



Bank–SMEs relationships and banks' risk-adjusted profitability



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ABSTRACT

This research investigates how SME performance, the typology of loans and the length and scope of relationships between small banks and SMEs affect the margin adjusted for the risk that each customer generates. After analysing 4285 firm-year observations from Finnish banks, the quality of a SME's performance is found to be the major factor in explaining the risk-adjusted profitability of banks. However, the length and scope of a relationship and the loan dimensions also play an important role.

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1. Introduction

Research on bank performance has mainly focused on internal and external determinants. Internal determinants are defined as those that are under the control of the management of the bank, while external determinants are factors that are beyond the control of management (Rasiah, 2010). Previous research has listed the cost structure of banks, such as bank size and linked economies of scale; differences in bank management objectives, such as diversification strategies or bank deposit/credit strategy; asset and liability portfolio mix; market interest rates; changes in capital and asset risk; the use of the internet; a focus on shareholders instead of stakeholders; and the number of branches and their characteristics. The external factors that previous works have identified as important include competitive conditions and market characteristics, particularly concentration, share and growth; ownership and its concentration; the structure of the competition; financial regulation and deregulation; and monetary policy.

In fact, the performance of a bank is the result of the margin that the bank is able to extract from each of its relationship with its customers. The margin generated by these relationships is the result of the bank's ability to sell different products to customers at the right price, whether that is a fee on services or the interest rates on loans. Indeed, banks cannot simply charge customers high

fees or high interest rates in order to increase their revenue, since this strategy would have two distinct negative consequences. Firstly, if there are frictions (Howorth et al., 2003), a customer can switch to a competing bank. Secondly, high interest rates might attract riskier customers, increasing the riskiness of the bank's portfolio of loans (Stiglitz and Weiss, 1981) and compromising the bank's long-term profitability. The latter point highlights the importance of the ability of banks to accurately evaluate the performance of their customers in order to correctly price the services they offer. Indeed, as long as the bank is able to retain at least a part of the benefit that is generated from the correct evaluation of customer performance, then that can be expected to be an important determinant in improving a bank's performance. This suggests that banks ought to exploit all the sources of information they have access to: formal sources, such as annual and interim financial reports; and informal sources, such as the relationship between a bank's personnel and its customers. Interestingly, those observations hold particularly true for small, local banks that need to carefully evaluate small businesses. For example, high levels of opaqueness characterise small businesses, nevertheless small local banks are able to exploit informal information they can access through the local community they serve.

This study focuses on relationships of SME's with small, local banks in order to examine the role of the performance of SMEs, the loans provided to SMEs, the scope of SME–bank relationships and the length of these relationships as determinants of the margin generated for small, local banks by their SMEs. Based on 4285 firm-year small bank–SME customer relationships collected over a period of five years (2001–2005) in Finland, this research measures bank prof-

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itability by using the margin generated by each relationship – the margins were determined by the Activity-Based Costing (ABC) used by the banks that participated in the research. In addition, since the ABC margin does not take into consideration the fact that a high margin could be the result of a high interest rate being charged due to the fact that a bank sees a customer as a risk, we adjusted bank profitability to take account of that by using the customer's rating for each individual relationship between a bank and a customer.

Our findings suggest that the performance of a firm explains the majority of the variance in a bank's risk-adjusted profitability. This implies that it is extremely important for a bank to price customer services according to their risk – the higher the risk, the higher the interest rate charged and the higher the fees for additional services. Banks are able to benefit from their ability to price according to the risk of loaning to the customer by retaining at least a part of the incremental risk-adjusted profitability. In addition, we find that the length of a relationship with a customer is a relevant variable that is positively associated with risk-adjusted profitability. This implies that the benefit of accessing additional informal information about the customer is, at best, only partially passed onto the customer. Finally, we find that both making loans – the traditional activity of small local banks – and offering other services are positively associated to risk-adjusted profitability. Thus, banks extract risk-adjusted profitability from the entire spectrum of services they sell.

The rest of the paper is organised as follows: Section 2 reviews the relevant literature. Section 3 states the hypotheses. Section 4 describes the methodology and data used. Section 5 describes the variables considered. Section 6 illustrates the econometric findings and Section 7 discusses them. Section 8 presents the conclusions.

2. Bank profitability and its determinants

Bank profitability has traditionally been examined by looking at internal and external determinants. The former include aspects that are under the control of the management of a bank, while the latter are comprised of factors that are beyond its control. In his extended and detailed review of previous literature on factors that influence bank profitability, [Rasiah \(2010\)](#) includes, among the internal determinants, the cost structure of the bank, differences in bank management objectives, bank deposit and bank credit strategy, asset and liability portfolio mix, market interest rates, the input and output prices of loans and expenses, operating efficiency, changes in capital and asset risk. Interestingly, these internal determinants are also found to affect a bank's ability to deal with any financial and economic crisis ([Beltratti and Stulz, 2012](#)). In addition, bank profitability has been found to depend on non-financial statement factors such as the number of branches and their characteristics ([Liang et al., 2013](#)), bank size and linked economies of scale, bank location ([Petersen and Rajan, 2002](#)), the use of the internet ([DeYoung et al., 2007](#)), a focus on shareholders instead of stakeholders ([Llewellyn, 2005](#)) and diversification strategies ([Berger et al., 2010](#)). Turning our attention to the external determinants, [Rasiah \(2010\)](#) lists bank profitability; the competitive conditions; and market characteristics, such as concentration, share and growth. However, ownership ([Micco et al., 2007](#)), its concentration ([Iannotta et al., 2007](#)), the structure of the competition ([Berger et al., 2000](#)), the probability of facing a financial crisis ([Beck et al., 2006](#)), and financial regulation and deregulation ([Zoua et al., 2011](#)) are also found to affect bank performance. Finally, monetary policy affects the profitability of large and small banks and banks with different levels of liquidity in different ways ([Gunji and Yuan, 2010](#)).

