and (c) the extension of the study environment to agro-industry-specific context of a developing economy. Unsurprisingly, the findings suggested a complex pattern of the matching of firm and primary bank type characteristics that, in various parts, somewhat answered to extant theoretical model predictions and implications as well as intuition. Within this complexity, however, lies a number of original pieces of revealing empirical evidence of

dominant emergent patterns. By and large, these patterns seem to be driven by differences in primary banks' nationality and ownership types that correspond to differences in establishment missions and institutional aversion to agro-allied finance. No wonder differences in firms' decision-specific bank preferences (i.e., corporate relationships, bank efficiency and outreach, quality, and culture) impinged strongly on their primary bank type choices.

To the best of my knowledge, the fourth (and final) stanza of this research premiers the empirical identification of the significant determinants of credit relationship intensity using borrowing shares and complements the embryonic literature on the determinants of firm-bank relationship intensity with three points of departure: (a) diverts focus from multi-sectoral sole proprietorships in an European country (in the very first empirical study) to largely limited liability enterprises in the agro-industrial sector of a sub-Saharan African country, (b) finds, on account of the mean credit relationship intensity level, a contrasting evidence of less intense credit relationship between banks and agro-industrial firms in Ghana; and, (c) identifies the internal and external characteristics of AIFs that significantly determine the intensity of their credit relationships with the entire banking industry (i.e., regardless of the number of credit relationships). The study enriches our understanding of how, inter alia, firms' decision-specific bank preferences (e.g., insistence on corporate relationships), trust in and commitment to their primary bank (relationship quality), the banks' ownership structure, and regional banking market structure and conduct shape credit relationship intensity of AIFs in Ghana.

Recommendations

The main findings from the enquiries into the firm-specific determinants of the four main dimensions of strategic banking relationships inform a number of management and public policy implications and recommendations. A direct implication of the joint validity of the life-cycle and Bolton-Scharfstein industry cyclicality hypotheses of the number of banking relationships (i.e., the robust positive firm size/age and food/beverage sector effects) is the inevitability of the deliberate corporate policy choice of relationship multiplicity over the growth trajectory for agro-industrial enterprises, especially those exposed to business cyclicality due to perishable inputs' seasonality. Even though multiple banking relationships hold the potential virtue of increasing inter-bank competition to mitigate financial services supply constraint and ultimately serve as a liquidity insurance and bank diversification mechanism, the phenomenon carries inherent risks. Notable amongst these risks is the easy transition to multiple credit relationships and elevated default probabilities, evidenced by poor loan payment performance and increasing non-performing assets that have bedeviled the Ghanaian banking system. As banking system instability may jeopardise firm and bank performance and growth with dire economic growth and development repercussions, addressing the inherent risks in multiple banking relationships requires a multi-stakeholder (i.e., firm, bank, regulator) policy approach.

To disincentivise relationship multiplicity arising from poor credit risk assessment and the consequent liquidity constraint, the significant negative effect on the NBR of the share of firms' primary banks' duration in their total banking duration inspires a clear recommendation. The managements of AIFs,

particularly the SME class, should adopt the strategic policy of developing a durable long-standing relationship with a primary bank with a track record of sound financial performance to build firms' loyalty and mitigate the ills of information asymmetry (adverse selection and moral hazard) and ensure stable access to finance. Where circumstances impose the inevitability of multiple banking relationships, theory recommends that firms make creditor concentration choices by limiting the number of banking relationships to two. And, to avert costly proprietary information disclosure and project refinancing discontinuation arising from the involved banks' coordination failure, firms may adopt the asymmetric or heterogeneous two-bank financing policy.

Three bank management policy prescriptions are made: (a) widen the range, depth, breadth and sophistication of domestic and foreign cash management service menus to meet international banking market standards and requirements of AIFs, particularly the foreign-owned and internationally present firms; (b) improve screening and monitoring intensity and efficiency (especially for large banks) to build a solid market share (clientele base) based on well-thought-out, client-retaining business models that lead to fully-met credit and other financial service demands rather than on quick-fixes that generate unmet liquidity demands, and (c) bolster liquidity position and adopt/strengthen relationship-based banking methodologies (especially for SOBs) to fully satisfy AIFs' credit and intense relationship requirements.

On the public or regulatory policy front, whiles the establishment of credit referencing bureaux to curb the high credit risk inherent in multiple banking relationships is commendable, the Bank of Ghana should take a second hard look at the number and ownership of such institutions on account of wider

public interest and access. With agro-industry being the cornerstone of Ghana's industrial development policy, the robust positive NBR effects of refinancing risk exposure, belongingness to the dominant food-beverage sub-sectors and having a primary SOB relationship suggest that relationship multiplicity is an adaptive response to profound financial services supply constraints and call for other public policy recommendations.

Two additional audacious policy measures are suggested: (a) a national declaration of firms in the agricultural supply and value chains as "priority sector" firms to enjoy preferential credit terms including interest rate capping, administered along the lines of the US Farm Credit System; and, (b) creation of a new development bank to specialize in agro-industry development finance and/or repurposing the existing SOBs by expanding their core missions to expressly incorporate this key strategic area. Whiles these public policy recommendations smack of a revisitation of measures adopted in the era of state-directed development finance paradigm, the grim industrial development implications of the far-reaching bank market failure in their absence and the high probability of increased financial services supply to this strategic industrial class by a specialized state-owned development finance vehicle to ensure AIFs' growth necessitates such radical Keynesian-style interventionist measures.

Largely dismissing the SOBs' mission drift argument, the empirical evidence from the second subject-matter of this study furnishes a sound case in support of this bold public policy call in terms of the wide-ranging nature of the current and potential AIF clientele base of sector-development SOBs. Besides leveraging their soft-budget constraints advantages and wide rural and peri-urban banking market penetration against the backdrop of private (domestic and

foreign) banks' characteristic disinclination to agro-allied finance, SOBs' management policy must aim at: (a) curbing the high probability of fungibility, (hinted by the positive Industry Diversification effect) that may lead to fund substitution, uncontrollable diversion of funds and unintended investment and production effects, through intense monitoring of loan utilisation to ensure its usage for the intended agro-industrial development purposes; (b) improving their attractiveness to AIFs attributing importance to their primary banks' efficiency and outreach by building dense international networks, upgrading ICT to cutting-edge standards, and reducing red tape to increase procedural speed; and, (c) targeting R&D-oriented AIFs as the resultant innovativeness (process- and/or product-wise) improves their business prospects and puts them on the highway of growth and profitability for positive development outcomes.

The whole gamut of AIFs' (internal and external) characteristics revealed by the third empirical enquiry to be motivating primary associations with SOBs highlights, most importantly, the relative irrelevance or secondary importance of SOBs' health to AIFs' choice of primary bank. This motivates the suggestion that any public discourse on the recommended establishment of an agro-industrial sector-specific SOB must be cognizant of its overriding long-term development impact above all else. Yet, this study motivates a number of management-level policy prescriptions. First, the adverse credit supply implication of the odd coupling of informationally opaque and highly leveraged AIFs with relatively agro-finance-averse healthy private (domestic and foreign) banks calls for (a) such AIFs to build closer, longer and durable working relationships with their primary banks to mitigate informational frictions and signal quality improvement over time to assuage credit risk concerns; and, (b)

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such primary banks' relaxation of their impersonal transactional business model for a more relationship-based banking technology to process "soft" information and build special capacity in agro-finance risk management practices.

Second, the increased relevance of foreign banks in primary associations with AIFs can be achieved by complementing the afore-suggested measures with easy renegotiability of credit contracts, extensions of their local branch networks beyond the urban areas and widening the range and quality of tailor-made agribusiness financial services. Finally, due to the criticality of bank health to healthy (well-performing), internationally present and foreign trade-oriented AIFs in primary bank relations, the attractiveness of the generality of banks to such AIFs can be assured by shoring up their general financial health and liquidity positions, in particular. Moreover, the proposed or new national agro-industrial development bank should emulate already existing SOBs by meeting the close corporate relationship requirements of its target clientele and the generality of SOBs should strategize to attract AIFs with a strong preference for bank efficiency and outreach into primary relationships.

The empirical evidence on the internal and external characteristics of AIFs driving their credit relationship intensity inspires the following set of managerial policy prescriptions: (a) functionally diversified and potentially innovative AIFs should maintain an intense banking relationship as the consequent reduction in information asymmetry and its vices may generate better lending outcomes that enable satisfaction of liquidity requirements of industrial diversification, (b) the inverse board size effect identifies relatively informationally opaque and, hence, financially constrained AIFs, especially SMEs, as the enterprise class with high credit relationship intensity, and bank

management policy should both strengthen their risk management systems and target agroindustrial SMEs as a special market niche for mutually beneficial outcomes that accelerate their contribution to national development; (c) AIFs which cannot accommodate the high monitoring intensity and repayment enforcement pressure consequent to intense credit relationships should desist from primary foreign bank relationship formations due to foreign banks' intolerance for non-performing assets and quick resort to legal enforcement, and, (d) the complementarity between banking market competition and credit relationship intensity should inform bank management policy of adopting and/or deepening client-driven relationship-based banking practices as a product and/or institutional differentiation strategy to stem profitability decline amidst increasing banking market competition.

