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Firm-specific determinants of internet services adoption

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Abstract

This paper studies the firm-specific factors that determine the adoption of internet banking in Italian firms. Results show that more profitable, older and larger firms that are expected to have a stronger banking relationship use more internet services. Implications suggest banks for developing facilities and improving their online services in order to empower the adoption of internet banking for smaller and younger businesses.

1. Introduction

The growth of the internet has had a significant impact on all areas of the economy. An important aspect in this context regards the use of the internet in the banking world. Indeed, banks and traditional banking networks have been forced to rethink their structure and organization by the evolution of new technologies. The bank of Italy in the latest annual report[1] highlights that from 2008 onwards Italy experienced a reduction of about 40% in the number of branches and operators in the territorial network, and almost all major banks and one third of the smaller banks have planned or initiated projects for technological innovation. This expansion of internet banking allows firms to complete their financial activities at a lower cost, at any time of the day and at any location of the entrepreneur. Digitalization is thus not only advantageous for banks, but also for companies. Internet banking allows making banking operations without geographic boundaries, providing an important novelty with respect to the past. The contribution of Hanafizadeh (2014) revies the existing literature on internet banking, suggesting that this is "a fertile area for academic research into the next decade". The papers of Malhotra and Singh (2007), and Furst et al. (2002) study the determinants of internet banking adoption by banks. However, as suggested by Yousafzai (2012), internet banking adoption is a multifaceted process that involves many actors. In this field of research, numerous papers study the internet banking adoption (Fasano and Cappa 2022, Arif et al. 2020, Chauhan et al. 2019, Polasik and Wisniewski 2019, Rahi et al. 2018, Rotchanakitumnuai and Speece 2003, Sharma et al. 2020; Tan and Teo 2000), mainly focusing on individual factors. Rahi et al. (2018) suggest that important drivers of the internet banking adoption are: performance expectancy, effort expectancy, social influence and facilitating conditions. Chauhan et al. (2019) examine the role of consumer innovativeness and perceived risk in internet banking adoption. From a different perspective, some other works investigated the barriers to the adoption of internet banking (Arif et al. 2020; Rotchanakitumnuai and Speece 2003). In this context, an important aspect that could influence internet banking adoption is represented by the firm-specific factors that encourage businesses to adopt new digital technologies. Despite the relevance of internet banking, to the best of our knowledge, no study has yet paid attention to the firm-specific determinants that induce firms to use or not to use internet banking services. It is reasonable that the characteristics of a firm could affect the use of internet services. For instance, younger firms which were born in the current digital era are expected to use more technological services compared to older companies. Larger firms or firms that have a bank loan typically have a stronger personal relationship with their bankers, for which they are expected to go to the bank branch more often and, consequently, useless remote services. As digital services provide important benefits, it appears relevant to know which features spur firms to use digitalization. I would help banks and entrepreneurs to understand how the use of internet banking could be increased. All these aspects highlight the relevance of studying the firm-specific determinants of internet services use. This paper aims to respond to this knowledge gap through an econometric analysis based on a sample of 71,591 Italian firms during the last five years before the pandemic (period 2015-2019). Results show that larger, older and more performing firms use more internet banking. Moreover, we also find that firms which issue bank debt use more internet services. Finally, we interestingly observe that northern firms use more internet banking with respect to centre and southern firms, respectively. Our findings provide implications for banks and entrepreneurs. First, we suggest banks to better support young and small firms in the use of new technological services. Second, we suggest 1 rel_2020.pdf (bancaditalia.it) 3 smaller and less performing firms to rely more on internet banking, as the relative benefits could positively contribute to their performance and growth.