Interestingly, the above stream of research does not pay detailed attention to the role of the relationship between a bank and its customers. In fact, banks develop complex and articulate relationships with their customers in general and with SMEs in

particular ([Elyasiani and Goldberg, 2004](#)). These relationships may affect their performance over and above financial statement factors and the environment in which banks operate. Interestingly, this holds particularly true for small, local banks that deal with small firms ([Scott, 2004](#)). Previous research on the relationship between banks and firms has investigated the impact of such relationships on firms and has found that a more intense relationship benefits firms by granting them easier access to credit ([Petersen and Rajan, 1994](#)), thus reducing its cost ([Berger and Udell, 1995](#)). However, these works also argue that stronger relationships can benefit the banks, particularly small, local banks specialised in lending to small firms, by affecting their ability to correctly evaluate the quality of customers due to a reduction in the information asymmetry regarding a customer's current performance and their business opportunities. The consequence is that different banks resolve information asymmetry issues in different ways ([Cole et al., 2004](#)): large banks rely more on transaction lending, which is based on leveraging information provided by annual and interim financial reports; by looking at the value of the firm's assets and by exploiting credit rating and credit scoring techniques ([Berger and Udell, 2006](#)). Nevertheless, this strategy at least partially affects their ability to serve small firms that struggle to provide the amount of information required. Small, local banks tend to exploit relationship lending where the information gathered goes beyond the relatively transparent data available in official documents. Such information gathering is a continuous process and the information remains confidential to the bank, who uses it as the basis for making further decisions ([Berger and Udell, 2006](#)). In fact, exploiting close and long-lasting relationships with customers and having access to privileged information is a characteristic of small banks ([Berger and Udell, 2002](#); [Stein, 2002](#)). Furthermore, the loan managers of small banks can increase the amount of hard and soft information available ([Berger and Udell, 2006](#)) and develop relationships of trust with their customers ([Howorth and Moro, 2006](#)). This, in turn, may help them to improve their ability to accurately select and evaluate customers, thus improving bank performance ([Baas and Schrooten, 2006](#)).

In fact, when small banks operate in a context of reduced competition, they can avoid passing onto the customer all the benefits they gain from long-term relationships ([Ergungor, 2005](#)). The same logic applies when customers face high switching costs linked to the search for an alternative bank or to the production of the information required by an alternative bank. Indeed, high switching costs are quite common for small firms because they struggle to produce the amount of information that banks require and their management often lacks the skills and time to evaluate the proposals of competing banks ([Howorth et al., 2003](#)). In such cases, banks can largely benefit from reduced information asymmetry, as they are able to increase their profitability by not passing onto the customer some of the benefits linked to reduced information asymmetry.

However, bank profitability is not solely dependent on interest margins ([Valverde and Rodriguez Fernandez, 2007](#)). Typically, banks provide firms with and charge them for additional products and services: from cash management to risk management to payment management. The literature suggests that value-based differentiation is needed in business relationships in order to maximise firm performance and this logic also applies to banks. Hence, the value of a relationship is built on loan pricing as well as the other banking services offered to a firm ([Torre et al., 2010](#)). Interestingly, some research shows that some banks tend to avoid full diversification; those that are more focused on cross-selling are usually more interested in managing savings, while traditional lending banks are more interested in granting and managing loans ([Ciarrapico and Cosci, 2011](#)). This can be particularly true for small, local banks. However, although loan remuneration may be one of the most important determinants of profitability for the latter

group of banks, they tend to offer and manage an overall package of banking products and services (Dietrich and Wanzenried, 2011). Clearly, banks have an interest in investing time and effort in the selling of additional products to firms that need them. Strong, long-lasting relationships can be helpful in identifying customers' needs and how to market bank services to these customers.

There are two major shortcomings with that research though. Firstly, it tends to look for the determinants of the overall profitability of a bank. Nevertheless, overall profitability depends on the profitability that a bank can extract from its financial relationship with each individual customer. Secondly, the previous research does not consider risk in detail. Prior research has theoretically discussed the adverse effect that loan price may have on attracting firms that bear different levels of risk (Stiglitz and Weiss, 1981; Wette, 1983) as well as the tools banks have to mitigate their adverse effect (Bester, 1985). However, empirical cross-sectional studies focused on overall profitability do not necessarily consider the fact that high-risk firms are typically charged higher interest rates and that this, at least in the short term, may generate higher margins. In addition, firms considered to be a higher risk have a weakened negotiating position, which means banks can easily charge them higher fees. Taking the above into consideration we argue that by looking at overall profitability and dismissing risk, previous research has not been able to capture the determinants of bank profitability.

3. Hypotheses

The characteristics of relationships between a bank and its customers, as well as the characteristics of customers, can affect the overall profitability of the bank. Therefore, it is necessary to examine what influences the ability of each bank-customer relationship to generate a positive contribution to bank profitability. Nevertheless, the risk incurred in lending to customers affects bank performance in the long-term. In order to consider both aspects, our research focuses on the margin generated by each bank customer, assessing it for the risk associated with each customer. The measure of profitability is defined as the bank's "risk-adjusted profitability".

A firm's financial needs and its capital structure affect the profitability of its bank; the higher the amount of assets the firm has in order to operate successfully, the more finance it needs. Additional finance – finance that can be given without necessarily compromising the firm's survival – is very often provided by financing received from banks (Ang, 1992). Consequently, firms with more assets usually need more loans and can generate more risk-adjusted profitability for banks. In addition, the short-term financial needs of SMEs are related to working capital as the lower the working capital required for their daily financial needs, the smaller the bank's risk-adjusted profitability. Finally, highly profitable firms ought to be able to rely on internal sources of finance (e.g. retained profit) and therefore require less bank finance (Myers and Majluf, 1984). This can negatively affect the risk-adjusted profitability of a bank. Thus,

H1a. There is a positive association between a SME's assets and a bank's risk-adjusted profitability.

H1b. There is a positive association between a SME's working capital and a bank's risk-adjusted profitability.

H1c. There is a negative association between a SME's profitability and a bank's risk-adjusted profitability.

Previous literature has stressed the importance of the length of the relationship for both SMEs (Berger and Udell, 1995; Petersen and Rajan, 1994) and banks (Dell'Ariccia and Marquez, 2004; Stein, 2002). Over time, a bank is able to access additional soft information about a firm, allowing them to reduce information asymmetry and to better evaluate the risk involved in lending to that SME and SMEs in general (Berger and Udell, 2006). Additionally, increased knowledge about a customer allows its bank to identify its needs and sell it more financial products. In fact, the opportunity for a bank to extract benefits from a long-lasting relationship is linked to its relative power. When banks operate in a market where there is reduced competition (Ergungor, 2005), or when SMEs face problems in switching to a competing bank because of their opaqueness (Howorth et al., 2003), banks only need to share a fraction of the benefit resulting from having greater knowledge of a customer. Furthermore, we cannot rule out the possibility that banks maintain long-term relationships only with those customers they consider profitable and that they reject potentially unprofitable firms or terminate relationships with firms that become unprofitable. This strategy is easier to implement in situations of reduced competition. In a market with reduced competition, such as in our sample, banks can profit from long-lasting relationships with SMEs. Thus,

H2. There is a positive association between the length of a relationship with a SME and a bank's risk-adjusted profitability.