Suggestions for Further Research

This final sub-section of the concluding chapter identifies and outlines the following suggestions for consideration in future empirical research to enhance our understanding of firm-bank relationships in the context of deep financial market imperfections:

1. Re-examine the determinants of these strategic banking choices by other firms, especially SMEs, along other key nodes of the entire agricultural supply/value chains (including those in base-of-the-pyramid agricultural production) and also in other economic sectors.

2. Identify the determining factors (firm characteristics) and their relative contributions to explaining the significant differential propensities for the examined strategic banking relationship formations by firms with

contrasting demographic characteristics and sub-sectoral affiliations (e.g., age (young vs. old firms), size (i.e., small vs. large firms), sector affiliation (food-beverage vs. non-food-beverage firms)).

3. Investigate how loan-specific characteristics may influence the formation of strategic banking relationships. This is particularly relevant for financially challenged agro-allied firms as the clemency or otherwise of debt contract terms/lending outcomes (i.e., credit volume/availability, lending rate, maturity, collateralization, credit rationing, etc.) may also influence strategic choices of banking relationships as a coping strategy.

4. Conduct a comparative study into the lending outcomes of the examined strategic banking relationships of firms in the various economic sectors; furthermore, the possibility of reverse causality, in which these credit contract outcomes influence banking relationships, may be explored.

5. Examine the potential implications of the regional legal and institutional environment (particularly legal/judicial system efficiency, rule of law, creditor/investors' rights protection and enforcement, and institutional quality) for strategic banking relationship formations. This is premised on the complementarity between law and finance in the institutional economics framework.

6. Given the consistently strong significant correlations between measures of firms' financial performance (e.g., refinancing risk exposure, profitability, liquidity and leverage) and the various dimensions of banking relationships, empirical enquiries that reverse the direction of effect by examining the effects of strategic banking relationship formations on financial performance of agro-allied firms and those in

other economic sectors may be profoundly revealing from a policy perspective.

7. Reverse the firm-specific perspective adopted by this study to investigate the bank-specific and environmental determinants of primary firm type and relationship intensity choices of financial intermediaries for various sectors.

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APPENDICES

APPENDIX A

Survey of Agroindustrial Firms' Banking Relationships

Please, your firm is part of a random sample of companies whose full participation as well as frank and accurate responses to this survey is humbly sought to research into the above-stated issues. Your candid responses will assuredly be treated with utmost confidentiality and, due to aggregation of these responses, individual firm anonymity is fully assured and guaranteed. Please, fill this largely closed-ended questionnaire by ticking (√) in an appropriate box and writing only in the spaces provided. Your assistance and cooperation would be highly appreciated.

SECTION A: FIRM DEMOGRAPHICS AND OPERATIONAL SCOPE

1. In what year did the firm formally commence business? ……………

2. Is the general headquarters of your firm located in Ghana?

   Yes ☐   No ☐

3. Please, state regional and municipal/district location of the firm's (domestic) headquarters in the spaces provided below:

   Region ……………………………………………………………….

   Municipal/District …………………………………………………

4. Please, is your firm a free zone enterprise in Ghana?

   Yes ☐   No ☐

5. Does your firm own and control other establishments?

   Yes ☐   No ☐

   If 'no', please skip or jump to Question 8.

6. How many other establishments does your firm own and control? ……...

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7. Are the businesses of these subsidiaries primarily conducted in the district/municipality where the firm's headquarters is domestically located?   Yes ☐   No ☐

8. Is your firm owned and controlled by another establishment?

   Yes ☐   No ☐

9. Please, how many persons were engaged, both permanently and temporarily, in the activities of the firm as at the end of the following years?

2014	2015	2016	2017	2018

SECTION B: OWNERSHIP STRUCTURE, LEGAL STATUS AND CORPORATE GOVERNANCE

1. Please, tick (√) in an appropriate box below to indicate the ownership type of your firm.

   Private-owned ☐   State-owned ☐   Public-Private Partners ☐

2. Is your firm family-owned?   Yes ☐   No ☐

   If 'no', please skip or jump to Question 4 under this Section.

3. Please, state the average **fraction or percentage** of the firm's management team that is related to the controlling family over the past five (5) years. ……………………….

4. What is the nationality of the firm's owner(s)? Please, tick (√) the appropriate box below.

   Ghanaian ☐   Non-Ghanaian ☐   Ghanaian-Non-Ghanaian ☐

   If either 'Ghanaian' or 'Non-Ghanaian', please skip to Question 7 under this section.

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5. Do both categories of owners have equal ownership and controlling rights in the firm?   Yes ☐   No ☐

   If 'yes', please jump to Question 8 under this Section.

6. Which category of nationalities has **greater** ownership and controlling rights in the firm?   Ghanaian ☐   Non-Ghanaian ☐

7. Please, what is the **estimated** average share of firm's equity/capital owned by its principal owner or largest shareholder over the past five (5) years? Below 15% ☐   15-30% ☐   Above 30% ☐

8. Does any financial institution have a share in the ownership of the firm?

   Yes ☐   No ☐

9. Is the manager of this firm the principal owner (or one with greater ownership rights)?   Yes ☐   No ☐

10. Please, tick (√) in an appropriate box below to indicate your firm's legal or organisational status.

    Sole Proprietorship ☐   Partnership ☐   Cooperative ☐

    Private Limited Co. ☐   Public Limited Co. ☐   Other ☐

11. Please, does the firm's management have the autonomy and capacity to make and implement financing decisions?   Yes ☐   No ☐

12. Does the firm have a Board of Directors in its administrative set-up?

    Yes ☐   No ☐

    If 'no', please skip or jump to Question 17 under this Section.

13. Please state the average number of members on the firm's Board of Directors for the past five (5) years. …………………..

14. Please, does a financial institution have a representative on the firm's Board of Directors?   Yes ☐   No ☐

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15. Does the firm have a controlling (non-financial) institutional shareholder represented on its Board of Directors? Yes ☐ No ☐

16. Does the firm's Board apply the one share-one vote principle?

   Yes ☐   No ☐

17. Does the firm belong to any business group, association or consortium?

   Yes ☐   No ☐

SECTION C: MANAGERS' DEMOGRAPHICS AND EXPERIENCE

1. Please, what is the current manager/CEO's gender?

   Female ☐   Male ☐

2. What is the firm's current manager/CEO's level of education? Please, tick (√) one appropriate box.

   Less than Senior High/Tech. Sch. ☐   Senior High/Tech. Sch. ☐

   Some Tertiary Education ☐   Polytechnic/College graduate ☐

   University/Postgraduate degree ☐

3. What is the firm's current manager/CEO's age?   ……………

4. Please, for how long has the firm's current manager/CEO held their position?   …………

5. Prior to their current position as manager/CEO of this firm, did they hold a managerial position in another business?   Yes ☐   No ☐

   If 'no', please skip or jump the next question to Section D.

6. Please, what was the total length in years of this prior business managerial experience? ………………………….

SECTION D: SECTOR, RESEARCH AND DEVELOPMENT, INNOVATION AND INTERNATIONALISATION

1. Please, state the enterprise's main business activity (i.e., one that accounts for the largest share of its total value of output) (e.g., food processing). ………………………………….

2. Tick (√) an appropriate box to indicate the industrial sub-sector of firm's principal activity.

Paper and paper products	☐	Textiles	☐
Wood and wood products	☐	Wearing apparel	☐
Furniture	☐	Tobacco	☐
Rubber and rubber products	☐	Beverage	☐
Footwear	☐	Food	☐
Leather and leather products	☐	Others	☐

3. Does the firm own and operate other business(es) in industrial sub-sector(s) not listed in Question 2 under this Section?

   Yes ☐   No ☐

   If 'no', please skip or jump to Question 5 under this Section.

4. Please state the firm's businesses activities not covered in the industrial sub-sectors listed in Question 2 under this Section.

   a) …………………………… b) ………………………………….
   c) …………………….................. d) ………………………………….
   e) …………………………… f) …………………………………..

5. Has the firm conducted any international trade activity (involving export, import, and/or foreign direct investments) in the last five (5) accounting years (i.e., 2014-2018)?   Yes ☐   No ☐

   If 'no', please skip or jump to Question 9 under this Section.

6. Please, specify the firm's principal foreign trade operations (e.g., exporting or importing) in decreasing order of value of trade.

Principal activity ……………………………………………………….

Secondary activity ……………………………..

7. Please, what was the value (in GH¢) of the firm's principal international trade activity as at the end of the following years?

2014	2015	2016	2017	2018

8. How many foreign countries, in total, has the firm exported to and/or imported from for the last five (5) fiscal years? ………………………

9. Please, has the firm invested in research and development (R&D) in the past five (5) years?   Yes ☐   No ☐

If 'no', please skip or jump to Question 12 under this Section.

