

EDUCATIONAL LEVEL AND INTERNET BANKING

José Ramón Zagalaz Jiménez

joseramon.zagalaz@ulpgc.es

Inmaculada Aguiar Díaz

inmaculada.aguiar@ulpgc.es

Universidad de Las Palmas de Gran Canaria
Facultad de Economía, Empresa y Turismo
Campus Universitario de Tafira, 35017 Las Palmas de Gran Canaria

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Abstract

The study focuses on the analysis of the determinants of the use of Internet banking in Spain, with special reference to educational level, both, per se, and the possible moderating effect on the other variables. The sample consists of 4,300 observations and has been obtained from the Financial Survey of Families for 2014. The results obtained allow us to conclude that exist a positive relationship between a higher educational level, the fact of being a man, the level of income, the fact of being self-employed, greater use of ATMs, greater frequency in the use of banking operations and the use of Internet banking. On the contrary, the age exhibits a negative relationship. One of the novelty results is that individuals with a higher educational level and higher income are less likely to use Internet banking, probably because in this case they prefer personalized advice to make decisions about investments in more complex financial products.

Keywords: Internet banking, Educational level, Financial survey of families (EFF).

1. INTRODUCTION

In the last decade there has been an exponential growth of the users that have Internet at home, this has posed an opportunity for the banking entities to derive many of their traditional banking operations towards the Internet banking. According to the Survey on Equipment and Use of Information Technologies and Communication in homes 2017, prepared by INE, the number of people who have used the internet is 29.3 million, 54% of these people uses internet for the Internet banking service.

Internet has become a new marketing channel that allows companies to have a greater degree of penetration than maintaining a network of physical establishments. In the banking sector, this break with the previous paradigm has allowed the entry of new competitors specialized in providing service almost exclusively through the Internet. These services have been offered under more advantageous conditions than traditional banking, due to the savings implied by the absence of a heavy cost structure due to the costs of rentals, furniture, maintenance, personnel, etc. from a bank office.

On the other hand, the recent crisis that began in 2008 has led to a major restructuring of the banking sector, with the concentration of entities and the consequent closure of offices and reduction of staff. According to data from the Spanish Banking Association (AEB), the number of national entities in Spain has gone from 88 in 2000 to 48 in 2016, while the number of foreign entities has gone from 51 to 82, maintaining an inverse trend to that of the local entities. Also according to the data extracted from the Statistical Yearbook that publishes annually the AEB, between 2007 and 2016 banks have closed 3,338 branches and the number of employees in the sector has decreased by 22,573 people. These data contrast with the increase in debit and credit cards, which in 2016 amounted to 40,331,339, 16.6% more than in 2007. The evolution of credit / debit cards is related to the growing prominence of online shopping. E-commerce has experienced significant growth, and is another factor that has favoured the increase in demand for Internet banking services (Tunay et al., 2015). According to the Survey on Equipment and Use of Information and Communication Technologies of 2017, the number of online shoppers in Spain rises to more than 17 million people.

The peculiarities of the Internet, and its immensity as a market, have contributed to numerous researchers focusing on the study of the behaviour of both consumers and companies. According to Internet World Stats, as of June 2017, the internet penetration ratio in the world was 54.4%, while in Europe it was 80.2% and in Spain it was 87.1%.

Given this scenario, financial institutions are giving great importance to digitization and the installation of machinery to replace part of the work used in the handling of cash, such as the installation of ATMs in which to make income and invoice payments, in addition to the already known cash withdrawals. The banking sector has been a pioneer in the adoption of new technologies. The first self-service technology in the financial sector appeared in the 70s when banks installed the first ATMs. Later, in the decade of the 80s, telephone banking appeared, in the 90s Internet banking and in the 2000 banking through mobile phone. The proliferation of these channels has allowed banks to develop a multichannel strategy (Hernández-Murillo et al., 2010, Hoehle et al., 2012). The first ATM was introduced by Barclays Bank in 1967 (Polasik and Wisniewski, 2009). The first bank to allow online transactions was in California the Wells Fargo in 1995 and in the same year the first virtual bank without offices was established the Security First Network Bank (De Young et al., 2007; Polasik and Wisniewsky, 2009). Likewise, the banking sector was one of the first to adopt the Internet as a new channel of relationship with its customers. However, according to Garcia and Romero (2004), this channel has not fulfilled the expectations that the banks deposited in it for attracting new customers, although it has been consolidated as an effective means of consolidating the client portfolio.

Studies focused on knowing consumer behaviour are increasingly important for financial institutions since competition can be global, which tends to reduce the benefit of the entities. Therefore, the detection and maintenance of clients will be vital for their survival. Specifically, the behaviour of the online consumer is occupying a greater number of studies, mainly those related to the purchase intention, while the continuity of the client occupies a second place. Internet banking is one of the key aspects in the influence of the relationship between the client and the financial institution.

Given the advantages for both parties, there is a great incentive on the part of financial institutions to encourage the use of Internet banking. According to Chiou and Shen (2012), financial institutions should take advantage of the relationship built in offline environments to influence customers and their intention to use services through the Internet. Likewise, the services offered via the Internet must have complementary support. In this sense, the decision to offer online services is currently perceived as vital to retain customers and maintain a competitive advantage (Polasik and Wisniewski, 2009). Internet banking improves competitiveness in the banking sector by allowing the

comparison of offers between different financial entities (Tunay et al., 2015). Currently, the trend among banks is to consider Internet banking as a complementary service to traditional banking that allows them to face the rapid changes and intense international competition (Sadiq-Sohail and Shanmugham, 2003, Santouridis and Kyritsi, 2013).

The objective of this study is to determine the factors that explain the use of Internet banking in Spain, in particular those related to the characteristics of users with special reference to educational level, both its direct impact and through its influence on other economic and sociodemographic factors, such as income, age and sex. For this, the database provided by the Bank of Spain created from the Financial Survey of Families is used, corresponding to the year 2014, the latest available to date.

The work is structured as follows. After this introduction, section two presents a synthesis of the advantages and disadvantages of Internet banking for users. In the third one, the theoretical arguments and hypotheses that relate the aforementioned factors to the use of Internet banking are included. The fourth section is dedicated to exposing the methodological aspects while the results are presented in the fifth. Finally, in the sixth section a discussion of the results is carried out and the conclusions of the study are presented.

2. ADVANTAGES AND DISADVANTAGES OF INTERNET BANKING FOR CUSTOMERS

The Internet banking services offer a series of advantages for the clients: possibility of the user to control their bank accounts from any place and at any time, the facility to compare between different alternatives of investment / financing and the saving of time and costs¹. Montazemi and Qahri-Saremi (2015) hope that Internet banking will have a so-called effect on consumers through cost savings, greater control over the service provided, reduced waiting times and access to services without space or time restrictions. In relation to costs, the Portuguese Association for consumer protection conducted a study in which concluded that users of Internet banking could save up to \$ 300 per year if they used Internet banking instead of traditional (cited in Martins et al., 2014). However, as the complexity of the products grows, human contact is more important (Durkin et al., 2008).

¹ Ainin et al. (2005), Black et al. (2001), Gerrard and Cunningham, (2003), Polatoglu and Ekin (2001), Suganthi et al. (2002); cited in Lassala et al. (2010).