The rest of the paper is divided into three following Paragraphs. The Paragraph describes the data, variables and methodology. The third Paragraph presents and discusses the empirical results, whereas the final section concludes

2. Data and econometric model

2.1 Data

The study is based on a sample of nonfinancial Italian SMEs selected according to the European Commission definition[2]. The period is from 2014 to 2019. We consider the last five years in which the use of internet banking increased before the pandemic, as this unprecedented shock for the Italian and the world's economy could lead to misleading results. We use an unbalanced panel dataset collected from the Amadeus database of Orbis from Bureau van Dijk. We selected only those companies with accounting information available over the 2014-2019 period and we excluded meaningless observations with respect to accounting information and observations with input mistakes. Moreover, we winsorized all the firm-specific variables at the 1st and 99th percentiles. Data on the gross domestic product (GDP) and population have been collected from the Italian National Institute of Statistics (ISTAT).

2.2 Variables

The dependent variable measuring the level of internet banking adoption is Internet Banking which is the total number of online internet banking services used by bank customers per province scaled to 1,000 inhabitants in the province. Firm-specific independent variables are Bank Debt which is the ratio of long-term and short-term bank debt scaled by total assets. Cash Holdings is the ratio of cash and cash equivalents scaled by total assets. Employees are the natural logarithm of 1 plus the number of employees in a company. Age is the natural logarithm of year minus year of birth. Growth Opportunity is calculated as sales in year (t) minus sales in the year (t-1). GDP growth is measured as the growth in real GDP at the provincial level from year (t-1) to year (t). South is a dummy that that equals one if the firm is located in the southern part of Italy and zero otherwise. The model also includes the dummies Centre and North if the firm is located in the central or northern part of Italy, respectively

2.3 Methodology

We investigate the firm-specific determinants of the internet banking adoption using the ordinary least square (OLS) technique with robust standard errors.

In particular, we studied the following empirical model:

Internet Banking = f (firm-specific variable, control variables, industry-dummies)

3. Empirical results

3.1 Descriptive and correlations

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[2] Employees fewer than 250, annual turnover lower than EUR 50 million, annual balance sheet total less than EUR 43 million.

Table 1 shows the descriptive statistics for the variables. It presents mean, standard deviation, minimum value, 25th, 50th (median), 75th percentiles and maximum value for all the variables.

Table 1 – Descriptive Statistics for the sample.

	mean	SD	min	p25	p50	p75	max
Internet Banking	3.061	0.961	0.574	2.341	3.057	3.765	5.680
Bank Debt	0.107	0.166	0.000	0.000	0.000	0.179	0.787
Cash Holding	0.134	0.167	0.000	0.014	0.068	0.192	1.145
Employees	2.095	0.958	0.693	1.386	1.946	2.708	5.525
ROA	0.060	0.136	-0.527	0.015	0.045	0.102	0.537
Age	2.395	1.008	0.000	1.792	2.565	3.219	4.949
Tangibility	0.219	0.236	0.000	0.037	0.130	0.332	1.220
Growth Opp.	0.403	2.557	-0.989	-0.180	-0.009	0.228	28.135
GDP Growth	-0.001	0.011	-0.175	0.000	0.000	0.000	0.204
South	0.242	0.428	0.000	0.000	0.000	0.000	1.000

Table 1 shows the descriptive statistics of the variable Internet Banking presenting mean, standard deviation, minimum value and maximum value distinguishing between North, Centre and South of Italy. It is interesting to notice that firms use digital banking services mainly in the northern regions of the county.

Table 2 – The use of internet banking in North, Centre and South of Italy.

	mean	SD	min	max
Internet Banking South	3.477	0.834	0.922	5.680
Internet Banking Centre	3.057	0.992	0.574	5.085
Internet Banking North	2.204	0.487	1.113	3.339

Table 3 reports the correlation matrix of the variables.