Loans are an important component of the profitability of a bank (Dietrich and Wanzenried, 2011). In fact, small, local banks can be particularly capable of exploiting hard and soft information in order to evaluate a SME's creditworthiness, thus reducing the risk they face (Cole et al., 2004). In addition, SMEs can face difficulties in switching to competing banks because of their opaqueness: the smaller the SME, the greater the information asymmetry faced by a competing bank, the more the SME is tied to its relationship with its current bank, the easier it becomes for its current bank to extract extra margin from the relationship (Howorth et al., 2003). Consequently, for small local banks, loans are a relevant source of profitability. Thus,

H3a. There is a positive association between the short-term credit provided to SMEs and a bank's risk-adjusted profitability.

H3b. There is a positive association between the long-term credit provided to SMEs and a bank's risk-adjusted profitability.

Even if banks specialise in loans, they do not overlook opportunities to deliver other services to customers for two major reasons. Firstly, if they do not provide the additional services requested by customers, customers in general, particularly the more successful ones, may decide to switch to competing banks that satisfy their financial needs. Secondly, many additional services are not free of charge and, by selling them, small, local banks can also improve their income statement. Thus,

H4. There is a positive association between the scope of the services provided to SMEs and a bank's risk-adjusted profitability.

4. Data and methodology

This research is based on a sample of privately held SMEs headquartered in Finland. The loan database incorporates 4285 firm-year observations from the financial period December 2001 to December 2005. The data has been provided by 21 small, local

cooperative banks. The observations are spread evenly over the five years: 18.6% of the observations are from 2001, 20.1% are from 2002, 20.3% are from 2003, 20.8% are from 2004 and 20.3% are from 2005. Moreover, the observations are made evenly across the different banks, see Table 1. All the banks in the sample have only a few branches and a very short line of command. They tend to rely on deposits since they are small they are not able to approach regulated markets and have very similar asset and liability mixes, generally they tend to finance local households and small, local firms. Also, they operate in a context characterised by limited competition. Overall, our sample consists of banks that are similar in terms of their cost structure, deposit and credit strategy, asset-liability mix as well as management objectives and style, operating efficiency, bank size, market, etc. Table 1 presents their basic information.

The dataset is constructed by collecting firm-specific information from the banks' databases about the firms served by each bank, such as financial figures and the relationships between the banks and the firms, such as the amounts loaned, a firm's characteristics and the services provided to firms. Both the firms' financial figures and bank relationship data are captured at the end of December for each year examined. The banks evaluate and assign an internal credit rating to firms. The internal rating summarises information about a firm's performance and credit risk in broad terms, which is determined by firm-specific information. This information is also collected and added to the dataset.

STATA version 12 is used to conduct the analysis. The hypotheses were tested by regressing the independent variables and a set of control variables on the banks' risk-adjusted profitability with the panel data. The regressions were estimated using panel regression with fixed-effects at firm level. Not only are the fixed effects at firm level sensible, because the focus of our work is on relationship profitability, the Hausman test (Hausman, 1978) empirically validates this choice. In our dataset each customer is associated with only one bank. If a firm had a relationships with more than one bank it was excluded from the sample. Importantly, no firm included in the sampled switched from one bank to another.

5. Variable description

5.1. Dependent variable

A unique feature of this work is the dependent variable. In order to test the hypotheses, we developed a method of measurement to determine a bank's risk-adjusted profitability. The measurement is based on two different components: the margin generated by the customer on products sold by the bank, principally loans and any other financial products, and the risk the bank incurs by serving the customer.

The participating banks use Activity-Based Costing to monitor margins generated by customers. ABC produces the margin as the income generated by the customer in terms of interest and fees minus the interest that the bank has to pay to the providers of funds, the fees that they have to pay when they outsource or purchase financial services and the cost of the time allocated by their personnel to specific customers. In addition, the banks involved in the research evaluate their customers and assign them internal ratings that account for firm-specific credit risk. These ratings capture information about financial position and credit risk and they are determined by firm-specific information. In the analysis, internal ratings are coded so that the first rating group receives the value 1, the second receives value 2, and so on, until the firms with the lowest internal ratings receive the largest value. The measure of a bank's risk-adjusted profitability is the ratio of the margin generated by the customer in euros and the internal rating of the firm. Thus, we define the risk-adjusted profitability (RAP) as:

$$RAP = \frac{\sum [i_{SME}^{STD} (STD) + i_{SME}^{LTD} (LTD) - i_{BANK} (STD + LTD)] + \sum [(fee_{SME} - fee_{BANK})] - Pers}{RATING}$$

where i_{SME}^{STD} is the specific interest rate charged to the firm by the bank on short-term loans, STD is the short-term loan, i_{SME}^{LTD} is the specific interest rate charged to the firm by the bank on long-term loans, LTD is the long-term loan, i_{BANK} is the average cost of funding for the bank, fee_{SME} and fee_{BANK} are the fees received from customers

Table 1
Bank characteristics and sample.