The main disadvantages or reasons that discourage the use of Internet banking are in the difficulty of use perceived by customers and security. The main barriers found by Mattila et al. (2003) were the perceived difficulty in the use of computers and the lack of personal attention in Internet banking (Akinici et al., 2004). Most users who do not adopt Internet banking claim that it is complicated, despite having experience in the use of the Internet and are concerned about the safety of Internet banking (Mansumittrchai and Chiu, 2012). According to Gensler et al. (2012), the products that are used more frequently do benefit from being used online (such as transfers), although the effect of online use on the benefit is less pronounced in the case of those customers who have savings accounts. Another factor that represents an inconvenience for the use of Internet banking is the preference of clients for personal treatment with bank employees, in order to seek advice. In this line, Aldas-Manzano et al. (2009) state that lack of human contact can be a barrier in the use of technology-based services. According to Chiou and Shen (2012), if customers have a close relationship with a bank employee, they may be reluctant to use Internet banking.

3. THEORETICAL ARGUMENTS AND HYPOTHESIS

Internet banking, besides being a marketing channel for banking products and services, represents the use of a computer technology, which requires certain knowledge on the part of users. Some authors argue that individuals with high levels of internet use are more likely to adopt the Internet banking (Corrocher, 2006; Kim et al., 2005). Others add that the use of electronic banking is more common among those clients who feel comfortable using computers (Corrocher, 2006, Kim et al., 2005, Giordani et al., 2014).

From the theoretical point of view, studies have used the so-called TAM (Technology Acceptance Model, Davis et al., 1989), according to which ease of use and perceived utility are the most relevant factors to explain the propensity to adopt a new technology (Chiou and Shen, 2012)². In the same line, Chong et al. (2010) considered that these two factors, ease of use and perceived utility are related. As they affirm, Montazemi and Qahri-Saremi, (2015), the smaller the effort that the consumers hope to realize when using the technology, greater utility they will perceive of the same one.

² This model has been tested in different situations explaining the acceptance of new technologies. Chiou and Shen (2012) cite the studies of Mathieson (1991), Adams et al. (1992), Taylor and Todd (1995), Venkatesh and Davis (1996) and Legris et al. (2003).

In the reviewed literature a certain consensus has been found in affirming that the ease of use is positively related to the adoption of Internet banking (Mattila et al., 2003, Wang et al., 2003, Chong et al., 2010). In this sense, some authors conclude that the perceived difficulty and lack of personalized attention is the most significant barrier to the adoption of Internet banking (Hanafizadeh et al., 2014). According to Boateng et al. (2016), the adoption of a technology is influenced by the social environment of the individual and their knowledge and beliefs about what it can provide for their personal goals.

In this sense, regardless of the ease of use derived from the web chosen by the bank, it can be stated that the degree of difficulty perceived by a client is closely related to their level of knowledge, since their ability to be able to understand the information provided by the web regarding the products and banking services it offers, and therefore to make decisions about it. However, the studies by Pikkarainen et al. (2004) and Eriksson et al. (2005) indicate that the perception of ease of use does not influence the adoption of Internet banking (Chong et al., 2010).

Finally, another of the aspects highlighted in the studies on the use of Internet banking refers to the trust or security perceived by users. In this sense, numerous authors maintain that trust is crucial in Internet banking (Hernández and Mazzon, 2007, Chong et al., 2010, Boateng et al., 2016). A client cannot have a positive attitude towards Internet banking if he believes there is a risk of exposing his personal credit data and exposing himself to fraud (Chiou and Shen, 2012). The Internet users who rely most on Internet banking are those who use their services most frequently and are those who show greater loyalty to them (Lassala et al., 2010). In the same line, Boateng et al. (2016) considers that the adoption of Internet banking is based on trust, among other factors such as the characteristics of the website, ease of use, compatibility with lifestyle and online customer service.

In this paper we try to determine the factors that influence the decision to use Internet banking, with special reference to the financial knowledge of the individual, which is approximated by the educational level. Among the most prominent factors in previous studies are the socio-demographic, as well as the economic ones, which in turn contribute to explain the educational level, so, unlike previous studies, in this paper we propose to state that the educational level exerts a moderating effect among the other factors and the use of Internet banking.

On the other hand, the use of electronic banking requires having a computer, as well as being familiar with the use of the internet. Hence, before focusing on the arguments that relate each of the factors to the use of Internet banking, a reference is made to the relationship of the aforementioned variable with the use of the internet, if applicable.

A high level of internet diffusion, income and education shows a receptive market for the introduction of Internet banking (e.g., Lassar et al., 2005, Corrocher, 2006, Santouridis and Kyritsi, 2014). The use of the Internet is related to age, educational level, occupation, employment in the services sector and GDP per capita, as well as the frequency in the use of the internet is positively related to the broadband connection, education, gender and size of the population in which it resides (Lera-Lopez et al., 2011). According to these authors, despite its economic development, Spain maintains a low internet use, as it happens in some southern European economies.

Therefore, we proceed then to raise the central hypothesis of the work, educational level and use of Internet banking, for later, while contributing the arguments of the different economic and demographic factors, consider the possibility of an interaction effect between the educational level and each of them.

3.1. Educational level and use of Internet banking

As indicated above, the use of any computer technology in the field of Internet, requires certain knowledge and skills both to navigate the Internet and to be able to understand the information that emanates from the webs and that must be processed to make decisions. In this sense, an objective measure of the level of knowledge is the educational level.

According to the Theory of Diffusion (Rogers, 2003), the most educated individuals tend to achieve a higher economic and professional status, being also prone to adopt innovations such as the Internet. Some studies have found empirical evidence of the existence of a positive relationship between the level of income and educational level (Lera-López et al., 2011). In addition, several studies support that an increase in education tends to be positively related to the adoption of an innovation (Karjaluoto et al., 2002). In this line, Giordani et al. (2014), individuals with a higher level of education (and income) have a greater exposure to new technologies, so they are more prone to the adoption of Internet banking. Specifically, these authors find that university education is positively related to the use of Internet banking.

According to Lera-López et al. (2011), the educational level has a great impact on the likelihood of Internet use, people with secondary education are 38% more likely to become an Internet user than individuals who have not reached that level of education. According to these authors, a higher education increases the probability of using the Internet by 61%. In the same vein, Polasik and Wisniewski (2009) reveal that customers with a higher education and familiar with the use of the Internet are more prone to the use of Internet banking. The study carried out by Polatoglu and Ekin (2001), through a survey of Turkish consumers, shows that the best educated (and youngest) clients perceive the Internet as very useful and easy to use, which gives them an advantage over the conventional office banking (Hoehle et al., 2012). Kolodinsky et al. (2004: PAGINA) find that "The current and expected future users of banking through the computer have higher income, higher education and are younger". Along the same lines, Hernández and Mazzon (2007) found that university graduates were more likely to use Internet banking. Numerous studies have found that clients with high levels of education are more likely to adopt Internet banking compared to clients with lower educational levels. Among them are those of Rice and Katz (2003), Lawson and Todd (2003), Corrocher (2006), Kim et al. (2005), Hernández and Mazzon (2007), Ono and Zavodny (2007), Goldfarb and Prince (2008), Polasik and Wisniewski (2009).

According to Sullivan (2000), the demand of banking clients regarding the use of the internet is higher in clients with higher education compared to the rest of clients. In this line, the study carried out by Akinici et al. (2004), reached the conclusion that the segment of "highly educated" customers deserves special attention from banks, since it is a low cost segment and very profitable. Being a part of the population accustomed to the use of the Internet, it will be less expensive for the bank to migrate them to the use of Internet banking than in those with a lower education.

H1 Individuals with higher education are more likely to use Internet banking than individuals with lower educational levels.

However, as indicated, the results obtained in some of the previous studies link this relationship with other economic and demographic factors, so the possibility of a joint effect of the educational level with these variables is considered below.