10. Please, how do you rate your firm's R&D efforts?

Low ☐   Fairly Low ☐   Average ☐   Fairly High ☐   High ☐

11. State the average R&D expenditure (in GH¢) for the past five (5) years. …………………….

12. Please, has the firm introduced either new products or significant changes to its existing products in the last five (5) years?

Yes ☐   No ☐

13. Has the firm introduced new production methods and processes in the last five (5) years?   Yes ☐   No ☐

14. Please, has the firm introduced both new production methods and processes and new products in the last five (5) years?

Yes ☐   No ☐

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SECTION E: FIRM-BANK RELATIONSHIP FEATURES

1. Please, does your firm undertake all of its cash management transactions (i.e., foreign exchange-related, credit-related, liquidity/deposit-related, investment-related, etc.) at the same financial institution?

   Yes ☐   No ☐

2. Please, has the absence and/or inadequacy of a specific cash management service at a financial institution ever compelled the firm to establish a new relationship (open a new account) with another financial institution(s)?   Yes ☐   No ☐

3. Please, has the execution of a major investment project ever compelled the firm to establish a new relationship (open a new account) with another financial institution(s)?

   Yes ☐   No ☐

   If you ticked 'no' to **both** Questions 2 and 3 under this Section, please skip or jump to Question 9 under this Section.

4. Please, has the firm settled all of its outstanding debt obligations with the 'old' financial institution(s)?   Yes ☐   No ☐

   If 'no', please skip or jump to Question 9 under this Section.

5. Has the firm closed its account with any of the 'old' financial institution(s)?   Yes ☐   No ☐

6. Which category of financial institutions **has been** 'dropped' from the firm's pool of financiers? (Please, tick (√) as many boxes as are applicable).

   Local Deposit Money Banks ☐   Foreign Deposit Money Banks ☐

   Rural & Community Banks ☐   Non-bank Financial Institutions ☐

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7. Which category of financial institutions is **<u>most likely</u>** to be 'dropped' from the firm's pool of financiers? (Please, tick (√) as many boxes as are applicable).

Local Deposit Money Banks ☐   Foreign Deposit Money Banks ☐

Rural & Community Banks ☐   Non-bank Financial Institutions ☐

8. What was the estimated average duration of the firm's relationship(s) with the **'dropped'** financial institution(s)?

☐☐ years   ☐☐ months

9. Please, has the firm reduced services from a financial institution in the recent past?   Yes ☐   No ☐

10. Please, does the firm undertake all of its credit/borrowing transactions with the same financial institution?   Yes ☐   No ☐

If 'yes', please jump to Question 12 under this Section.

11. Please how many financial institutions **in Ghana** normally finance your firm? …………...

12. Please, list the names of financial institutions with which the firm had a relationship for managing its cash management transactions **before August, 2018** in decreasing order of priority (i.e., the most important one first).

a) …………………………..   b) ………………………….

c) …………………………..   d) ………………………….

e) …………………………..   f) …………………………..

g) ……………………………   h) ………………………….

i) ………………………….   j) …………………………..

13. Please, re-arrange the above-listed financial institutions in the space below in ascending order of frequency of visits (starting from **the least** visited bank) and indicate the duration of the firm's relationship with the bank against its name (e.g., ABC Bank Ltd—4 years).

a) …………………………...   b) ……………………………….

c) …………………………...   d) ……………………………….

e) …………………………...   f) ………………………………..

g) …………………………………   h) ………………………………….

i) ……………………………….   j) ………………………………...

14. Please, has the firm currently borrowed from any of the above-listed financial institutions?   Yes [ ]   No [ ]

If 'no', please skip or jump to Question 21 under this Section.

15. Please, how many of the above-listed financial institutions has the firm currently borrowed from? …………………..

16. Please, state the **name(s)** of the firm's current creditor(s) and the **years** in which they provided their financing shares (e.g., ABC Bank Ltd—2015).

a) ……………………………   b) ……………………………

c) ……………………………   d) ……………………………….

Please, jump to Question 21 under this Section **if** the firm has **only one current** creditor.

17. Has the firm borrowed equal amounts from each of its creditors?

Yes [ ]   No [ ]

If 'yes', please skip or jump to Question 21 under this Section.

18. Please what, in your estimation, is the **largest fraction or percentage** of the firm's total bank credit that was taken from a single creditor? …………………......

19. Please, what is the name of the financial institution that provided the largest financing share in the firm's current total bank credit? ……………………………………………….

20. Referring to Question 15 under this Section (on number of current creditors), please state the estimated financing shares (**in fraction or percentage**) of each of the **remaining** current creditors in the firm's current total loans.

    a) ………………………………… b) ……………………………………..

    c) ………………………………… d) ……………………………………..

    [Please, note that the sum of the largest financing share in Question 18 and the remaining financing shares stated here in Question 20 must be equal to one (1)].

21. Please, **estimate** the largest share (**in fraction or percentage**) of loans that a single lender **has ever** contributed to the firm's total loans obtained from two or more lenders over the same time period. …………

22. Please, state the name of the financial institution that contributed the largest financing share stated in Question 21 and the year of contribution (e.g., ABC Bank Ltd—2012)…………………………………………...

23. Has the firm experienced any changes in its banking relationship structure indicated in Questions 12 and 13 of this Section **since August, 2018**?   Yes ☐   No ☐

    If 'no', please skip or jump to Question 25 under this Section.

24. Please, briefly describe any changes in respect of the number of financial institutions for cash management purposes, priority assignment and frequency of visits……………………………………………………….

………………………………………………………………………..

………………………………………………………………………..

25. Please, does the firm use more of its internal financial resources than external debt to manage its operations?   Yes [ ]   No [ ]

26. Please, indicate the importance of minimising borrowing costs in the firm's relationships with financial institutions. (Tick (√) in an appropriate box below).

No Importance [ ]   Considerable Importance [ ]

Little Importance [ ]   Great Importance [ ]

Some Importance [ ]

SECTION F: FIRMS' CHOICES OF PRIMARY BANKS

Please, evaluate the following criteria as factors that influence the firm's selection of its primary bank(s) by ticking (√) one appropriate box along each criterion. (MI = Most Important; VI = Very Important; I = Important; NI = Not Important).

Criterion	MI	VI	I	NI
Bank Consultancy and Advisory Services				
Range and Quality of Bank Services				
Extensiveness of Local (Branch) Networks of Bank				
Availability/Extensiveness of International Networks				

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Personal Treatment and Relationship				
Ease and Success of (Re)negotiation with Bank				
Bank Specialisation in Firm's Sector of Operation				
Advances in ICT (e.g., electronic banking)				
Bank's Understanding of Firm's Business Challenges				
Bank's Dominant Market Position and Experience				
Bank (Branch) Proximity to Firm Location				
Suitability of Bank Image to Corporate Culture				
Handling, Processing and Procedural Speed				
Bank Promises and Guarantees				
Price of Bank Products/Services (incl. terms and conditions)				
General Bank Reputation				

SECTION G: RELATIONSHIP QUALITY AND STRENGTH

The first twenty-two (22) items under this Section contain statements of opinion about firm-bank relationship quality. Please, indicate the extent of your agreement or otherwise to these statements by ticking (√) one box that most closely matches your view using the following scale: Strongly Agree = 5; Mildly Agree = 4; Neither Agree nor Disagree = 3; Mildly Disagree = 2; Strongly Disagree = 1.

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Statements of Opinion	1	2	3	4	5
1. Our main bank generally fulfils our expectations on the amount of loan approved as compared to the amount requested.					
2. The firm generally meets its main bank's security and collateral requirements for loan approvals.					
3. The firm's equity invested in the business always meets its main bank's requirement for loan approvals.					
4. The interest rates charged on loans and other banking services charges of the firm's main bank are affordable.					
5. The firm is satisfied with the whole range and quality of cash management services provided by its main bank.					
6. The firm has frequent (at least fortnightly) informal interactions (via personal visits, telephone calls and/or emails) with the loan officer/representative of its primary bank.					
7. Our primary bank (or its loan/relationship officer) has frequent formal exchanges of meaningful and timely information with the firm.					
8. The formal and informal sharing of information between firm and its primary bank is sufficient to favourably influence a loan decision.					

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9. The firm is fully aware of the service delivery capabilities and current financial performance of its primary bank.				
10. The firm needs no additional information to make more reasoned decisions in its financial transactions with its primary bank.				
11. The firm has full knowledge of its primary bank's investment and growth prospects.				
12. Our primary bank does not systematically look for opportunity to maximise profit from our financial transactions.				
13. Our primary bank has established a reputation of excellence in service delivery and earned respect for its high sense of integrity in the banking market.				
14. Given our primary bank's reputation and integrity, it can be counted on to be responsive to our needs and interests and fulfil its obligations in financial transactions with the firm.				
15. Our primary bank behaves in a fashion consistent with our expectations of positive outcomes without prior discussion with us.				
16. Our primary bank provides sufficient and satisfactory information to explain unforeseen negative outcomes in transactions.				
17. Given our primary bank's reputation and integrity, the firm is willing to rely or depend solely on the primary bank to meet all of its financial and service requirements.				
18. The availability of alternative financial institutions with comparable reputation, range				

and quality of services does not influence the firm's relationship with its primary bank.					
19. The estimated benefits would not outweigh the estimated costs of changing the firm's primary bank or reducing services from it.					
20. It is only fair and just for the firm to maintain its relationship with its primary bank due to the bank's invaluable contributions to the firm's operations.					
21. The firm cherishes its financial relationship with its primary bank because of the suitability of the bank's image and values to the firm's culture.					
22. Our firm desires to develop a valuable and long-term relationship with its main bank in order to achieve mutually beneficial outcomes.					