Bank	Bank data									Firms per Bank	
	Net profit	Assets	Equity	Solvency (%)	Labour cost/revenues (%)	Profit/assets (%)	Firm loans/loans (%)	Deposit/assets (%)	LT assets/LT loans	Firms	Firms by bank (%)
1	7613	441,024	49,213	22.6	56.1	2.1	11.0	84.0	1.1	179	4.2
2	4673	416,693	23,778	20.9	66.3	1.3	8.1	83.1	1.1	151	3.5
3	7777	502,571	48,544	21.4	59.9	1.8	4.2	85.2	1.1	188	4.4
4	9490	679,643	100,525	27.1	63.4	1.7	9.1	78.7	1.2	253	5.9
5	5572	513,603	36,934	14.8	67.3	1.3	8.2	87.7	1.1	180	4.2
6	5835	421,905	36,064	15.8	62.4	1.7	8.4	82.2	1.1	150	3.5
7	4842	405,812	33,927	18.3	67.1	1.4	8.9	82.8	1.1	130	3.0
8	14,932	1,202,882	73,311	11.4	64.1	1.4	7.6	87.6	1.1	378	8.8
9	12,051	752,774	68,418	19.3	55.2	1.8	8.6	85.6	1.1	258	6.0
10	3251	367,396	23,635	14.0	72.6	1.1	7.3	85.0	1.1	121	2.8
11	4823	505,569	41,486	17.0	70.0	1.2	7.7	86.3	1.1	138	3.2
12	4678	510,144	29,443	11.9	74.4	1.0	7.5	89.0	1.1	158	3.7
13	10,665	1,076,093	61,652	12.1	69.2	1.2	6.7	86.9	1.1	294	6.9
14	5531	431,610	33,155	12.7	74.8	1.4	10.6	90.4	1.1	169	3.9
15	9546	627,189	55,312	18.1	63.2	2.0	9.9	84.0	1.1	238	5.6
16	2201	574,952	19,972	9.7	87.4	0.5	8.9	90.7	1.0	158	3.7
17	7388	341,966	60,789	32.7	50.7	2.2	10.0	78.7	1.2	130	3.0
18	10,152	1,290,003	57,682	10.9	76.8	0.9	9.9	90.6	1.0	342	8.0
19	8611	1,411,773	53,761	12.3	80.4	0.9	9.0	83.7	1.0	329	7.7
20	5723	594,953	36,664	15.2	69.1	1.4	8.7	88.1	1.1	153	3.6
21	4557	457,303	33,083	15.8	71.5	1.2	12.8	84.4	1.1	188	4.4

The values are expressed in Euro thousands.

and the cost of services provided when they are outsourced or bought from other financial institutions, respectively. Pers is the cost of personnel involved in assisting the customer.

5.2. Independent and control variables

In order to test hypotheses H1a, H1b and H1c, we looked at accounting measures collected from the annual financial reports of the firms considered in the sample. Even if accounting measures do not perfectly represent firm performance, particularly when one looks at SMEs, they are considered a good proxy (Beaver et al., 2005). The role of a firm's profitability was tested by using its return on equity (percentage) (ROE), since it controls for a firm's ability to generate profits to pay back its loans. Additionally, according to pecking order theory, higher profitability increases the possibility of financing a firm with retained profit, reducing a SME's dependence on bank finance. The expectation is that high ROE is associated with lower bank risk-adjusted profitability. In order to test the role of working capital on a bank's risk-adjusted profitability, we use the quick ratio (QUICK): a simple measure that explains how firms may rely on their short-term assets in order to finance their short-term liabilities. A high quick ratio implies that a firm has more liquid assets to finance its short-term liabilities. The quick ratio is, in some way, inversely related to working capital. Thus, QUICK is expected to be negatively related to a bank's risk-adjusted margin. In order to examine the role of assets we computed the logarithm of total assets. As discussed in the hypotheses section, firms with larger assets need more funds to finance themselves and are expected to rely more on both long- and short-term loans, increasing their bank's risk-adjusted profitability. Furthermore, firms with more assets are often bigger and need additional services, meaning a bank can sell them other financial products, increasing their risk-adjusted profitability. Overall, LN_ASSETS is expected to be positively related to the risk-adjusted profitability of banks.

Hypothesis H2 is tested by using the length of a relationship expressed in years (LENGTH). In fact, it is an indicator of the strength of a relationship that has been widely used in prior literature (Berger and Udell, 1995; Petersen and Rajan, 1994), although it has been questioned (Uchida et al., 2012). A positive association between LENGTH and a bank's risk-adjusted profitability is expected.

Hypotheses H3a and H3b are tested by using the logarithm of the short-term loan (LN_SHORT_DEBT) and the logarithm of the long-term loan (LN_LONG_DEBT), respectively. Bigger loans are associated with higher amounts of interest paid by SMEs and thus both LN_SHORT_DEBT and LN_LONG_DEBT are expected to be positively associated with a bank's risk-adjusted profitability.

Hypothesis H4 is tested by using a variable called SCOPE that considers banking services other than loans. The variable does not discriminate between different services, their level of sophistication or the intensity with which customers use them. However, it would be very difficult to distinguish between services according to the level of sophistication, which would entail much subjective evaluation. Furthermore, the intensity with which a service is used depends on a firm's needs and on the characteristics of the financial product. Overall, the number of products purchased by customers is a good proxy for the diversification of the products sold to a firm and the diversification of income that the bank obtains from the firm. SCOPE is expected to be positively associated with the risk-adjusted profitability of banks.

In addition to the variables used to test the hypotheses, we enter some control variables into the regressions that can influence a bank's risk-adjusted profitability above the reported covariates. Firstly, we control for the bargaining power (BARGAIN) of the customer. A SME's negotiating power is measured using a firm's equity ratio. Firms with a high equity ratio are considered more

financially sound and stronger when dealing with difficulties. The intrinsic solidity of firms with a high equity ratio puts them in a better position to negotiate fees and loan terms, particularly the interest rate charged, because of the amount of unlevered assets available as collateral. We also enter a firm's (log of) turnover (TURNOVER) in order to control for the power linked to the dimension of the firm. Firms that perform well, and also larger firms, are able to exert greater influence over a bank when negotiating interest and fees, which can affect a bank's risk-adjusted profitability. In addition, we control for whether a bank monitors the cash flow of its customers because firms often use banks to manage incoming payments. When banks handle incoming payments they have the opportunity to financially monitor firms, thus they benefit from a reduction of information asymmetry. In the regression we enter a dummy variable PAY_IN that has the value 0 when a firm does not use the bank to handle incoming payments and 1 when the bank handles them. Similarly, firms can delegate banks to handle payments to suppliers. This can also benefit banks since they can monitor a firm's financial performance. Both PAY_IN and PAY_OUT are expected to be positively related to the risk-adjusted profitability of banks, since they reduce the information asymmetry the bank faces, reducing risk.