3.2. Level of income, educational level and use of Internet banking

The use of the Internet is associated with the level of income, among other reasons due to the fact that there is probably a lower penetration of computers in the lower strata of the population (Polasik and Wisniewski, 2009). Another argument that relates income to the use of the internet stems from the fact that an increase in income (and in education) tends to be positively related to the adoption of an innovation (Karjaluoto et al., 2002). Lera-López et al. (2011) affirm that the use of Internet is associated, among other variables, with a high GDP per capita.

Regarding the use of Internet banking, Giordani et al. (2014) state that banking clients with a higher level of income (and a higher educational level) are more exposed to new technologies and are more likely to adopt Internet banking. In addition, Kim et al. (2005) found that customers with higher levels of income concede greater value to their time and that electronic banking allowed them to save time so they were more prone to use it (Giordani et al., 2014).

Numerous studies have obtained a positive relationship between the use of electronic banking and a high level of income. Thus, Mattila et al. (2003) find that household incomes (and education) have a significant effect on the adoption of electronic banking among Finnish consumers. Kolodinsky et al. (2004) conclude that current and future users of computer banking have higher incomes, more education and are younger. In the study carried out by Flavián et al. (2006) it could be inferred that a person was less likely to use electronic banking if their salary was less than 24,000 euros, compared to someone with a higher salary. Corrocher (2006) concluded that a high degree of Internet diffusion, income and education indicated the existence of a market very receptive to the entry of Internet banking services.

Contrary to the conclusions of most studies, Santouridis and Kyritsi (2014) found an inverse relationship between high income and the use of Internet banking. The justification for this idea was based on the fact that these customers could be involved in transactions of a larger volume and more complex so they preferred to solve them in face-to-face meetings.

From the empirical evidence mentioned, it can be deduced that not only does the level of income affect the decision to adopt Internet banking, but that in many cases the educational level seems to act as a moderator of the relationship. Hence, the following hypothesis is raised in the aforementioned terms:

H2a. Individuals with a higher level of income are more likely to use Internet banking.

H2b. Individuals with a higher level of income and a higher educational level are more likely to use Internet banking.

Finally, in relation to family income, the possibility is considered that the family is the owner of a business and in particular that the exercise of economic activity is carried out as an individual or autonomous entrepreneur, as an individual, instead of creating a commercial society. In this sense, Lawson and Todd (2003) came to the conclusion that the self-employed were more likely to adopt the services of Internet banking, since this segment of clients has to direct all the work related to banks by themselves. Due to their time constraints they will be open to the use of new technologies (Giordani et al., 2014).

H3 Individuals who exercise a business activity as freelancers are more likely to use Internet banking.

3.3. Demographic aspects, educational level and use of Internet banking

Age, educational level and Internet banking

Given that the use of Internet banking requires a certain willingness to use the internet, in principle young people would be more likely to use Internet banking. Polatoglu and Ekin (2001) came to the conclusion that younger and better educated clients perceived the Internet as very useful and easy to use.

Many authors have analysed the relationship between age and the use of Internet banking. The results obtained mostly support that younger customers are more inclined to adopt Internet banking than older customers. Among the most cited are those of Polatoglu and Ekin (2001), Rice and Katz (2003), Akinci et al. (2004), Kim et al. (2005), Chang (2003), Flavian et al. (2006), Hernández and Mazzon (2007), McKeown et al. (2007), Goldfarb and Prince (2008), Hanafizadeh et al. (2014), Kolodinsky et al. (2004).

In addition, the fact that not only Internet is used to access the website of a bank to make inquiries, but also to perform operations (transfers, etc.), carries a certain risk. As Gan et al. (2006), older consumers are more risk adverse and prefer a personal banking relationship to a non-personal one. Therefore, age can condition the use of Internet banking. In this line, other authors argue that the most innovative consumers tend to be younger and that a part of the mature segment may perceive the technologies as confusing or stress inducing (Im et al., 2003; Elder et al., 1987; in Polasik and Wisniewski, 2009).

The degree of receptivity of the innovation and the perceived risk in the purchase are factors that determine how quickly an Internet user becomes an online buyer (Citrin et al., 2000, Vrechopoulos et al., 2001, Aldas-Manzano et al. 2009).

Some studies specify a section of age. Thus, Flavián et al. (2006) find that within the age group, those who are between 17 and 25 years are more likely to make transactions via the Internet, while those 45 and older are less likely. The Marktest Group classified the group of men, young people between 25-34 years old and upper middle class who have an adoption rate 2.5 times above the average, with 74% of users (cited in Martins et al., 2014).

Some studies raise a profile of the user of Internet banking. In this line, Polasik and Wisniewski (2009), in their study about Poland, the typical client who has an online account is a 34-year-old man with 15 years of education, who performs office tasks and lives in a city with a population average of about 620,000 inhabitants. Hernandez and Mazzon (2007) conclude that young men who own a computer, have university degrees and higher than average incomes are more likely to adopt Internet banking. These variables do not play a very important role in the intention to use or in the continuity of their use, only in adoption.

In agreement with the exposed arguments, as well as the previous empirical evidence, the first hypothesis is presented in such a way that the age is contemplated and also the age conditioned by the educational level.

H4a. Younger clients are more likely to use Internet banking.

H4b. Younger and more educated clients are more likely to use Internet banking.

Gender, educational level and use of Internet banking

First, as in the case of age, the relationship between gender and the adoption of Internet banking is conditioned by the predisposition to use the internet. In this sense, Lera-Lopez et al. (2011) find that the use of the internet is slightly higher in men than in women (around 8%) and that the difference is greater the higher the level of education, specifically, among individuals with high education the use Internet reaches 87.5%.

Regarding the use of Internet banking, Polasik and Wisniewski (2008) argue that gender has a significant importance in the decision to direct operations online. In the same line, Flavian et al. (2006) and Lera-López et al. (2011) state that women were less likely to

carry out their Internet banking activities, which may be associated with differences in education and income and the distribution of domestic tasks (Bimber, 2000).

Among studies that have found evidence of less use by women than men are those of Bimber (2000), Karjaluoto (2002), Lawson and Todd (2003), Akinci et al. (2004), Kolodinsky et al. (2004), Kim et al. (2005), McKeown et al. (2007), Polasik and Wisniewski (2009). Finally, Hernández and Mazzon, (2007) found that young men with higher education and higher incomes are more likely to adopt electronic banking. However, other authors (Rice and Katz, 2003, Goldfarb and Prince, 2008) have not found differences between sex and the use of Internet banking. In any case, according to Lera-López et al. (2011: 7): "it seems that the differences by gender are being reduced as the use of the internet becomes popular".

In accordance with the above, the following hypothesis is proposed:

H5a. Men are more likely than women to use Internet banking.

H5b. Men with higher education are more likely than women to use Internet banking.

Marital status, educational level and use of Internet banking

The family structure, and in particular, marital status can affect the use of the internet. In this sense, married clients as a rule request more complex transactions and therefore are more likely to adopt Internet banking (Sohail and Shanmugham, 2003). However, Lee-Kelley et al. (2003) found no relationship between marital status and preference for making purchases online. It is possible that this discrepancy depends on the educational level, so the following hypotheses are proposed:

H6a. Married individuals are more likely to use Internet banking.

H6b. Married individuals with a higher educational level are more likely to use Internet banking.

3.4. Means of payment, banking operations and use of online banking

Currently, the use of electronic banking is also linked to the lifestyle of people, the way they think, act and live (Hernández and Mazzon, 2007). In this sense, the preferences of banking clients determine their habits or behaviours in their relationships with entities. Thus, with regard to the most common means of payment, it has been shown that

customers who have a credit card or who use checks adopt more Internet banking than those who simply maintain savings accounts (Gensler et al., 2012).