Table 3 – Correlation matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	VIF
(1)	Internet Banking	1.00										
(2)	Bank Debt	-0.09	1.00									1.15
(3)	Cash Holding	0.01	-0.28	1.00								1.18
(4)	Employees	0.05	0.16	-0.14	1.00							1.16

												VIF
(5)	ROA	0.01	-0.10	0.23	-0.02	1.00						1.15
(6)	Age	0.09	0.17	-0.11	0.31	-0.09	1.00					1.07
(7)	Tangibility	-0.09	0.21	-0.23	0.05	-0.10	0.18	1.00				1.13
(8)	Growth Opp.	-0.05	0.03	-0.02	0.07	0.04	-0.07	-0.01	1.00			1.05
(9)	GDP Growth	0.08	0.04	-0.03	0.05	-0.00	0.12	0.00	0.17	1.00		1.06
(10)	South	-0.42	-0.10	0.04	-0.13	-0.03	-0.16	-0.01	0.00	-0.10	1.00	1.05

Notes: Industry dummies are not reported. Correlations different from 0.00 are statistically significant at the 0.01 level.

We also test possible multicollinearity problems using the variance inflation factors (VIFs) and observe no particular multicollinearity problem as the maximum VIF in the model is 1.18 (mean of 1.11) which is far below the generally accepted cut-off of 10

3.2 Firm-specific determinants of internet banking adoption

Table 4 reports the results of our regressions. In column 1 we run our main model, while columns 2, 3 and 4 report regression results distinguishing between north, center and south of Italy.

Table 4 - Main Model: firm-specific determinants of internet banking adoption.

	(1) Internet Banking	(2) Internet Banking North	(3) Internet Banking Centre	(4) Internet Banking South
Bank Debt	0.032*** (0.005)	-0.018*** (0.007)	0.034*** (0.011)	0.011* (0.006)
Cash Holding	0.012** (0.005)	-0.002 (0.007)	-0.009 (0.011)	0.035*** (0.005)
Employees	0.008*** (0.001)	-0.015*** (0.001)	0.014*** (0.002)	0.019*** (0.001)
ROA	0.013** (0.006)	-0.093*** (0.009)	0.044*** (0.013)	0.059*** (0.006)
Age	0.027*** (0.001)	0.008*** (0.001)	0.044*** (0.002)	0.000 (0.001)
Tangibility	-0.146*** (0.004)	-0.127*** (0.005)	-0.274*** (0.009)	-0.073*** (0.004)
Growth Opp.	-0.000 (0.000)	0.001* (0.000)	-0.000 (0.001)	-0.001** (0.000)
GDP Growth	3.957*** (0.066)	3.143*** (0.101)	5.645*** (0.159)	1.887*** (0.067)
South	-1.057*** (0.002)			
R2_Adj	0.412	0.236	0.234	0.323
Observations	71.591	53.425	12.471	5.695

Notes: Industry and year fixed effects are the controls. The *p*-values in parentheses are based on standard errors clustered by provinces and firms. The superscripts denote significance as follows: *p< 0.10, **p< 0.05, ***p< 0.01. Standard errors in parentheses.

The findings show that the use of internet banking is higher for firms that report higher values of the variables Bank Debt, Cash Holdings, Employees, Age and ROA. Therefore it seems that more profitable (in terms of operating result), older and firms with a large staff adopt more digital services to carry out their banking activities. It is thus possible that high profitable, old and firms with many employees have a stronger banking relationship, for which they use more digital services. Following the same reasoning, we find that firms that issue bank debt and as such have recurrent contacts with the bank use more internet banking services. Moreover, we observe that the variable Tangibility is negatively related with the variable Internet Banking, 5 while we find no statistically significant relationship between the growth of sales of a firm and its use of internet banking service.

4. Concluding remarks

The advent of the internet has introduced the on-line services as a new way to carry out the banking activities. This historical change brought important benefits for both firms and banks. In this context our work scrutinizes the firms-specific determinants that induce firms to adopt the internet banking. We investigate a sample of Italian SMEs during the 2014-2019 period to avoid the potential influence of the pandemic. Our empirical analysis reveals that more profitable, older and firms with many employees and more cash use more internet banking. Therefore, firms that are expected to have a stronger banking relationship significantly use internet services. Implications suggest banks for supporting younger and smaller firms towards the adoption of online services. This study thus aims to stimulate the banking industry to improve their online services and revise their policies to meet the digital needs of younger and smaller firms.

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