23. Please, what type of information does your firm regularly present to its financier(s) in credit transactions?

Only quantitative data ☐   Only qualitative data ☐   Both ☐

[Please, quantitative data are documented and, therefore, verifiable and transmittable (e.g., balance sheet/profit and loss statements, budgets, financial/business plans, cash flow forecasts, historical records of payment, etc.].

24. Please, how long has the firm, since beginning operations, conducted business with its primary financial institution?

☐☐ Years   ☐☐ Months

25. Please, what is the **estimated** distance (in kilometres) between the firm's headquarters and its primary bank's headquarters? …………………….

26. Is a branch of the firm's main bank situated in the district of location of the firm's headquarters?　　Yes ☐　　No ☐

27. Please, is the following statement true? 'A branch of a competing bank is closer to the firm than a branch of the firm's primary bank.'

　　Yes ☐　　　No ☐

28. Does your firm patronise this closest branch of its primary bank?

　　Yes ☐　　No ☐

29. Please, is the firm's loan processing officer usually located in a branch office of its primary bank?　　Yes ☐　　　No ☐

30. Please, how many times in the last five (5) years (i.e., 2014-2018) has the primary bank granted a loan request from the firm? …………………

31. If the firm is privileged to have more than two **current** financiers, please what is the financing share (in fraction or percentage) of the main bank in the firm's total debt?　…………………………

SECTION H: CREDIT CONTRACT CHARACTERISTICS AND OUTCOMES

1. During the last five years (i.e., 2014-2018), were there times the firm needed credit but could not apply because it thought the application would be turned down?　　Yes ☐　　　No ☐

2. Please, has the firm applied for a credit facility within this period (i.e., 2014-2018)?　　Yes ☐　　　No ☐

   If 'no', please skip or jump to Question 16 under this Section.

3. Please, how many times during this period has the firm applied for new loan(s), excluding renewals of existing credit facilities? ………………..

4. Please, indicate the purpose for which the last/new or most recent credit facility was applied.

General Corporate Purpose ☐   Working Capital ☐

Debt Repayment/Prepayment ☐   Firm Start-up ☐

Research/Product Development ☐   Other Purpose(s) ☐

5. Please, tick (√) within one of the boxes below to indicate the type of loan that was most recently (i.e., 2014-2018) applied for.

Investment Credit ☐   Mortgage Credit ☐   Overdraft ☐

New Credit Line ☐   Other(s) ☐

6. Excluding renewals of existing credit facilities, was the firm's last/new or most recent loan application during this period approved?

Yes ☐   No ☐

If 'no', please skip or jump to Question 16 under this Section.

7. Please, what was the interest (lending) rate (in percentage) on the last/new or most recently approved credit facility? …………………..

8. Please, was any type of collateral required by the lending bank and/or pledged by the firm to secure the last/new or most recently secured loan?

Yes ☐   No ☐

If 'no', please, skip or jump to Question 10 under this Section.

9. What type of collateral was used to secure this most recent loan? (Please, tick (√) as many boxes below as are appropriate).

Inventory/Accounts Receivable ☐   Business Equipment/Vehicles ☐

Business Securities/Deposits ☐   Business Real Estate ☐

Personal Real Estate ☐   Other Personal Assets ☐

(If you ticked any box above, jump to Question 11 under this Section).

10. Please, list **not** more than two (2) reasons why the firm obtained the loan without any type of collateral.

a) ……………………………………………………………………

b) ……………………………………………………………………

11. Was the firm required to have a personal guarantee, co-signer, or other guarantee?   Yes ☐   No ☐

12. Please, state the contractual duration (in months, from the start date to end date) for the repayment of this most recently obtained credit facility. ……………………

13. Please, tick (√) the appropriate box below to indicate the size class of the last/new or most recently obtained loan (in GH¢).

Up to 5,000 ☐   5,001-10,000 ☐   10,001-20,000 ☐

20,001-30,000 ☐   Above 30,000 ☐

14. Is the total amount of this recently granted loan smaller than the amount originally applied for at the prevailing lending rate? Yes ☐   No ☐

If 'no', please skip to Question 16 below.

15. What estimated fraction or percentage of the requested loan was finally granted? ………………………..

16. Please, has the total amount of loans granted by your financiers in the years preceding this period been generally smaller than the amounts originally applied for?   Yes ☐   No ☐

17. Please, has the firm, in the past five years, been unable to settle its business or financial obligations for 60 days or more? Yes☐   No☐

APPENDIX B

Pilot Testing of Questionnaire

The Banking Relationship Survey consisted of eight sections (A to H). Excepting Sections F (on firms' choice of primary banks, adapted from Ongena et al., 2012) and G (on literature-inspired measures of relationship quality), the other sections comprise of list, quantity and a few space-limited open-ended questions. Section F consists entirely of 16 four-point ranking questions, while 22 out of 31 questions ($\approx$ 71%) of Section G consists of five-point Likert-style rating questions. After the exercise, there was no basis to alter all but Section F of the instrument. For the sake of uniformity and increasing completion time, all negative statements in Section F, originally intended to elicit careful thought before response, were changed into positive statements. Before-and-after factor loading comparisons in exploratory factor analyses confirmed the necessity for these changes. The questionnaire was adopted for use based on an evaluation of its internal consistency (reliability) using the Guttman-Cronbach (G-C) alpha and the average inter-item correlation (I-IC) coefficient.

Table 11: *Reliability Statistics*

Statistic	Section F	Section G
Common Variance	0.498	0.722
True Variance	0.090	0.177
Error Variance	0.408	0.545
Common Inter-item Correlation	0.181	0.245
Reliability of Scale	0.779	0.877
Reliability of Scale (unbiased)	0.780	0.878

Source: Field survey (2019)

According to convention (see, e.g., Briggs & Cheek, 1986; Clark & Watson, 1995; Lance, Butts, & Michels, 2006; Nunnally, 1978), G-C alpha of 0.7 ($\approx$ 0.8 and 0.9 for Sections F and G respectively) and I-IC coefficient of 0.15 ($\approx$ 0.2 for both sections) are the minimum acceptable limits for instrument reliability.

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APPENDIX C

Factor Analysis of Decision Factors

The factor identification process of the factor analysis is guided by four practical steps: (a) determination of data factorability, (b) determination of the number of factors, (c) choice of rotation method, and (d) interpretation of factor solution. As an assessment of data variables' sufficient intercorrelation to justify the appropriateness and performance of factor analysis, factorability was statistically determined by Bartlett's Test of Sphericity (BTS) and the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy (MSA). The KMO MSA test statistic, which measures the common variance among the 16 variables (Hair, Tatham, Anderson, & Black, 1998), was 0.830, interpretable as 'meritorious' (see, e.g., Kaiser & Rice, 1974; Sharma, 1996). The BTS is statistically highly significant, indicating the existence of sufficient/significant overall correlations among the variables to warrant the conduct of further analysis.

Table 12: *KMO and Bartlett's Test of Decision Factors*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.830
Bartlett's Test of Sphericity	Approx. χ^2	2602.041
	Df	120
	Sig.	0.000

Source: Field survey (2019)

The overall results provided statistical evidence of the existence of some underlying patterns or dimensions in the data and the appropriateness of factor analysis to uncover these latent structures.

Parallel analysis, originated by Horn (1965), was employed to determine the number of factors (latent structures) to be retained in the factor solution, as it outperforms other such stopping rules as the eigenvalue criterion (or Kaiser's Little Jiffy), Cattell's Scree plot and factor interpretability (Finch & French,

2015; Ledesma & Valero-Mora, 2007; Sharma, 1996). Beyond the explicit unequivocal statement of the suggested number of factors (four, in this analysis), the associated parallel analysis scree plot (Figure 1) aids graphical determination of the factor number by plotting the eigenvalues from the observed, computer simulated and resampled data on the y-axis and the factor number on the x-axis. The number of factors to retain is determined by the factor number corresponding to the point of intersection of the lines of observed and random data.