However, there is still a great preference for the use of cash. Each month, 73% of Europeans use ATMs, while only 30% use Internet banking (Hoehle et al., 2012). The study by Akinçi et al. (2004) reveals that, for users of Internet banking, this is the preferred channel followed by ATMs, while non-users prefer ATMs.

Another aspect that has been the object of study is the periodicity or frequency of the operations carried out by banking clients. In this line, Estrella-Ramón et al. (2016), find that customers who adopt Internet banking faster have an offline behaviour with a greater frequency of interactions, rather than a high number of products involved in their interactions or the purchase of high risk products or high monthly obligations.

H7. Greater use of credit cards is associated with greater use of Internet banking.

H8 Greater use of ATMs reduces the use of Internet banking.

H9 Greater frequency of banking operations increases the use of Internet banking.

4. METHODOLOGICAL ASPECTS

4.1. Information sources and sample

The source of information used to carry out this study is the Financial Survey of Families, hereinafter EFF, prepared by the Bank of Spain. This survey is of three-year periodicity, the first one is the one related to 2002 and the last one available corresponds to the year 2014. It is worth noting that the Banco de España Studies Service anticipates the results of this survey in different formats in an aggregate form, although access to the database for researchers is only available from December 2017. The survey consists of multiple sections or modules. Among the different sections are those of demographic variables, relations with banking entities and the use of Internet banking. Regarding the economic variables, the EFF displays a multitude of questions related to heritage (housing, jewellery, financial assets, etc.), as well as debts, and in particular provides the variable income of the household, created from the aggregation of the different incomes (of work, business, investments, etc.).

A characteristic of the EFF is that it has a bias towards individuals / families with a high income level. To do this, the initial selection of respondents is done based on the

declaration of the 2011 wealth tax, provided by the Tax Agency. A detailed explanation of the methodology used in EFF2014 can be found in Bover et al. (2018).

The EFF corresponding to 2014 contains the responses of 6,120 families, although the module relating to the use of Internet banking is answered by 4,316. Therefore, the initial sample of the present study consists of 4,316 observations. However, due to the existence of missing values in some of the variables necessary for the study, the final sample consists of 4,300 observations of which there is information about the use of Internet banking, as well as economic and demographic characteristics of the individuals, specifically of the person of reference who is considered the head of the family. In addition, when considering the variables of banking operations and means of payment, the sample is reduced to 3,905 observations.

A final question refers to the existence of different databases referring to the same survey. This is due to the allocation of values or imputations made by the Bank of Spain itself, in cases in which individuals do not respond to certain issues³. Finally, note that among the most recent studies based on this survey are Bover (2015), Sánchez-Martínez et al. (2016), Barceló and Villanueva (2016); Amuedo-Dorantes and Borra (2017); Pinilla et al. (2017). None of them, nor the previous ones, has analyzed the use of Internet banking.

4.2. Variables

According to the hypotheses, the dependent variable is the use of Internet banking, while explanatory variables include educational level, economic and demographic variables, as well as means of payment and banking operations.

Internet banking. The use of Internet banking is collected through a dichotomous variable that adopts the value one if the respondent affirms that he does use Internet banking and zero if he does not use it.

Education level. The level of studies refers to the highest level reached and is collected through four dichotomous variables, in order of increasing training. Thus, the variable *Ili_or_PriS* adopts the value 1 if the reference individual is illiterate or has only primary studies and zero otherwise. The variable *Sec_S* adopts the value 1 if its highest level of training is that of secondary studies (E.S.O.) and zero otherwise. The variable *Bacca* adopts the value 1 if he has completed the baccalaureate degree or an equivalent degree

³ From the five available imputations, number 1 has been used in the present work (see Bover et al. (2018).

in professional training (second degree) and zero otherwise. Finally, the variable *Hight_S* adopts the value 1 if it has finished university studies, either in degree or master.

Family income (Income). The level of income or family income is a continuous variable provided by the database, although it has been created by the Bank of Spain adding the items that represent different income concepts, whether from work, family businesses, investments, etc. This variable is introduced in the models in the form of a logarithm.

Demographics variables. The *Age* of the reference person is a continuous variable, although it is introduced in the models in logarithmic form. *Sex* is collected through the variable *Man* who adopts the value 1 if it is a male and 0 if it is a woman. The civil status is collected through the *Married* variable, which takes the value 1 if the reference person is married or has a de facto partner, and 0 in any other state (separated, divorced, widowed, etc.).

Business. Under the presumption that holding a business requires the completion of numerous banking operations, the variable that adopts the value 1 if the family has a business, regardless of whether it has total or partial ownership, and 0 in opposite case⁴.

Payment methods. In order to consider whether the choice of the different means of payment affects the use of Internet banking, representative variables of cash payments (ATMs), use of credit and debit cards have been included. The variable *Cards* refers to the number of payments that are made on average monthly with credit or debit cards. *ATMs* indicates the number of times a week that on average they withdraw money from ATMs, all family members. *Bank operations*. In order to consider different banking operations, 4 dichotomous variables have been included. 1) *Banc_Ac_Inc* adopts the value 1 if any member of the family receives regular income in the form of transfers or direct debits (e.g., payroll, pensions, rent, etc.) and zero if they do not receive any income in this way; 2) *Payment_Dom* adopts the value 1 if regular payments are made through direct debit and 0 otherwise and 3) *Fre_Transf_emi*, adopts the value 1 if transfers are made frequently and 0 if they are made sporadically or are not made and 4) *Credit_Line* is equal to 1 if you maintain a line or credit account with a bank which you can have according to your needs with an established limit and 0 otherwise.

⁴ Strictly one should consider if one is an independent employer, but the question of the EFF relative to the legal form of the business is answered by a noticeably smaller number of individuals. In any case, the results are similar for models that include this variable or not (results not reported).

5. RESULTS

5.1. Descriptive analysis

As indicated above, the analysis is performed from two samples. The first is made up of 4,300 individuals who have answered the question regarding the use of Internet banking, of which their income and demographic characteristics (age, sex and marital status) are also known. Of this sample, 63% are users of Internet banking. The second by 3,905 individuals who know their financial habits and banking operations (use of cards and ATMs, direct debits, transfers, etc.).

Table 1 shows the mean values (percentage in dichotomous variables) of the variables, as well as the mean difference test, for each of the aforementioned samples. As can be seen in table 1, there are significant differences in all variables (except Bacca), among the group of users and non-users of the Internet banking. Based on this information, a certain profile of the Internet banking user in Spain can be elaborated. Thus, they are married men, somewhat younger than non-users and mostly with higher education. Regarding the level of income, the difference between both groups is minimal. Finally, in relation to the means of payment, these are individuals with a certain preference for payment by card and who frequently make bank transfers.