As discussed above, our analysis focuses on a sample of very similar banks. Nevertheless, it is important to control whether bank specific characteristics affect bank performance. Thus, we estimate some robustness checks by entering a set of bank specific variables into our specifications. We use the LABOUR COST/REVENUES ratio to measure the labour intensity of the bank cost structure and the operating profit on asset ratio (PROFIT/ASSET) to control for the bank's operating profitability. In addition, we enter the ratio of loans to firms to total loans (FIRM LOANS/LOANS) to control for the credit strategy of the bank and the DEPOSIT/ASSET ratio to measure the financing strategy of the bank. Finally, we use the long-term assets to long-term loans ratio (LT ASSETS/LT LOANS) to measure the financial structure of the bank.

5.3. Summary statistics

Table 2 presents the summarised statistics of the variables considered.

Risk-adjusted profitability has an average value of 693.270, but with values spread from -3 (the worst relationship from the bank's point of view) to over 9000 (the best relationship for the bank). Interestingly, only three relationships in the entire dataset generate an absolute negative margin for the bank. The average assets are 1,674,776 euros while the average ROE is 35.88% and the average quick ratio is 1.5. Overall, firms have good performances and seem to be financially balanced. The average length of the relationship is longer than 15 years – the longest is 66 years, suggesting stable relationships between the SMEs and the banks. SMEs tend to use more long-term bank credit (average 1,161,689 euros) than short-term (average 137,665 euros), reinforcing the fact that, on average, the firms are financially stable, i.e. they do not use short-term debt to finance long-term liabilities. Interestingly, the SMEs use banks more to manage outgoing payments (79% of firms) rather than incoming payments (52% of firms).

6. Findings

6.1. Econometric findings

The dataset used is characterised by a large number of observations for a very limited period (five years), thus panel regression with random effects is suggested as the best approach to estimate

Table 2

Panel A. Descriptive statistics. This table presents a description of the variables as well as their minimum, maximum, mean values and standard deviations. Panel B. Correlations. This table presents the variables of the Pearson correlations.

Description	Name	Mean	Std. dev	Min.	Max.											
<i>Panel A</i>																
Risk-adjusted profitability	RAP	693.270	974.535	−3.000	9,003.400											
Firm size	ASSETS	1674.776	3935.100	5.100	40,818.600											
Firm profitability	ROE	35.877	74.853	−200.000	200.000											
Firm solvency	QUICK	1.475	4.803	0.000	199.500											
Length of the relationship	LENGTH	15.140	8.776	1.000	66.000											
Number of other services	SCOPE	14.158	11.042	1.000	183.000											
Amount of short-term debt	SHORT_DEBT	137.665	1417.613	0.000	65,404.040											
Amount of long-term debt	LONG_DEBT	1161.689	3832.236	0.000	81,056.470											
Firm turnover	TURNOVER	2217.499	4648.912	0.000	49,359.000											
Negotiating power of firm	BARGAIN	33.094	25.162	0.000	100.000											
Incoming payment service	PAY_IN	0.520	0.559	0.000	5.000											
Outgoing payment service	PAY_OUT	0.792	0.761	0.000	5.000											
Bank cost structure	LABOUR COST/REVENUES	67.504	10.248	40.100	93.700											
Bank operating profitability	PROFIT/ASSET	0.014	0.005	0.003	0.025											
Credit strategy of bank	FIRM LOANS/LOANS	0.087	0.332	0.013	0.166											
Financing strategy of bank	DEPOSIT/ASSET	0.855	0.035	0.764	0.922											
Financial structure of bank	LT ASSETS/LT LOANS	1.084	0.042	1.000	1.226											
Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Panel B</i>																
RAP	1.000															
ASSETS	0.496	1.000														
ROE	−0.048	−0.210	1.000													
QUICK	0.000	0.003	−0.032	1.000												
LENGTH	0.158	0.219	−0.058	−0.014	1.000											
SCOPE	0.400	0.297	−0.051	−0.031	0.217	1.000										
SHORT_DEBT	0.082	0.016	0.004	−0.063	0.016	0.141	1.000									
LONG_DEBT	0.202	−0.010	0.023	−0.101	−0.034	0.099	0.154	1.000								
TURNOVER	0.357	0.699	−0.055	−0.112	0.205	0.333	0.014	−0.108	1.000							
BARGAIN	0.012	0.186	−0.198	0.271	0.082	−0.018	−0.147	−0.326	0.095	1.000						
PAY_IN	0.086	0.110	−0.064	0.010	−0.021	0.140	0.104	0.198	0.133	−0.012	1.000					
PAY_OUT	0.097	0.126	−0.077	0.030	−0.049	0.151	0.100	0.171	0.159	0.644	0.037	1.000				
LABOUR COST/REVENUES	0.010	−0.009	−0.006	−0.018	0.013	0.012	−0.008	0.033	0.017	−0.020	0.097	0.000	1.000			
PROFIT/ASSET	−0.006	−0.017	0.028	0.004	−0.002	−0.022	0.000	−0.051	−0.021	0.005	−0.158	−0.170	−0.855	1.000		
FIRM LOANS/LOANS	0.036	−0.017	0.027	−0.031	0.013	0.002	−0.018	−0.029	0.000	−0.027	−0.074	−0.216	0.280	0.027	1.000	
DEPOSIT/ASSET	0.004	0.006	0.003	0.010	0.019	0.017	−0.024	−0.007	0.018	0.000	0.025	0.040	0.536	−0.546	−0.097	1.000
LT ASSETS/LT LOANS	−0.010	−0.007	−0.005	−0.008	−0.020	−0.010	0.032	0.005	−0.021	−0.003	−0.029	−0.304	−0.605	0.672	0.136	−0.722

a panel regression analysis. However, as discussed above because the focus of our work is on relationship profitability, fixed effects at the firm level would appear to be the more suitable option. The Hausman test ($\chi^2(15) = 87.12$ with $p < 0.0000$) also suggests that fixed effects is the best approach to estimate this panel regression analysis.

In order to test the hypotheses we worked out four different regressions: the first one (Model A) considers only those variables that capture the performance of SMEs; the second (Model B) considers only the length of relationships; the third (Model C) considers the different products sold by banks to SMEs; the last (Model D) considers all variables jointly. This approach allows us to disentangle the different effects of the variables while gaining a clear understanding of the determinants of overall bank performance. Table 3 reports all the regressions.