Parallel analysis suggests that the number of factors = 4
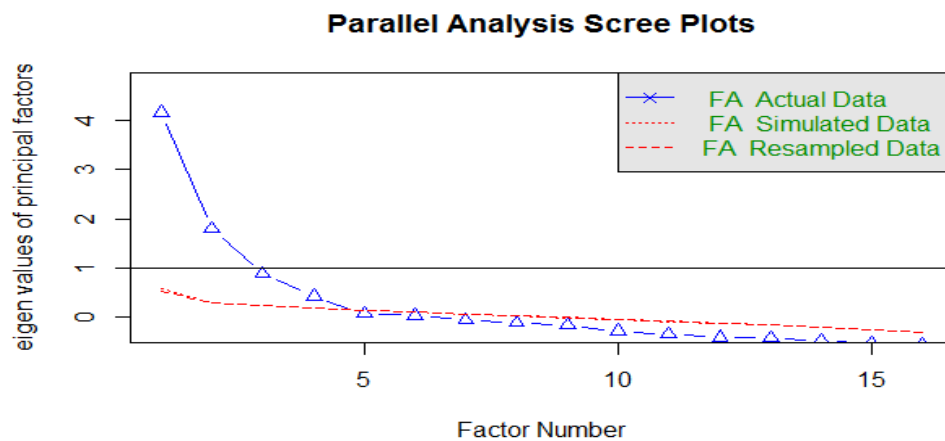
Figure 1: Parallel analysis scree plot for decision factors.

Factor extraction in factor analysis can be conducted by application of several techniques. These include: (a) alpha factoring, (b) principal component factoring, (c) image factoring, (d) unweighted least squares, (e) generalised (weighted) least squares, (f) common factor (principal axis or factor) analysis. However, the study opted for the maximum likelihood factor analysis on account of its popularity and common use in the literature (Finch & French, 2015). With multiple (i.e., two or more) factors, model identification at the extraction stage is indeterminate (i.e., characterised by an infinite number of factor loading combinations with identical model fits). Determination of the

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optimal factor loading solution is done with factor rotation, that is, "transformation of the initial set of factor loadings so as to simplify interpretation of the results by seeking a simple structure solution" (Finch & French, 2015, p.13). With respect to the choice of factor rotation method, the VARIMAX orthogonal rotation method was preferred to the suite of oblique rotation techniques for three key reasons: (a) the general data reduction objective of this sub-section of the study, (b) the specific objective of extracting few uncorrelated or independent factors to reduce the potential for multicollinearity among the extracted variables, and (c) the popularity and availability of VARIMAX in several software packages.

Table 13: *Rotated Factor Matrix: Decision Factors*

Variables	Factor			
	1	2	3	4
Bank consultancy and advisory services				.676
Range and quality of bank services			.599	
Extensiveness of local networks of bank			.652	
Availability/extensiveness of international networks			.629	
Personal treatment and relationship	.820			
Ease and success of (re)negotiation with bank	.730			
Bank specialisation in firm's sector of operation				
Advances in ICT		.810		
Bank's understanding of firm's business challenges	.551			
Bank's dominant market position and experience			.706	
Bank proximity to firm location				
Suitability of bank image to corporate culture				.605
Handling, processing and procedural speed		.770		
Bank promises and guarantees				.573
Price of bank products/services				
General bank reputation			.616	

Source: Field survey (2019)

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Interpretation of factor solution entails examination of the rotated factor matrix (i.e., the variables' loadings onto each extracted factor) and assignment of meaningful labels to the different factors after assessing the practical and statistical significance of the loadings. Factor loadings ≥ |0.30| are considered to be practically significant for a sample size of 350 and above (Hair et al., 1998). Labelling a factor is, thus, highly influenced by variables with the highest loadings onto that factor and, hence, variables with larger loadings in absolute size assume crucial importance to the interpretation of the rotated factor matrix. These procedures informed the labelling and interpretation of the ML-extracted factors used for the study. This approach, however, falls short of assessing the statistical significance of the factor loadings which are correlation coefficients between the variables and the factors (see, e.g., Hair et al. (1998) and Stevens (2002) for criteria for determination of statistical significance in this context). The study sidestepped the determination of the statistical significance of the factor loadings because of the overriding interest in the statistical significance or otherwise of the coefficients of the ML-extracted factors in relation to the various dimensions of strategic banking relationships investigated in the study.

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APPENDIX D

Conceptualisation of Relationship Quality

Without a unified definition, in part due to its context dependency, RQ is contemporarily consensually regarded as a higher-order construct that defies academic agreement over its constituent dimensions and determinants (see, e.g., Athanasopoulou (2009), and Vieira, Winklhofer, & Ennew (2008) for reviews). Defined as firms' perceptive assessment of how well the whole relational interaction with their primary bank fulfils their expectations, predictions, goals and desires (see Jarvelin & Lehtinen, 1996), RQ has been crystallised as the "cognitive evaluation of business interactions by key individuals in the dyad, comparatively with potential alternative interactions" (Holmlund, 2001, p.15). Since the seminal publications of Crosby, Evans and Cowles (1990), Allen and Meyer (1990) and Morgan and Hunt (1994), there has, however, been a paradigm shift in the theoretical conceptualisation of RQ from a traditional two-factor (trust and satisfaction) to a contemporary three-factor (trust, satisfaction and commitment) higher-order construct.

Myriad determinants of these first-order constructs (trust, satisfaction and commitment) have emerged in the literature (Figure 2 depicts an RQ model), intensifying the debate over the theoretical and empirical modelling of RQ. Given the far-reaching ramifications of these first-order constructs at the inter-organisational (business-to-business) level, I used these three constructs in modelling RQ and examine the extent to which they influence firms' banking choices. Drawing largely from the extant literature, I defined trust as a firm's ability and willingness to become vulnerable by suspension of its disbelief (corresponding to a leap of faith) in its primary bank based on the latter's proven values and virtues (e.g., integrity, trustworthiness and general behaviour) in the

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confident expectation of positive relationship outcomes. Firms' commitment was defined as a consistent motivation to maintain and develop a valuable long-term relationship with their primary banks despite increased availability of alternative banks with comparable reputation, range and quality of services. Following the expectancy-confirmation/disconfirmation paradigm (Anderson & Sullivan, 1993; Kotler, 1991; Oliver & Swan, 1989; Yi, 1990), satisfaction referred to post-consumption judgement concerning product or service quality, given pre-consumption expectations. Out differently, satisfaction was seen as firms' perceived contentment with the availability, adequacy, affordability and quality of the whole range of cash management services of its primary bank.
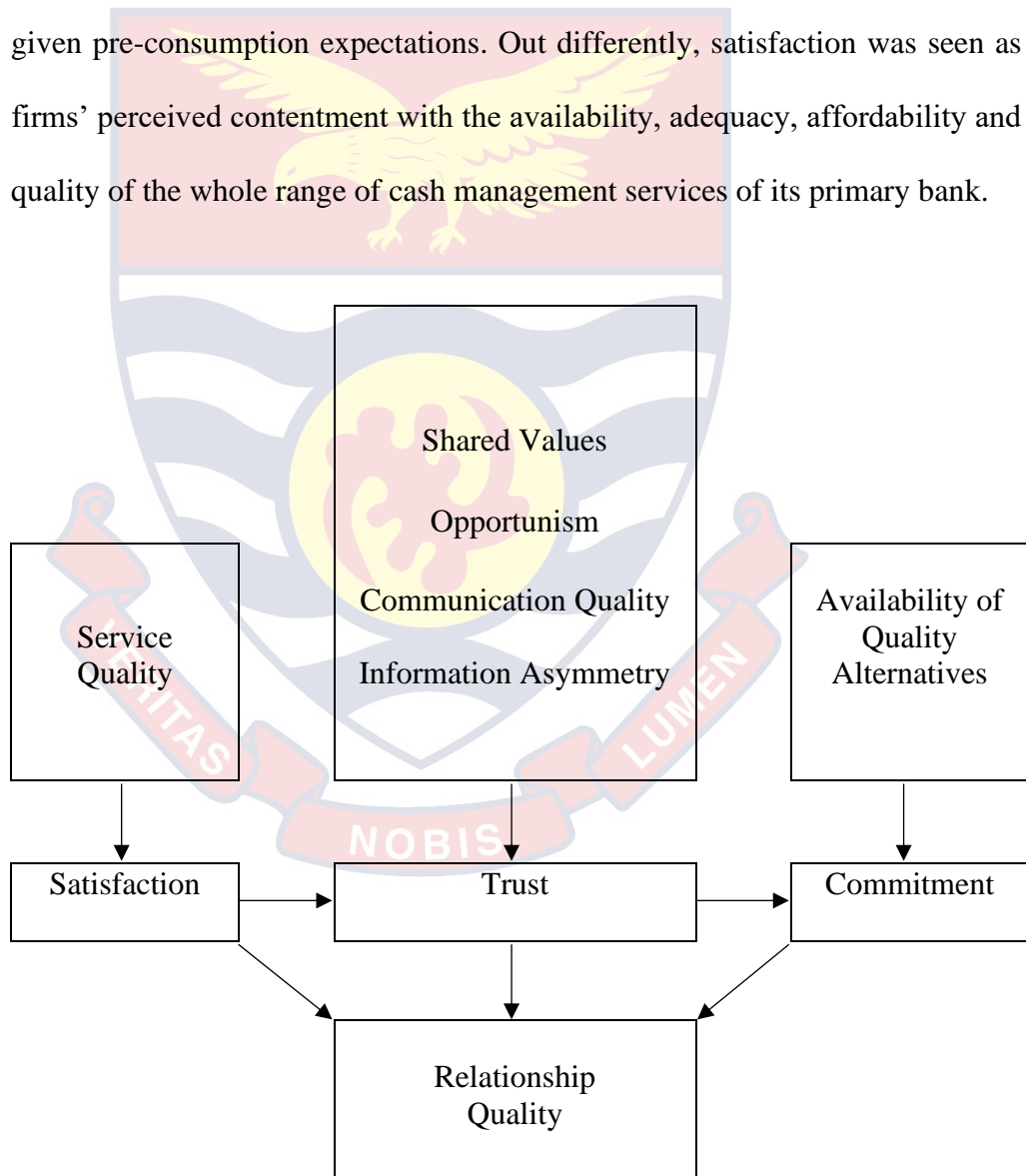
Figure 2: Conceptual model of relationship quality adapted from Morgan and Hunt (1994), Vieira et al., (2008) and Athanasopoulou (2009).