Table 1. Differences between users and non-users of Internet banking

	All	Users	Non-users	Means dif.
Ili_or_PriS	13,97	6,99	25,82	17,85***
Sec_S	15,22	11,30	21,88	9,44***
Bacca	27,30	27,87	26,32	-1,09
Hight_S	42,49	53,82	25,95	-18,53***
Income (log)	10,69	10,81	10,24	-21,42***
Age (log)	3,99	3,96	4,02	7,17***
Man	64,89	68,88	58,12	-7,19***
Married	71,68	74,41	67,06	-5,19***
Cards (n°)	14,99	17,89	9,15	-11,85***
ATM (n°)	1,38	1,48	1,18	-5,31***
Credit_Line	5,33	6,37	3,23	-4,12***
Bank_Ac_Inc	94,74	95,57	93,07	-3,306***
Payment_dom	99,31	99,73	98,46	-4,54***
Fre_Transf_emi	6,27	8,05	2,69	-6,54***
Observations*	4.300	2.700	1.600	

Variables: The educational level variables are dummies that adopt the value 1 for the highest level of education attained. Ili_or_PS: Without studies or only primary studies; Sec_S: secondary studies; Bacca: baccalaureate or second grade professional training, Hight_S: university studies (degree, master), Income (log): income level of the family; Age (log): age of the reference person. Man = 1, 0 if she is a woman; Married = 1 if you are married or have a de facto partner and zero in any other situation or marital status. Business = 1 if the family is a business owner and 0 otherwise.

* For the variables of means of payment, the sample of 3,905 observations was used.

Source: Own elaboration

Table A2 of the Appendix contains the average values as well as the matrix of correlations between the variables. In this table it can be seen that there are no high correlations between the variables, which avoids the problem of multicollinearity when estimating econometric models.

5.2. Econometric analysis

Given the dichotomous nature of the dependent variable, a logistic regression model is proposed, which is estimated using a probit model, using the Stata14 statistical package. The coefficients of the variables obtained in the probit estimation should be interpreted in probabilistic and marginal terms, that is, as the variation of the probability of the dependent variable before a variation of each explanatory variable, keeping the rest of the variables constant. Therefore, instead of the beta coefficients (linear regression), the marginal effects are used.

The results of the models estimated to contrast the hypotheses presented are presented in Table 3. Models 1 and 2 are estimated for the sample of 4,300 individuals, model 1 contains only the educational, economic and demographic variables while model 2 also includes the interactions between these and the educational level. The results obtained from model 1 indicate that a higher educational level increases the probability of using Internet banking.

Thus, income is directly related to the use of Internet banking. On the contrary, age is negative, which indicates that older individuals have a lower propensity to use Internet banking than younger people. Regarding sex, men seem more willing to use the services of Internet banking than women. Finally, the civil status is not significant to explain the use of Internet banking in Spain.

However, some of these relationships are altered when considering the interaction with the educational level. Thus, the results of model 2 indicate that, although individuals with a higher level of income are more likely to use Internet banking, this probability is reduced when individuals have higher education. In the case of age, the educational level enhances the negative effect. Men only show a significant difference with women in the

use of Internet banking when they have high school studies, not being relevant sex or marital status in the other educational levels.

Table 2. Determinants of Internet banking in Spain
V.D.: Internet banking dummie = 1 if use, 0 do not use

Model	(1)		(2)	
	<i>E.M.</i>	<i>S.E.</i>	<i>E.M.</i>	<i>S.E.</i>
<i>Ili_or_PS</i>	Reference		Reference	
<i>Sec_S</i>	0,0889***	0,0257	-0,4434	0,4961
<i>Bacca</i>	0,2169***	0,0212	0,6319***	0,1582
<i>Hight_S</i>	0,3187***	0,0222	0,9808***	0,0264
<i>Income (log)</i>	0,1464***	0,1122	0,1851***	0,0322
<i>Age (log)</i>	-0,4087***	0,3199	-0,2850***	0,0864
<i>Man</i>	0,0678***	0,0173	0,0057	0,0435
<i>Married</i>	0,0229	0,0184	0,0300	0,0507
<i>Business</i>	0,0372**	0,0180	0,0359**	0,1818
<i>IncomexSec_S</i>			0,0697	0,4499
<i>IncomexBacca</i>			-0,0212	0,0387
<i>IncomexHight_S</i>			-0,0870***	0,3585
<i>AgexSec_S</i>			-0,0308	0,1143
<i>AgexBacca</i>			-0,1591	0,1055
<i>AgexHight_S</i>			-0,2173**	0,1013
<i>ManxSec_S</i>			0,0273	0,0458
<i>ManxBacca</i>			0,1019**	0,0484
<i>ManxHight_S</i>			0,0775	0,0507
<i>MarriedlxSec_S</i>			-0,0776	0,0700
<i>MarriedxBacca</i>			-0,0197	0,0592
<i>MarriedxHight_S</i>			-0,0052	0,0584
Observations	4.300		4.300	
R ²	0,1519		0,1595	

Variables: The educational level variables are dummies that adopt the value 1 for the highest level of education attained. *Ili_or_PS*: Without studies or only primary studies; *Sec_S*: secondary studies; *Bacca*: baccalaureate or second grade professional training, *Hight_S*: university studies (degree, master), *Income (log)*: income level of the family; *Age (log)*: age of the reference person. *Man* = 1, 0 if she is a woman; *Married* = 1 if you are married or have a de facto partner and zero in any other situation or marital status. *Business* = 1 if the family is a business owner and 0 otherwise. The rest of variables include the interaction of the three dummies of educational level (secondary studies, baccalaureate or and higher studies) with the other variables.

E.M., marginal effects (dy / dx)

*, **, *** Significant at 10%, 5% and 1%, respectively

Source: Own elaboration

Models 3 and 4 replicate models 1 and 2, respectively, including, in addition to the previous variables, the variables of banking operations or financial habits, which is why they are estimated for the sample composed of 3,905 individuals. As can be seen in table 2, both in models 3 and 4, the results obtained with respect to the variables of educational level, such as income and demographic, coincide in sign and statistical significance with those commented in models 1 and 2.

With respect to the variables related to the means of payment, all are positive and significant in both models. This indicates that the individuals with whom they use the cards the most, as well as the ATMs, are more likely to use Internet banking. Regarding banking operations, the results indicate that if periodic income is received in the form of bank transfers or direct debits, as well as if payments are made through direct debit, and those that make frequent transfers, they are more likely to use Internet banking. Finally, the results obtained from the interaction between educational level and economic and demographic variables are also maintained in relation to models 1 and 2.

Table 3. Determinants of Internet banking in Spain
V.D.: Internet banking dummy = 1 if use, 0 do not use

Modelo	(3)		(4)	
	<i>E.M.</i>	<i>S.E.</i>	<i>E.M.</i>	<i>S.E.</i>
Ili_or_PS	Referencia		Referencia	
Sec_S	0,0653**	0,0266	-0,2212	0,6547
Bacca	0,1877***	0,0216	0,6841***	0,1482
Hight_S	0,2795***	0,0235	0,9756***	0,9756
Income (log)	0,0927***	0,0117	0,1272***	0,1272
Age (log)	-0,0377***	0,0330	-0,2095**	-0,2095
Man	0,0626**	0,0176	-0,0157	-0,0157
Married	0,0119	0,0187	0,0002	0,0002
Business	0,0568***	0,0183	0,0552***	0,0552
Cards	0,0019***	0,0019	0,0019***	0,0003
ATM	0,0127**	0,0127	0,0110**	0,0053
Bank_Ac_Income	0,1068***	0,1068	0,1076***	0,0385
Payment_Dom	0,2669**	0,2669	0,2317**	0,1145
Transf_bank_emi	0,1344***	0,1344	0,1366***	0,0293
Credit_Line	0,0905***	0,0905	0,0955***	0,0321
IncomexSec_S			0,0824*	0,0483
IncomexBacca			-0,0213	0,0411
IncomexHight_S			-0,0745**	0,0382
AgexSec_S			-0,1338	0,1192
AgexBacca			-0,2346**	0,1114
AgexHight_S			-0,2163**	0,1056
ManxSec_S			0,0501	0,0563
ManxBacca			0,1119**	0,0475
ManxHight_S			0,0893*	0,0511
MarriedlxSec_S			-0,0725	0,0751
MarriedxBacca			0,0439	0,0598
MarriedxHight_S			0,0177	0,0600
N° Observations	3.905		3.905	
R ²	0,1454		0,1526	