The first regression (model A) is significant ($p < .0000$) and has a within R^2 of 0.051. Turning our attention to the control variables, covariates BARGAIN and PAYMENT_IN are both significant and have the expected sign: the higher the bargaining power of SMEs, the lower the risk-adjusted profitability for the bank, the bank managing incoming payments is positively associated with risk-adjusted profitability, although the firm dimension (TURNOVER) is not significant. Consequently, the financial solidity and financial independence of SMEs are negatively associated with bank profitability, not with firm dimension. Strangely, managing outgoing payments is not associated with risk-adjusted profitability for the banks, suggesting that they are not able to exploit additional information linked to managing customers' cash outflows customer or, alternatively, that it is more important to monitor cash inflows.

When looking at the covariates we see LN_ASSETS is significant and has the anticipated positive sign; QUICK is highly significant but is unexpectedly negative; ROE is also significant but is unexpectedly positive, all of which suggests that firms that are more profitable rely more on banks to finance them. The expected positive sign for BARGAIN rules out the possibility that more profitable firms do not have negotiating power as the more financially sound a firm is, the easier it is for it to look for more favourable offers. In summary, model A supports H1a whereas H1b and H1c are rejected. The results may depend on two different factors: more profitable firms can expand their activities and thus buy more services from banks, which opens up possibilities for risk-adjusted profitability. Additionally, more profitable SMEs may not be able to finance their growth by relying solely on their profits. Hence, they need the additional finance provided by banks that then benefit in terms of risk-adjusted profitability. Moreover, banks are able to manage their risk-adjusted profitability by serving good SMEs, i.e. those that have greater assets (high LN_ASSETS). Clearly, in the latter case, an increase in risk-adjusted profitability can also depend on the fact that firms that have more assets can use more debt finance, increasing the risk-adjusted profitability of banks. Finally, the risk-adjusted profitability of banks is negatively associated with a reduced need for short-term loans to finance working capital (QUICK). An additional effect can also be that high quick ratios characterise firms of higher quality and those that have more negotiating power. In other words, QUICK may have a reinforcing effect on BARGAIN, which is suggested by a Pearson's correlation of 0.27.

The second regression (model B) is significant ($p < .0000$) and has a within R^2 of 0.040 suggesting that model B explains only an additional fraction of the variance. LENGTH is highly significant and has the expected sign. Thus, the findings clearly support H2: the length of relationships increases the amount of information (formal and informal) the bank has access to, thus helping to distinguish between good and bad customers. Furthermore, the bank can select profitable customers, terminating relationships that are not as beneficial. Regarding the control variables, only BARGAIN

and PAYMENT_IN are significant ($p < .05$) and have the expected sign, while TURNOVER is significant but has the unexpected positive sign suggesting that power is not linked to dimension.

The third regression (model C) is significant ($p < .0000$) and has a within R^2 of 0.084. In this specification, TURNOVER, BARGAIN and PAYMENT_OUT are significant control variables. However, PAYMENT_OUT and TURNOVER both have unexpected signs. Regarding the covariates, LN_SHORT_LOAN is highly significant and has the expected positive sign. This finding supports H3a. LN_LONG_LOAN is also highly significant and has the expected positive sign. This finding supports H3b. All in all, both short and long-term loans provided to SMEs contribute to the overall profitability of a bank. This is in line with Ciarrapico and Cosci (2011), who suggest that small banks tend to be mainly focused on selling loans and expect to generate risk-adjusted profitability from them. Finally, the variable SCOPE is highly significant and has the expected positive sign, supporting H4. Thus, selling more services is not just a response to demand from SMEs or a strategy to attract and maintain customers because the additional services sold by banks contribute towards their overall profit.

Model D enters all the covariates. Model D is significant ($p < .0000$) and has a within R^2 of 0.099. Interestingly, there are no changes of sign and no major changes in the significance level of the covariates. PAYMENT_IN is significant in model A ($p < .01$) and B ($p < .05$) but is not significant in model C nor model D. PAYMENT_OUT is significant in model C and is also significant in model D, even if it has an unexpected negative sign. Overall, model D provides additional support for the previous findings: all the hypotheses are supported except H1b and H1c, suggesting SME firm performance, the intensity of the relationship between a bank and a SME and products sold by banks are associated with the risk-adjusted profitability of banks.

We also examine the economic impact of the variables by using a parsimonious model. Interestingly, the average 10% increase in the value of the assets has an important impact on risk-adjusted profitability as it increases by 16%. This is possibly linked to the fact that firms that use tangible assets tend to finance themselves with bank debt and are larger in terms of firm size. Thus, they buy additional services from their bank, positively affecting their risk-adjusted profitability. ROE and QUICK have a limited economic impact (a 10% average change implies an increase of 0.17% and a reduction of 0.14%, respectively). A one-year increase in the length of a relationship (from the average of 14 years to 15 years) is worth, on average, a 2.93% increase in risk-adjusted profitability. An increase of 10% in the average amount of short-term loans implies an increase in risk-adjusted profitability of 0.42%, while for long-term loans it implies an increase of 1.57%. The measure of bargaining power (the ratio between equity and debt) has a marginal effect: a 10% increase in the average ratio – if the firm is 10% more financially independent, which decreases the risk-adjusted profitability by 0.02%. We also examined the effect of the increase of product and services sold. However, there is a large variability in the profitability linked to products and services sold. There is an average increase of 5% in the remuneration of products, although that is not very representative of the risk-adjusted profitability.

6.2. Robustness checks

Even if banks are very similar, we cannot rule out the fact bank specific characteristics can affect a bank's performance. Thus, we re-estimate specification D (here defined as D1) by adding five variables that control for a bank's characteristics as robustness checks. Interestingly, there are no changes in the significance among the original variables and none of the additional variables is significant, except FIRM LOANS/LOANS, which controls for the

Table 3

Econometric findings. This table presents the regression results of the firm and bank characteristics regarding the risk-adjusted profitability of the banks. All the specifications include control variables (TURNOVER, BARGAIN, PAYMENT_IN and PAYMENT_OUT) and yearly dummies. Model A regresses SME performance (LN_ASSETS, ROE and QUICK) on risk-adjusted profitability, Model B shows the length of the relationship between the bank and its customer (LENGTH), Model C presents the scope and loans (SCOPE, LN_SHORT_LOAN, LN_LONG_LOAN) of the risk-adjusted profitability of the banks (RAP). Model D incorporates all the variables in the specification.