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APPENDIX E

Factor Analysis of Relationship Quality

The KMO MSA test statistic of 0.874 can be described as 'meritorious' by established standards (see, e.g., Kaiser & Rice, 1974; Sharma, 1996). The statistically highly significant BTS is indicative of the existence of sufficient correlations among the variables to warrant the conduct of further analysis.

Table 14: *KMO and Bartlett's Test of Relationship Quality*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.874
Bartlett's Test of Sphericity	Approx. χ^2	4070.693
	Df	231
	Sig.	0.000

Source: Field survey (2019)

Overall, these statistical test results support the performance of factor analysis to uncover the latent patterns or dimensions in the relationship quality data. Interestingly, both parallel analysis and Cattell's Scree plot were unanimous in determining five underlying patterns in the RQ data.

Parallel analysis suggests that the number of factors = 5
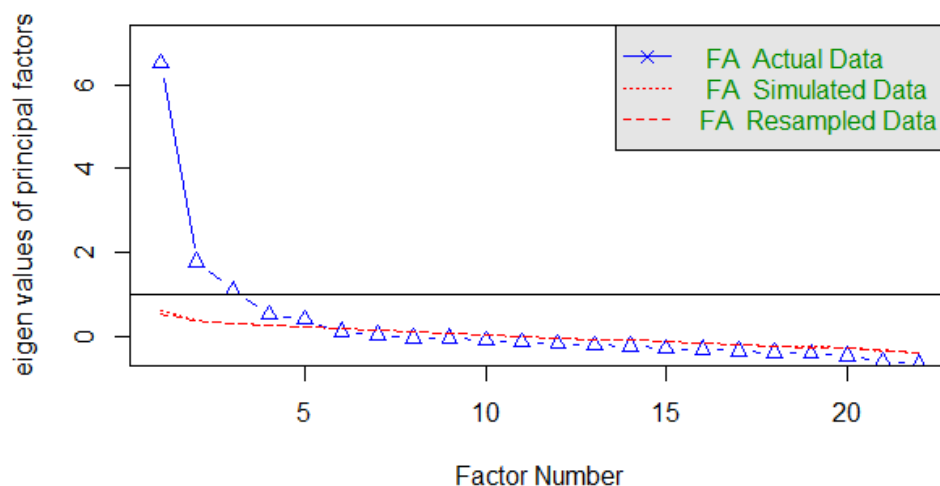
Figure 3: Parallel analysis scree plot for relationship quality.

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Non Graphical Solutions to Scree Test
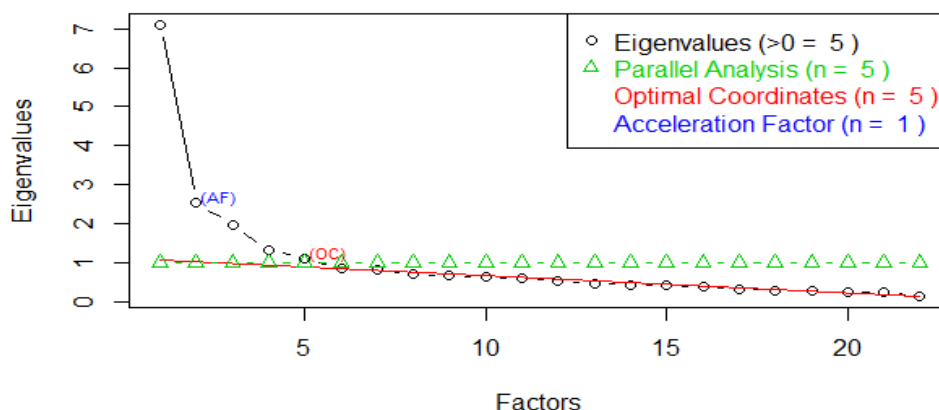
Figure 4: Cattell's scree plot for relationship quality.

Factor extraction by the maximum likelihood approach was undertaken. Anticipating correlations among the potential factors due to the theoretical interrelationships and interdependence among the first-order constructs, I commence the analysis with the PROMAX oblique rotation method and re-estimated using the VARIMAX orthogonal rotation method due to the negligible correlations in the former estimation.

Despite the consensual statistical identification of five underlying factors in the final solution, only two factors were retained for use in this study on the basis of meaningful labelling (assignment of names) and factor interpretability. An examination of the rotated factor matrix (Table 15) indicates that, discarding factor loadings of less than |0.30|, 10 of the Trust (six) and Commitment (four) variables loaded onto the first extracted factor with generally greater correlation coefficients than those of the two Satisfaction variables. In addition, the relatively greater average factor loadings of individual measures of Trust (0.551) and Commitment (0.663) and the combined average factor loadings of Trust and Commitment (0.596) relative to the individual

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average factor loadings of measures of Satisfaction (0.455) informed the retention and labelling of this factor as Trust and Commitment.

Table 15: *Rotated Factor Matrix: Relationship Quality*

Variables	Factor 1	2	3	4	5
1 Satisfaction	.462	.152	.257		.402
2 Satisfaction		.837	.112		
3 Satisfaction		.657		.137	
4 Satisfaction		-.427		.189	.214
5 Satisfaction	.448	.353	.327	.136	.353
6 Trust	.195	.195	.771		.117
7 Trust	.244	.115	.663		
8 Trust	.367	.237	.492	.170	-.330
9 Trust		.193		.841	
10 Trust	.330	.245		.466	.152
11 Trust				.694	.107
12 Trust	.231	-.169		.130	.304
13 Trust		.610	.171	.227	
14 Trust	.560	.379	.386	.156	
15 Trust	.640	.143		.219	.126
16 Trust	.567	.220		.187	
17 Trust	.841		.327		
18 Commitment	.857	-.227	.205		.121
19 Commitment	.601		.210		.214
20 Commitment	.668	.154	.275		.210
21 Trust	.203	.147		.224	.437
22 Commitment	.526	.437	.242	.123	.233

Source: Field survey (2019)

Even though two Trust variables (with factor loadings of 0.610 and 0.379, averaging into 0.492) and one Commitment variable (0.437) loaded onto the second principal factor, four out of the five Satisfaction variables had loadings

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exceeding the minimum threshold with a superior average of 0.569. The second principal factor was thus labelled Satisfaction and retained. On the combined bases of the number of variables of a construct loading above the minimum threshold onto an extracted factor and the absolute magnitude of the construct's average factor loadings, these two factors were retained for use in this study.

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APPENDIX F

Quasi-Poisson Estimation of Number of Banking Relationships

Variables	Model (1)	Marg. Eff	Model (2)	Marg. Eff
Firm Size (Large Firm)	0.067 (2.976)***	0.169	0.084 (2.768)***	0.210
Firm Age (Old Firms)	0.073 (3.271)***	0.183	0.068 (3.290)***	0.172
International Presence	0.088 (2.368)**	0.222	0.072 (1.691)*	0.180
Foreign Trade	0.045 (1.534)	0.113	0.052 (1.817)*	0.130
Foreign Ownership	0.048 (2.011)**	0.121	0.056 (2.105)**	0.141
Concentrated Owners.	0.020 (1.106)	0.050	0.001 (0.064)	0.003
Ref. Risk Exposure	0.005 (4.766)***	0.013	0.006 (4.681)***	0.014
Fix. Asset Tangibility	0.003 (1.209)	0.007	0.003 (1.344)	0.008
Group Membership	0.045 (1.789)*	0.112	0.035 (1.367)	0.088
Share of Primary Bank Relationship Duration	-1.336 (-20.30)***	-3.350	-1.372 (-19.22)***	-3.440
SSQ_G	0.018 (1.162)	0.046	0.029 (1.775)*	0.072
Food & Beverage	0.042 (2.453)**	0.106	0.029 (1.600)	0.073
Liquid Bank	-0.033 (-1.536)	-0.083	-0.036 (-1.483)	-0.090
Large Bank	0.039 (1.803)*	0.097	0.061 (2.581)***	0.152
State-owned Bank	0.083 (4.134)***	0.208	0.079 (3.791)***	0.198
Population Density	0.083 (2.617)***	0.207	0.068 (2.211)**	0.170
Res. Deviance (p-val.)	0.902		0.955	
Wald test (16)	262.8***		219.4***	
Prob > χ^2	0.000		0.000	
No. of Observations	388		388	