Variables: The educational level variables are dummies that adopt the value 1 for the highest level of education attained. *Ili_or_PS*: Without studies or only primary studies; *Sec_S*: secondary studies; *Bacca*: baccalaureate or second grade professional training, *Hight_S*: university studies (degree, master), *Income* (log): income level of the family; *Age* (log): age of the reference person. *Man* = 1, 0 if she is a woman; *Married* = 1 if you are married or have a de facto partner and zero in any other situation or marital status. *Business* = 1 if the family is a business owner and 0 otherwise. *Bank_Ac_Income* = 1 if any member of the family receives regular income in the form of transfers or direct debits and zero if they do not receive any income in this way; *Payment_Dom* = 1 if regular payments are made through direct debit and 0 otherwise, *Fre_Transf_emi* = 1 if transfers are made frequently and 0 if they are carried out sporadically or are not made, *Credit_Line* = 1 if you keep a line or Credit account with a bank 0 otherwise. The rest of variables include the interaction of the

three dummies of educational level (secondary studies, baccalaureate and higher studies) with the other variables.

E.M., marginal effects (dy / dx)

*, **, *** Significant at 10%, 5% and 1%, respectively

Source: Own elaboration

6. DISCUSSION OF RESULTS AND CONCLUSIONS

The results obtained allow us to conclude that the existing relationship between education and the use of Internet banking is positive, so that the higher the educational level, the more likely users will be to use it. This offers support to the arguments presented in relation to hypothesis H1. In addition, they are in line with those obtained by other studies at the international level. Thus, in the case of Italy (Corrocher, 2006), Brazil (Hernández and Mazzon, 2007), Poland (Polasik and Wisniewski, 2009) or Greece (Giordani et al., 2014).

Likewise, the results allow corroborating hypothesis H2a, according to which a positive relationship is established between the level of income and the use of Internet banking. These results coincide with those obtained by Kolodinsky et al., (2004, United States), Akinci et al. (2004, Turkey), Chang (2005), Corrocher (2006, Italy), Hernández and Mazzon (2006, Brazil), Gan et al., 2006, New Zealand), Flavian, et al. (2006, Spanish speakers), Ono and Zavodny (2007), Goldfarb and Prince (2008), Driga (2014 Romania) Giordani et al. (2014, Greece).

However, when analysing the joint effect of the rent with the educational level, the positive relationship is only maintained for individuals with secondary education and ceases to be significant for baccalaureate. However, the most striking is the negative result found when crossing individuals with higher education with the level of income. One possible explanation is that individuals with a high income may have a level of financial investments or information needs about more sophisticated financial products, which justify a personal relationship with the employees of the banking entities, not being sufficient the type of services offered online. The only study that has found a negative relationship between income and Internet banking is that of Santouridis and Kyritsi (2014) referred to Greece, probably due to the fact that a higher amount and more complex of the operations, the people are more comfortable dealing in a face to face context.

Regarding the age and use of Internet banking, the negative relationship confirms a lower propensity to use it by older people, which allows us to corroborate hypothesis H4a. The

results obtained coincide with the studies by Polatoglu and Ekin (2001), Rice and Katz (2003), Akinci et al. (2004), Kolodinsky et al. (2004), Kim et al. (2005), Chang (2005), Flavian et al. (2006), Hernández and Mazzon (2007), McKeown et al. (2007), Goldfarb and Prince (2008), Hanafizadeh et al. (2014) in its study on the adoption of Internet banking worldwide, Giordani et al. (2014), which indicated that younger customers are more likely to adopt Internet banking than older customers. When the interaction between age and educational level is analyzed, the negative relationship is maintained when individuals have a baccalaureate or higher education, not being significant at lower educational levels. Therefore, H4a is accepted, and H4b is partially accepted.

In terms of gender, hypothesis 5a is corroborated, since there is a positive relationship between the fact of being a man and being a user of Internet banking. These results are in line with those found in previous studies such as Bimber (2000), Karjaluoto (2002), Lawson and Todd (2003), Akinci et al. (2004), Kolodinsky et al. (2004), Kim et al. (2005), McKeown et al. (2007), Polasik and Wisniewski (2009). These results have been associated with the lower use of the internet by women. Authors such as Bimber (2000) attribute the lower use of the Internet in the female gender for historical reasons such as the salary gap and the lower level of education. In any case, Lera-López et al (2011) maintain that the differences between genders are gradually being diluted due to the improvement in the generalized level of studies and the greater equality between the sexes.

However, the greater propensity of men over women is altered when individuals have secondary studies, in which case it is women who present the greatest use of Internet banking. In addition, when interacting the educational level with the fact of being a man, the relationship between being a man and being a user of Internet banking is no longer significant, this suggests rejecting the H5b hypothesis. These results do not coincide with previous studies such as that of Hernández and Mazzon (2007) who found that young men with higher education and higher incomes were more inclined to use Internet banking.

Regarding the marital status, the absence of statistical significance of this variable, indicates that we must reject H6 hypothesis, both H6a and H6b. These results coincide with those found by Lee-Kelley et al. (2003). Therefore, they do not support the arguments of Sohail and Shanmugham (2003) which affirm that married clients are more prone to the use of Internet banking since they usually request more complex transactions.

The positive relationship between having a business and the use of Internet banking presumably derives from the need for this group to consult operations at the corporate level and its transfer to the personal sphere. This allows corroborating H3 hypothesis. Likewise, when considering the interaction with the educational level, the relationship remains positive. These results coincide with those obtained by Lawson and Todd (2003) and Giordani et al. (2014) which suggest that the existence of this relationship is due to the time limitations of this group and that they are familiar with these tools to access their banking information.

Regarding the means of payment, a greater use of credit cards is related to a greater use of Internet banking, which allows us to accept H7 hypothesis. This coincides with the results of Gensler et al. (2012) in their study conducted in Europe on the benefits and costs of Internet banking, in which they show that customers who use credit cards or checks use Internet banking more. In the same way, there is also a positive and significant relationship between the use of ATMs and the use of Internet banking, therefore, we reject H8 hypothesis, which suggested otherwise. However, the study by Akinci et al. (2004), indicated that the majority of non-users of Internet banking preferred the use of ATMs.

Finally, we confirm the existence of a positive and significant relationship between the greater frequency of use of banking operations and the greater propensity to use Internet banking, corroborating H9 hypothesis. In this sense, Estrella-Ramón et al. (2016) in the study carried out in Spain on the influence of consumers' offline behaviour on their online behaviour, found a close relationship between the user's offline behaviour with a greater frequency of operations and a faster adoption of Internet banking.

Table 4 presents a synthesis of the results obtained, in relation to each of the hypotheses. According to the conclusions drawn, Spanish financial institutions interested in referring their customers to Internet banking, should target young men with higher education, business owners, who use ATMs and credit cards and are used to selling crossed or the contracting of various banking products. However, individuals with higher education and higher income levels should offer a more personalized service. We consider it interesting for financial institutions to identify the customer segments that may be most beneficial to them, so we hope to be of help to them when prioritizing the collection and management of them.