		Model A			Model B			Model C			Model D			
Names	Description	Coef.	Std. err.	P > t	Coef.	Std. err.	P > t	Coef.	Std. err.	P > t	Coef.	Std. err.	P > t	
Number of obs.		4285			Number of obs.			4285			Number of obs.			4285
Number of groups		966			Number of groups			966			Number of groups			966
R-sq: within		0.051			R-sq: within			0.040			R-sq: within			0.084
Between		0.263			Between			0.056			Between			0.215
Overall		0.225			Overall			0.054			Overall			0.233
Obs. per group: min		1			Obs. per group: min			1			Obs. per group: min			1
Average		4.4			Average			4.4			Average			4.4
Max		5			Max			5			Max			5
F(11,3308)		16.12			F(9,3310)			15.13			F(10,3309)			27.66
Prob. > F		0.000			Prob. > F			0.000			Prob. > F			0.000
Corr. (u _i ,X _b)		0.182			Corr. (u _i ,X _b)			-0.330			Corr. (u _i ,X _b)			0.105
Corr. (u _i ,X _b)		0.182			Corr. (u _i ,X _b)			-0.330			Corr. (u _i ,X _b)			0.105
Corr. (u _i ,X _b)		0.182			Corr. (u _i ,X _b)			-0.330			Corr. (u _i ,X _b)			0.105
Corr. (u _i ,X _b)		0.182			Corr. (u _i ,X _b)			-0.330			Corr. (u _i ,X _b)			0.105
Corr. (u _i ,X _b)		0.182			Corr. (u _i ,X _b)			-0.330			Corr. (u _i ,X _b)			0.105
LN_ASSETS		205.573									171.677			31.991
ROE		0.256									0.320			0.153
QUICK		-8.478									-6.543			2.065
LENGTH					52.513			12.695			39.072			12.373
SCOPE								21.560			2.540			19.473
LN_SHORT_LOAN								6.062			2.226			19.555
LN_LONG_LOAN								17.899			2.141			17.448
TURNOVER		29.319			19.393			87.072			17.699			54.367
BARGAIN		-5.055			0.839			-6.752			0.795			-4.547
PAYMENT_IN		55.538			25.767			49.197			25.890			29.412
PAYMENT_OUT		-20.053			20.358			-24.152			20.463			-46.281
YEAR														
2002		-5.636			24.980			9.513			25.003			-138.537
2003		-33.477			30.334			-0.647			29.953			-126.890
2004		10.595			29.094			50.960			28.398			-56.458
2005		-49.358			30.461			2.104			29.251			-106.172
CONSTANT		-632.472			203.789			-472.382			226.348			149.094
		sigma_u			749.11			sigma_u			893.35			sigma_u
		sigma_e			496.02			sigma_e			498.83			sigma_e
		Rho			0.695			rho			0.762			rho
											765.62			sigma_u
											487.22			sigma_e
											0.712			rho
														750.09
														483.71
														0.706

* Sig. at .10.

** Sig. at .05.

*** Sig. at .01.

Table 4

Robustness checks. This table presents the regression results of the firm and relationship characteristics that affect the risk-adjusted profitability of banks, including bank characteristics.

	Model D1			Model D2			
	Number of obs.			Number of obs.		4285	
	Number of groups			Number of groups		966	
	R-sq: within		0.101	R-sq: within		0.100	
	Between		0.263	Between		0.263	
	Overall		0.234	Overall		0.234	
	Obs. per group: min		1	Obs. per group: min		1	
	Average		4.4	Average		4.4	
	Max		5	Max		5	
	F(11, 3308)		18.52	F(9, 3310)		22.85	
	Prob. > F		0.000	Prob. > F		0.000	
	Corr. (u _i , X _b)		–0.152	Corr. (u _i , X _b)		–0.151	
Names	Description	Coef.	Std. err.	P > t	Coef.	Std. err.	P > t
<i>FIRM CHARACTERISTICS</i>							
LN_ASSETS	Log of assets	171.483	31.980	***	171.174	31.976	***
ROE	Return on equity	0.315	0.153	**	0.323	0.153	**
QUICK	Quick ratio	–6.572	2.066	***	–6.459	2.065	***
LENGTH	Length of the relationship	39.031	12.375	***	38.937	12.366	***
SCOPE	Scope of the relationship	19.473	2.545	***	19.500	2.544	***
LN_SHORT_LOAN	Log of short term debt	5.623	2.214	**	5.541	2.211	**
LN_LONG_LOAN	Log of long term debt	17.448	2.126	***	17.451	2.125	***
TURNOVER	Log of turnover	6.389	19.258		6.201	19.253	
BARGAIN	Bargaining power	–3.241	0.832		–3.239	0.832	
PAYMENT_IN	Incoming payments	37.061	25.296		36.828	25.281	
PAYMENT_OUT	Outgoing payments	–43.416	19.932	**	–42.735	19.924	**
<i>BANK CHARACTERISTICS</i>							
LABOUR COST/REVENUES	Bank cost structure	–1.087	2.482				
PROFIT/ASSET	Bank operating profitability	3099.931	5222.321				
FIRM LOANS/LOANS	Credit strategy of bank	970.732	373.326	***	737.911	351.261	**
DEPOSIT/ASSET	Financing strategy of bank	104.771	359.010				
LT ASSETS/LT LOANS	Financial structure of bank	–540.166	347.553				
YEAR DUMMIES	Years 2002–2005	Included			Included		
CONSTANT		–792.553	660.857		–1287.243	274.155	***
				sigma_u			749.35
				sigma_e			483.46
				Rho			0.706

Sig. at .10.

** Sig. at .05.

*** Sig. at .01.

credit strategy of a bank. The R^2 increases only marginally. Moreover, the new variables raise problems of multicollinearity (the highest VIF is 607.03). This is not surprising as the banks in the sample are quite similar. We also estimate a parsimonious model (D2) where we drop all the variables related to banks except for FIRM LOANS/LOANS. This specification diminishes the problem of multicollinearity (the highest VIF is 17.83, the average 4.26) and there is no change in the significance level of the dependent variables. In the main results none of the specifications represent the problem of multicollinearity (the highest VIF values are below 10). Overall, the robustness checks reinforce this study's findings about the determinants of bank profitability. The results are presented in Table 4.