Source: Field results (2019)

APPENDIX G

Diagnostic Accuracy Assessment of SOB Choice Models
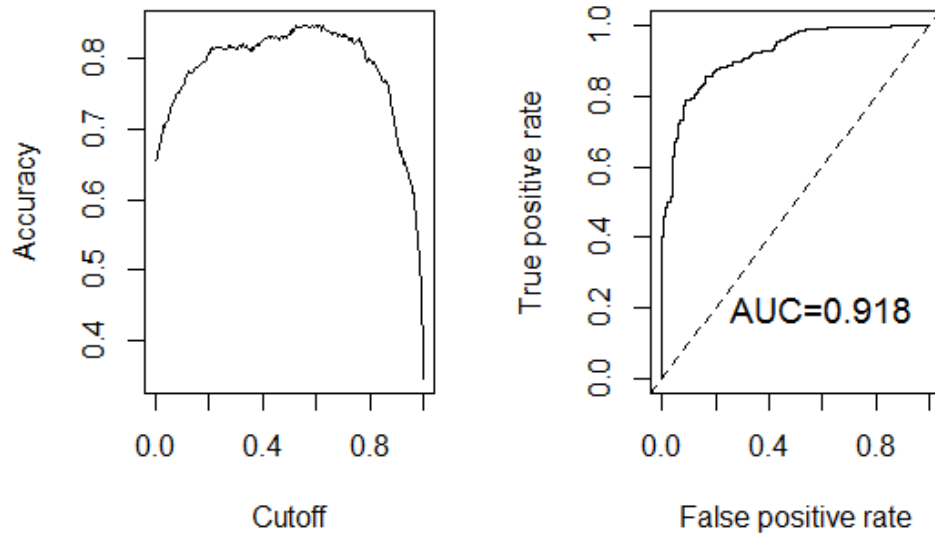
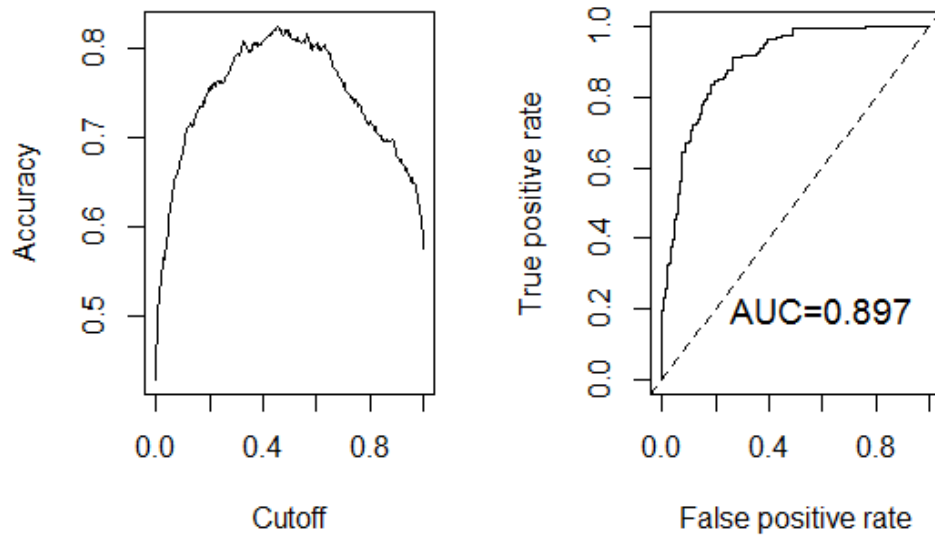*Figure 5:* Accuracy and ROC curves for SOB formation probit model.

Figure 6: Accuracy and ROC curves for SDSOB formation probit model.

APPENDIX H
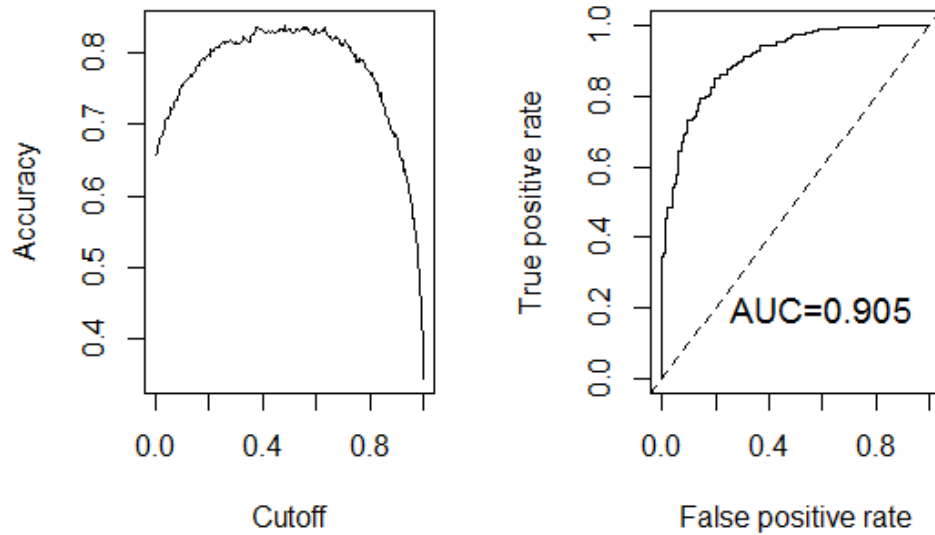
SOB Diversification Choice Models' Fit Assessments

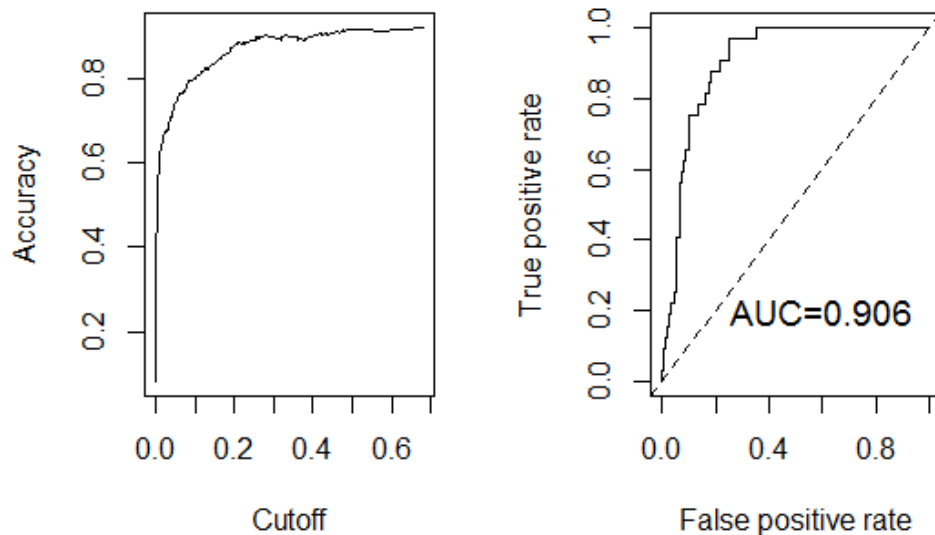*Figure 7*: Accuracy and ROC curves for SOB Diversification model.

Figure 8: Accuracy and ROC curves for SDSOB Diversification model.