Table 4. Synthesis of results

Hypothesis	Predicted relationship	Relation obtained	Acceptance or rejection
H1 Individuals with higher education are more likely to use Internet banking than individuals with lower educational levels.	Positive	Positive	H1 is accepted
H2a. Individuals with a higher level of income are more likely to use Internet banking.	Positive	Positive	H2a accepted
H2b. Individuals with a higher level of income and a higher educational level are more likely to use Internet banking.	Positive	Negative in higher education and income. Not significant in the rest	H2b is rejected
H3. Individuals who exercise a business activity as freelancers are more likely to use Internet banking.	Positive	Positive	H3 is accepted
H4a. Younger clients are more likely to use Internet banking.	Negative	Negative	H4a is accepted
H4b Younger and more educated clients are more likely to use Internet banking.	Negative	Negative relationship between age, educational level and use of Internet banking	H4b is accepted
H5a. Men are more likely than women to use Internet banking.	Positive	Positive	H5a is accepted
H5b. Men with higher education are more likely than women to use Internet banking.	Positive	Positiva solo bachiller	H5b is partially accepted
H6a. Married individuals are more likely to use Internet banking.	Positive	Not significant	H6a is rejected
H6b. Married individuals with a higher educational level are more likely to use Internet banking.	Positive	Not significant	H6b is rejected
H7. Greater use of credit cards is associated with greater use of Internet banking.	Positive	Positive	H7 is accepted
H8. Greater use of ATMs reduces the use of Internet banking.	Negative	Positive	H8 is rejected
H9. A greater frequency of banking operations increases the use of Internet banking.	Positive	Positive	H9 is accepted

REFERENCES

AEB Asociación Española de Banca. Statistical yearbook of the Spanish Bank Association (2016).

AEB Asociación Española de Banca. Statistical yearbook of the Spanish Bank Association (2007).

Akinci, S., Aksoy, Ş., y Atilgan, E. (2004). Adoption of internet banking among sophisticated consumer segments in an advanced developing country. *International journal of bank marketing*, 22(3), 212-232.

Aldás-Manzano, J., Lassala-Navarré, C., Ruiz-Mafé, C., y Sanz-Blas, S. (2009). The role of consumer innovativeness and perceived risk in online banking usage. *International Journal of Bank Marketing*, 27(1), 53-75.

Amuedo-Dorantes, C. y Borra, C. (2017). Emerging wealth disparities after the storm: Evidence from Spain. *Review of Economics of the Household*, 1-31.

Bimber, B. (2000). Measuring the gender gap on the Internet. *Social science quarterly*, 868-876.

Boateng, H., Adam, D. R., Okoe, A. F. y Anning-Dorson, T. (2016). Assessing the determinants of internet banking adoption intentions: A social cognitive theory perspective. *Computers in Human Behavior*, 65, 468-478.

Barceló, C. y Villanueva, E. (2016). The response of household wealth to the risk of job loss: Evidence from differences in severance payments. *Labour Economics*, 39, 35-54.

Bover, O. (2015). Measuring expectations from household surveys: new results on subjective probabilities of future house prices. Banco de España, Documentos de trabajo, 1535, 361-405.

Bover, O.; Crespo, L.; Gento, E. y Moreno, I. (2018). The Spanish survey of household finances (EFF): description and methods of the 2014 wave, Banco de España. Documentos ocasionales, 1804.

Chang, Y. T. (2003). Dynamics of banking technology adoption: An application to Internet banking. *Warwick Economic Research Papers*.

Chiou, J. S. y Shen, C. C. (2012). The antecedents of online financial service adoption: the impact of physical banking services on Internet banking acceptance. *Behaviour & Information Technology*, 31(9), 859-871.

- Chong, A.Y.-L. Ooi, K.-B., Lin, B. y Tan, B.-I. (2010). Online banking adoption: An empirical analysis. *International Journal of Bank Marketing*, 28(4), 267-287.
- Citrin, A.V., Sprott, D.E., Silverman, S.N. y Stem, D.E. (2000). Adoption of internet shopping: the role of consumer innovativeness, *Industrial Management & Data Systems*, 100(7), 294-300.
- Corrocher, N. (2006). Internet adoption in Italian banks: An empirical investigation. *Research Policy*, 35(4), 533-544.
- Davis, F. D., Bagozzi, R. P. y Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management science*, 35(8), 982-1003.
- Durkin, M., Jennings, D., Mulholland, G. y Worthington, S. (2008). Key influencers and inhibitors on adoption of the internet for banking. *Journal of Retailing and Consumer Services*, 15(5), 348-357.
- Eriksson, K., Kerem, K. y Nilsson, D. (2005). Customer acceptance of internet banking in Estonia. *International journal of bank marketing*, 23(2), 200-216.
- Estrella-Ramón, A.; Sánchez-Pérez, M. y Swinnen, G. (2016). How customers' offline experience affects the adoption of online banking. *Internet Research*, 26(5), 1072-1092.
- Flavián, C., Guinaliu, M. y Torres, E. (2006). How bricks-and-mortar attributes affect online banking adoption. *International Journal of Bank Marketing*, 24(6), 406-423.
- Gan, C., Clemes, M., Limsombunchai, V. y Weng, A. (2006). A logit analysis of electronic banking in New Zealand. *International Journal of Bank Marketing*, 24(6), 360-383.
- García, C. E. y Romero-Medina, A. (2004). La expansión de la banca online en España. *Revista de economía. Información Comercial Española*, 813, 89-100.
- Gensler, S., Leeflang, P. y Skiera, B. (2012). Impact of online channel use on customer revenues and costs to serve: Considering product portfolios and self-selection. *International Journal of Research in Marketing*, 29(2), 192-201.
- Giordani, G., Floros, C. y Judge, G. (2014). Econometric investigation of internet banking adoption in Greece. *Journal of Economic Studies*, 41(4), 586-600.
- Goldfarb, A. y Prince, J. (2008). Internet adoption and usage patterns are different: Implications for the digital divide. *Information Economics and Policy*, 20(1), 2-15.

- Hanafizadeh, P., Keating, B. W. y Khedmatgozar, H. R. (2014). A systematic review of Internet banking adoption. *Telematics and informatics*, 31(3), 492-510.
- Hernandez, J.M.C. y Mazzon, J.A. (2007). Adoption of internet banking: proposition and implementation of an integrated methodology approach. *International Journal of Bank Marketing*, 25(2),72-88.
- Hernández-Murillo, R., Llobet, G. y Fuentes, R. (2010). Strategic online banking adoption. *Journal of Banking & Finance*, 34(7), 1650-1663.
- Hoehle, H., Scornavacca, E. y Huff, S. (2012). Three decades of research on consumer adoption and utilization of electronic banking channels: A literature analysis. *Decision Support Systems*, 54(1), 122-132.
- INE (2017). Encuesta sobre Equipamiento y Uso de Tecnologías de Información y Comunicación en los hogares 2017.
- Internet World Stats (2017). Usage and Population Statistics. Disponible en: <https://www.internetworldstats.com/stats.htm>
- Karjaluoto, H., Mattila, M. y Pentto, T. (2002). Factors underlying attitude formation towards online banking in Finland. *International journal of bank marketing*, 20(6), 261-272.
- Kim, B.M., Widdows, R. y Yilmazer, T. (2005), The Determinants of Consumers' Adoption of Internet Banking, unpublished paper, Purdue University, West Lafayette, IN.
- Kolodinsky, J. M., Hogarth, J. M. y Hilgert, M. A. (2004). The adoption of electronic banking technologies by US consumers. *International Journal of Bank Marketing*, 22(4), 238-259.
- Lassala N., C. Mafé, C. R. y Blas, S. S. (2010). Implicaciones de la satisfacción, confianza y lealtad en el uso de los servicios bancarios online. Un análisis aplicado al mercado español. *European Journal of Management and Business Economics*, 19(1), 27.
- Lassar, W. M., Manolis, C. y Lassar, S. S. (2005). The relationship between consumer innovativeness, personal characteristics, and online banking adoption. *International Journal of Bank Marketing*, 23(2), 176-199.
- Lawson, R. y Todd, S. (2003). Consumer preferences for payment methods: a segmentation analysis. *International Journal of Bank Marketing*, 21(2), 72-79.