It could be also argued that our specification suffers from potential endogeneity problems and more specifically from reverse causality. In order to check for this potential problem we re-test the specifications A, B, C and D using lagged variables. Interestingly, there is no change in the results. Thus, we can rule out possible reverse causality issues.

7. Discussion

The results of this paper respond to the call for the analysis of the overall profitability of relationship lending (Ergungor, 2005).

The overall profitability of banks – in terms of fees from loans and other bank services – has been neglected due to data limitations. Our findings, based on a unique data set, suggest that products sold by banks, the characteristics of customers and the characteristics of loans as well as banking relationships are associated with the risk-adjusted profitability of banks. Furthermore, in our sample, such aspects are more relevant than bank-specific characteristics.

Bigger SMEs have more opportunities to diversify their operations, permitting enhanced risk management. They also tend to have more versatile operations, which are reflected by the need for extensive banking services. Our findings regarding the effect of firm characteristics on the risk-adjusted profitability of banks suggest that bigger firms generate greater profits for banks due to lower levels of risk and a greater operative need for banking services. In addition, the findings on banking relationships show that longer relationships and the broader scope of banking services are associated with the risk-adjusted profitability of banks. These findings suggest that banks share only a part of the benefits arising from having greater knowledge of the customer with the customer.

Interestingly, the econometric evidence suggests that banks' risk-adjusted profitability is mainly explained by the characteristics of customers. In fact, the performance of the firm explains the largest amount of variance within our sample. It is important to stress that the rating systems banks have rely on a long list of

items that are derived from both financial reports and other sources of information. Interestingly, the ratios used to identify the performance of a firm are among only three of the many inputs banks use for determining a firm's ratings. Thus, we can rule out the possibility that risk-adjusted profitability is affected by being determined by the same variables that are used to measure customer performance. This point is also reinforced by our test based on the lagged variables. The important role of the performance of a firm can be interpreted in different, but not necessarily conflicting, ways. Firstly, it may imply that banks are able to price products to individual customers according to the risk they face, i.e. high risk customers pay more for services but this does not adversely affect risk-adjusted profitability. Secondly, it may imply that, from a bank's perspective, it is mandatory to select good customers to increase risk-adjusted profitability. The implication of this finding is that banks in our sample are not adversely affected in terms of capital allocation. In fact, if banks grant loans to high-risk firms, their short-term profitability may increase if the loan margin reflects the risks related to these particular loans. However, banks also need to allocate more capital to equity due to minimum capital requirements. Thus, loans to high-risk firms may decrease the bank's return on equity by reducing the profitability the bank can extract from such a relationship.

The econometric findings also suggest an important role is played by the length of a relationship, although that may not explain the amount of variance explained by the performance of customers. Nevertheless, the finding suggests that banks are able to benefit from long-lasting relationships with customers due to the amount of additional information acquired over time. Indeed, reduced information asymmetry can affect banks in different ways. Firstly, banks can decide to terminate relationships with less creditworthy customers, but increase their activity with more creditworthy ones. Secondly, reduced information asymmetry, as a result of a long relationship, can help banks price loans at rates that properly consider the risk they incur in lending to customers, thus avoiding any adverse effects on their risk-adjusted profitability. The econometric evidence cannot rule out the fact that the benefits of long-lasting relationships may be passed onto the customer. Nevertheless, banks are able to retain at least an incremental fraction of these benefits by increasing their risk-adjusted margin.

Regarding the scope of products sold to customers, the findings suggest that banks do not under-price financial products to attract customers. Unsurprisingly, both short- and long-term loans are important contributors to risk-adjusted profitability. However, other services sold to customers also contribute to risk-adjusted profitability, suggesting that banks try to make money by diversifying and not only attracting new customers.

8. Conclusions

We examine how the interdependencies of the financial performances of SMEs, the relationships between banks and SMEs and the range of banking services offered by banks to SMEs affects the risk-adjusted profitability of banks. A SME's financial performance is closely related to its negotiating power in a relationship because having a strong financial position is a powerful asset when negotiating loans, irrespective of any other individual factors. However, banks can use their information advantage by exploiting specific combinations of relationship factors, such as the length of their relationship with a customer. Furthermore, information sensitive banking services can also help banks to differentiate themselves from others in the lending market.

This study focuses on small, local banks with strong community ties and little competition. This implies that SMEs will have difficulties if they attempt to switch to competing banks – the smaller

the SME, the greater the information asymmetry faced by a competing bank, meaning an SME is usually locked into a relationship with its current bank, making it easier for the bank to extract extra margin from the relationship. This study finds that, in such contexts, banks, at best, share only a part of the benefit linked to having greater knowledge of their customers. Hence, a firm's performance and long-lasting relationships increase risk-adjusted profitability. In addition, banks do not have to under-price other services to attract customers and are able to extract risk-adjusted profit from their additional financial services. Small, local banks are thus well placed to exploit hard and soft information when evaluating an SME's creditworthiness and reduce the risk they face.

This study makes several contributions to the literature on relationship banking. Firstly, we use a new measure of bank profitability that takes into consideration the specific risk carried by banks. Secondly, we examine the risk-adjusted profitability generated by each customer to a bank. This was possible because the banks in our sample used ABC to calculate customer-specific margins, enabling the rigorous analysis of their risk-adjusted profitability. Thirdly, we provide empirical evidence of the factors associated with banks' risk-adjusted profitability. In this manner, our approach provides an explanation of the factors associated with the performance of banks and makes inferences about the combination of services that would lead to the acquired level of risk-adjusted profitability.

The findings of this research raise questions for further study. In particular, the effects of the combination of loans and services provided to SMEs for generating economic capital in banks should be more closely investigated, while a more detailed study of the margin generated by different financial products may also be useful. If banking regulation becomes stricter, in terms of minimum capital requirement, it would be important to have a strategy based on a mix of products and not just the provision of loans and banking services. Moreover, our work focuses on bank profitability before 2008, which means it may be interesting to examine how the financial crisis since then has affected banks and how the performance of SMEs since then has affected the determinants of risk-adjusted profitability. Finally, this research suggests that a firm's financial performance is important. Thus, it would be fruitful to investigate how banks extract profitability from firms that have different levels of performance, i.e. is the mix of products used to deal with different levels of firm's risk in order to maximise risk-adjusted profitability?

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