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APPENDIX I

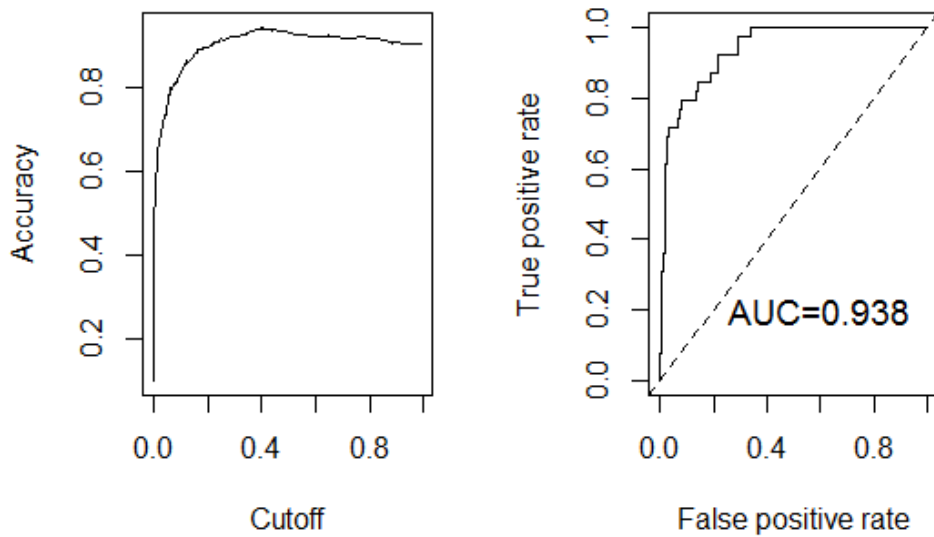**Primary Bank Choice Models' Predictive Power Assessment**
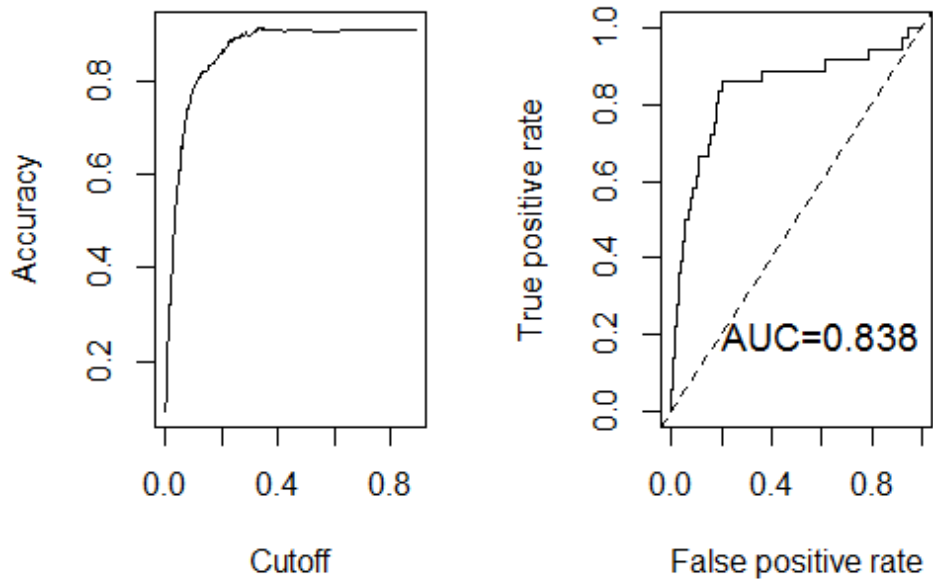
Figure 9: Accuracy and ROC curves for LLDS bank type model
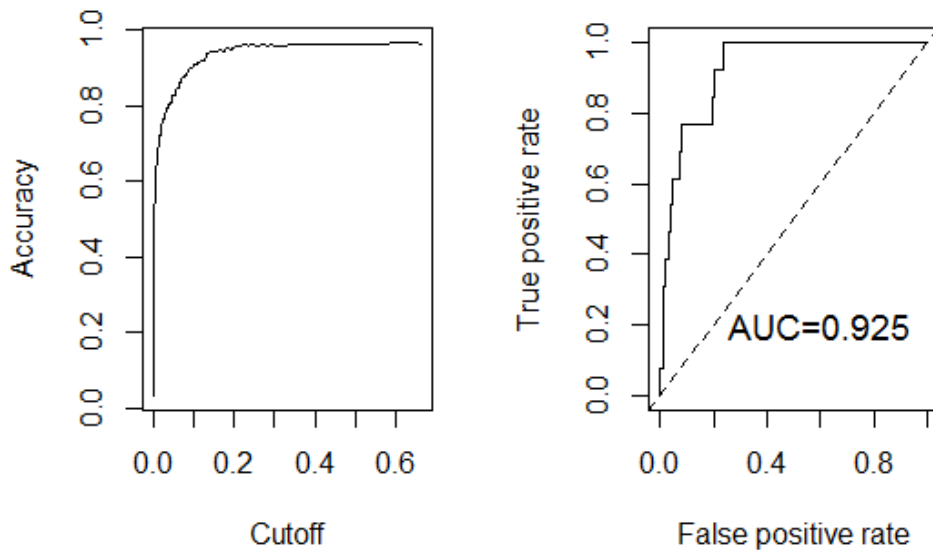
Figure 10: Accuracy and ROC curve for LLDP bank type model

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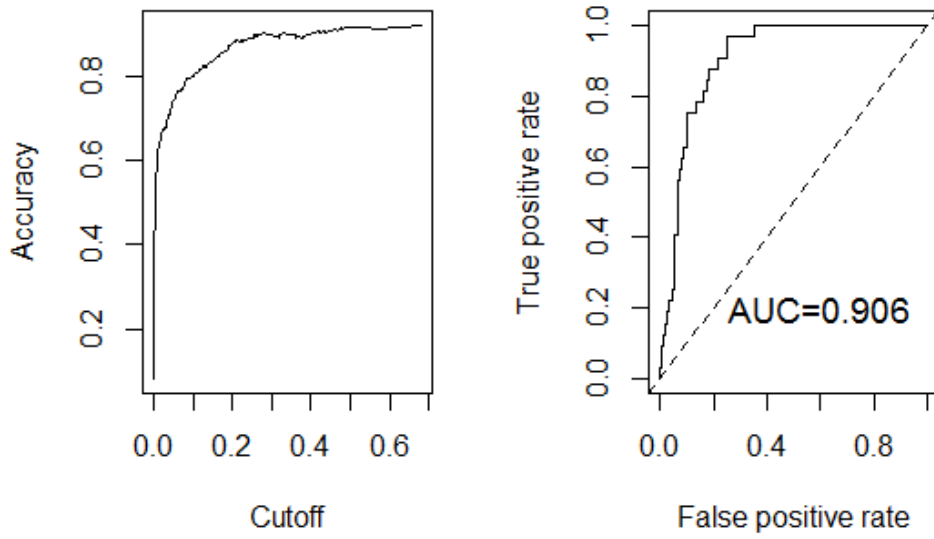
Figure 11: Accuracy and ROC curves for LLFP bank type model

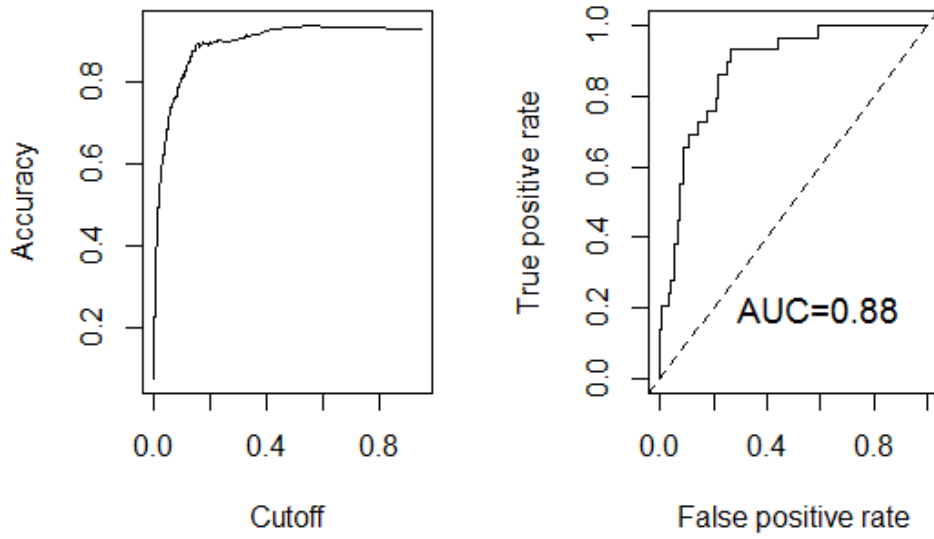*Figure 12:* Accuracy and ROC curves for LSFP bank type model

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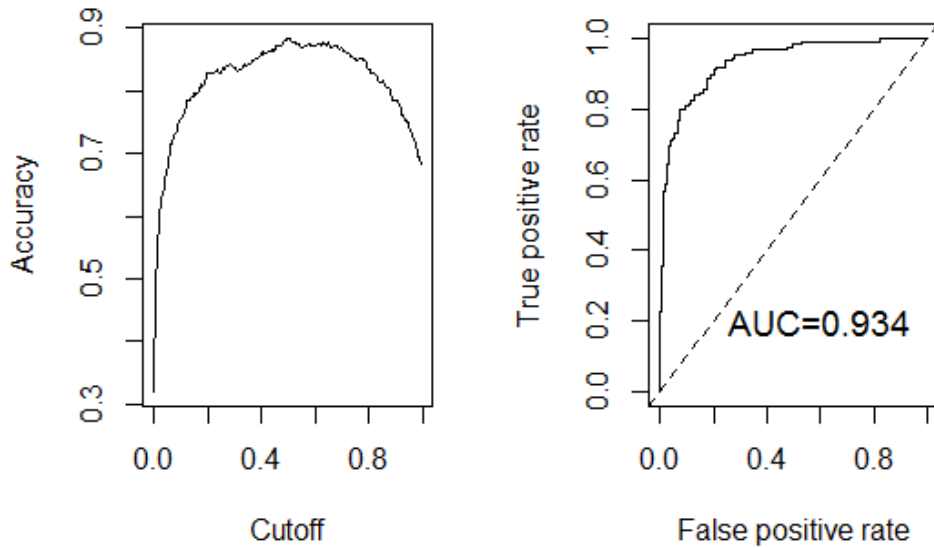*Figure 13:* Accuracy and ROC curves for ISFP bank type model

Figure 14: Accuracy and ROC curves for ISDS bank type model

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