- Lee-Kelley, L., Gilbert, D. y Mannicom, R. (2003). How e-CRM can enhance customer loyalty. *Marketing Intelligence & Planning*, 21(4), 239-248.
- Lera-López, F., Billon, M. y Gil, M. (2011). Determinants of Internet use in Spain. *Economics of Innovation and New Technology*, 20(2), 127-152.
- Mansumittrchai, S. y Chiu, C. (2012). Adoption of internet banking in UAE: Factors underlying adoption characteristics. *International Journal of Management and Marketing Research*, 5(1). 103-115.
- Martins, C., Oliveira, T. y Popovič, A. (2014). Understanding the Internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, 34(1), 1-13.
- Mattila, M., Karjaluo, H. y Pentto, T. (2003). Internet banking adoption among mature customers: early majority or laggards? *Journal of services marketing*, 17(5), 514-528.
- McKeown, L., Noce, A. y Czerny, P. (2007). Factors associated with Internet use: Does rurality matter? Statistics Canada, Agriculture Division.
- Montazemi, A. R. y Qahri-Saremi, H. (2015). Factors affecting adoption of online banking: A meta-analytic structural equation modeling study. *Information & Management*, 52(2), 210-226.
- Ono, H. y Zavodny, M. (2007). Digital inequality: A five country comparison using microdata. *Social Science Research*, 36(3), 1135-1155.
- Pikkarainen, T., Pikkarainen, K., Karjaluo, H. y Pahnla, S. (2004). Consumer acceptance of online banking: an extension of the technology acceptance model. *Internet research*, 14(3), 224-235.
- Pinilla, J., G.; López-Valcárcel, B. y Urbanos-Garrido, R.M. (2017). Estimating direct effects of parental occupation on Spaniards' health by birth cohort. *BMC Public Health*, 17:26.
- Polasik, M. y Piotr Wisniewski, T. (2009). Empirical analysis of internet banking adoption in Poland. *International Journal of bank marketing*, 27(1), 32-52.
- Polatoglu, V.N. y Ekin, S. (2001). An empirical investigation of the Turkish consumers' acceptance of Internet banking services. *International journal of bank marketing*, 19(4), 156-165.

- Rice, R. E. y Katz, J. E. (2003). Comparing internet and mobile phone usage: digital divides of usage, adoption, and dropouts. *Telecommunications Policy*, 27(8-9), 597-623.
- Rogers, E.M. (2003). *Diffusion of Innovations*, 5th ed., Free Press, New York, NY.
- Sánchez-Martínez, M.T.; Sanchez-Campillo, J.; Moreno-Herrero, D. (2016). Mortgage debt and household vulnerability: Evidence from Spain before and during the global financial crisis", *International Journal of Housing Markets and Analysis*, 9(3),400-420.
- Santouridis, I. y Kyritsi, M. (2014). Investigating the determinants of Internet banking adoption in Greece. *Procedia Economics and Finance*, 9, 501-510.
- Sohail, M. S. y Shanmugham, B. (2003). E-banking and customer preferences in Malaysia: An empirical investigation. *Information sciences*, 150(3-4), 207-217.
- Sullivan, R. J. (2000). How has the adoption of Internet banking affected performance and risk in banks? Federal Reserve Bank of Kansas City. *Financial Industry Perspectives*, 1-16.
- Tunay, K. B., Tunay, N. y Akhisar, İ. (2015). Interaction between Internet banking and bank performance: The case of Europe. *Procedia-Social and Behavioral Sciences*, 195, 363-368.
- Vrechopoulos, A. P., Siomkos, G. J. y Doukidis, G. I. (2001). Internet shopping adoption by Greek consumers. *European Journal of Innovation Management*, 4(3), 142-153.
- Wang, Y. S., Wang, Y. M., Lin, H. H. y Tang, T. I. (2003). Determinants of user acceptance of Internet banking: an empirical study. *International journal of service industry management*, 14(5), 501-519.

Tablea A1. Average values (percentages in dummies variables) and correlation matrix

	Online Banking	Sec_S	Bacca	Hight_S	Income	Age	Men	Married	Business	Cards	ATM	Bank_Ac_Income	Payme_dom	Frec_T
Media	62,92	15,22	27,30	43,50	10,60	3,99	64,89	71,68	27,13	14,99	1,38	94,74	99,31	6,27
Online_Bank	1													
Sec_S	-0,142***	1												
Bacca	0,016	-0,230***	1											
Hight_S	0,271***	-0,295***	-0,385***	1										
Income	0,310***	-0,160***	-0,013	0,484***	1									
Age	-0,108***	-0,166***	-0,140***	-0,006	0,040***	1								
Men	0,108***	-0,053***	0,014	0,144***	0,263***	0,074***	1							
Married	0,078***	-0,010	0,027**	0,096***	0,341***	-0,021*	0,302***	1						
Business	0,127***	-0,040***	0,042***	0,173***	0,320***	0,096***	0,061***	0,158***	1					
Cards	0,1861***	-0,096***	-0,0223	0,1578***	0,2769***	-0,056***	0,0671***	0,0893	0,0639***	1				
ATM	0,0845***	-0,0364**	0,0431***	0,0089	0,0901***	-0,091***	0,0249	0,0535***	0,0592***	0,132***	1			
Bank_Ac_Inc.	0,0528***	-0,0590	-0,0590***	0,0594***	0,1022***	0,0674***	0,0195	0,0245***	-0,159***	0,057***	0,0398**	1		
Payment_Dom	0,0724***	-0,0037*	-0,0037	0,0584***	0,1186***	0,0627***	-0,0011	0,0526	0,0307**	0,044***	0,0233	0,0495***	1	
Frec_trans_B	0,1040***	-0,0389**	-0,0329**	0,0880***	0,1088***	-0,0297*	0,0300*	-0,0155***	0,0710***	0,085***	0,0857	-0,0050	0,0088	1
Credit_Line	0,0658***	-0,0282*	0,0082*	0,0199	0,0863***	0,0034	0,0190	0,0185	0,0924***	0,0286*	0,0286**	-0,0153	0,0198	0,0556***

Variables: The educational level variables are dummies that adopt the value 1 for the highest level of education attained. *Ili_or_PS*: Without studies or only primary studies; *Sec_S*: secondary studies; *Bacca*: baccalaureate or second grade professional training, *Hight_S*: university studies (degree, master), *income* (log): income level of the family; *Age* (log): age of the reference person. *Man* = 1, 0 if she is a woman; *Married* = 1 if you are married or have a de facto partner and zero in any other situation or marital status. *Business* = 1 if the family is a business owner and 0 otherwise. *Bank_Ac_Income* = 1 if any member of the family receives regular income in the form of transfers or direct debits and zero if they do not receive any income in this way; *Payment_Dom* = 1 if regular payments are made through direct debit and 0 otherwise, *Fre_Transf_emi* = 1 if transfers are made frequently and 0 if they are carried out sporadically or are not made, *Credit_Line* = 1 if you keep a line or Credit account with a bank 0 otherwise. The rest of variables include the interaction of the three dummies of educational level (secondary studies, baccalaureate and higher studies) with the other variables.

*, **, *** Significant at 10%, 5% and 1%, respectively