UNIVERSITA' DEGLI STUDI DI PADOVA

DIPARTIMENTO DI SCIENZE ECONOMICHE ED AZIENDALI "M. FANNO"

CORSO DI LAUREA MAGISTRALE / SPECIALISTICA IN ECONOMICS AND FINANCE

TESI DI LAUREA

HOME BANKING USAGE IN ITALY DURING THE COVID-19 PANDEMIC

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ANNO ACCADEMICO 2021/2022

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Abstract

The COVID-19 pandemic brought unprecedented changes to everyday life and behavioural trends, one of them being the accelerated adoption of various technologies. The thesis analysis how the imposed measures and fear of contracting the virus affected home banking usage in Italy, a country known for its reluctance to access banking services online in pre-pandemic times. The Bank of Italy Special Survey of Italian Households and The Survey on Household Income and Wealth are used to quantify the increase in home banking usage and investigate the users' socio-demographic and economic features. We find that the pandemic hastened the adoption of home banking; in addition to the increase of the users who naturally adopt technologies through time, part of the population used it for the first time precisely because of pandemic-related reasons. After running probit regressions, consistently with pre-existing literature, we find the digital divide persisted during the pandemic outbreak as higher education and income, as well as younger age, increased home banking usage more than the control group. Meanwhile, being from the South of Italy or the Islands lowered the probability of accessing banking services remotely. In addition, general internet use, owning a credit or debit card, and higher financial knowledge are positive and strong predictors.

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Introduction

Klaus Schwab, the Executive Chairman of the World Economic Forum, while pondering Fourth Industrial Revolution, which should bring swift digital changes, emphasised that it might develop exponentially rather than linearly (Hantrais et al., 2021). The idea, discussed in 2015, now seems almost like a prophecy. Indeed, the COVID-19 pandemic brought unanticipated and revolutionary changes in daily lives around the globe, one of them being the rapid development of technologies, especially related the remote connection possibilities. Forced confinement and the need to respect physical distancing led to the implementation of online learning, increased e-shopping, and e-government services usage. At the same time, over a third of employees working in the E.U. started working from home for the first time in 2020 (Sostero et al., 2020).

Nonetheless, there is a consensus of existing literature that it also deepened the already pre-existing trend of the digital divide. The population living in rural areas struggled with the quality of internet connection since the data traffic increased substantially during the pandemic. Older adults, lacking digital skills, scuffled trying to navigate often overwhelming remote services' web pages. People in lower income deciles suffered from not being able to afford devices facilitating the connection to the internet (BEREC). Employees with university degrees or living in the cities were much more likely to work from home. More than 50% of individuals working in I.T., communication or energy supply sectors enjoyed the benefits of remote work, while those in blue-collar occupations did not have this possibility (Sostero et al., 2020). Finally, given their specialised fields of work, women have found it more challenging to take advantage of remote employment options (Coury et al., 2020).

This research aims to analyse one niche of increased use of remote technologies after the pandemic outbreak: home banking. It is of particular importance as refusal to use it could have led to financial exclusion and increased risk of contracting the virus. Most banks closed and shortened their brick-and-mortar branches' working hours, while the concern diffused in society that physical money banknotes could carry the COVID-19 pathogen (Benni, 2021). We will analyse the situation in Italy, a nation which was especially reluctant to use home banking services before the pandemic. The country is a peculiar example; it is a high-income economy where most of the population is banked and has an internet connection, hence has the necessary conditions to remote-access

banking services. At the same time, it also becomes a perfect objective as home banking usage has a huge prospect for improvement, differently than in, for example, Nordic countries.

Home banking use during the COVID-19 pandemic has yet to be widely researched. Orkun et al. (2021) pioneering work concentrated on remote banking services used during the previous epidemics in 2011-2017. They found that exposure to an epidemic increases the probability of conducting an online or mobile banking transaction by 10.6 percentage points. Fu et al. (2020) studied COVID-19 and fintech adoption focusing on the main factors which lead to the download of finance-related apps. However, most of the research concentrates on the banking industry. For example, Core et al. (2021), Erel et al. (2020), and Kwan et al. (2021) studied the connection between the I.T. capabilities of banks and loan origination during the pandemic.

The thesis contributes to the existing literature in two ways. First, we want to know if and how much home banking increased during the pandemic in Italy. It is crucial to know how much the possibility to carry services online helped the population, where the technology adoption issue is salient, to continue their financial activities. Second, we will analyse the digital divide issue, which was mostly neglected in home banking problematic during the pandemic. Namely, which segments of society used it the most and which were lagging behind. The central hypothesis is that it should have increased because of lockdowns, imposed physical distancing rules and fear of contracting the virus. Meanwhile, the digital divide should follow a similar pattern as during the pre-pandemic times: older, lower income and education, jobless or lower digital and financial skills individuals most likely be the ones who used remote banking services the least.

After a detailed literature review, we use two surveys for the empirical analysis conducted by the Bank of Italy: the fifth way of The Special Survey of Italian Households (SSIH) and The Survey on Household Income and Wealth of 2020 (SHIW). Both surveys cover 2020, the first year of the pandemic, while the former also covers the beginning of 2021. After exploring raw data, we run binary probit regression, with the dependent variable being home banking usage. We include main socio-economic and demographic variables, like age, education, income, macro-region, or employment status. For SHIW, we explore additional payment instrument variables, like the household's ownership of a debit or credit card, the average amount of cash spent in the month and the number of cash withdrawal points in the area. Furthermore, we include constructed financial literacy and internet usage variable, the latter serving as the proxy for digital skills. For

comparability, we run probit regressions for the later SHIW waves of 2014 and 2016 to see if the digital divide existing before the pandemic also persisted during the outbreak and to explore the home banking adoption evolution. We also use Eurostat data to see the Italian situation in the European context.

The terms home banking, online banking, e-banking, electronic banking, digital banking, or online banking are used interchangeably throughout the research. It refers to the service allowing accessing banks or financial institutions through digital technology using an internet connection. Meanwhile, mobile banking can be perceived as the extension of online banking, using specifically phone or smartphone (Mosteanu et al., 2020). In general, all the previous notions encompass mobile banking. Nevertheless, if the mobile banking notion is used exclusively, it will refer specifically to the services conducted via phone.

The thesis is organised as follows. Section 1 reviews the literature, which will be divided into four parts. First, it is crucial to understand the benefits or impact technologies have on financial behaviour or the financial system in general. Second, we address the digital divide issue. Even though home banking has many advantages, like 24-hour service or lower fees, its usage requires having an internet connection and digital skills. The last two parts are explicitly dedicated to online banking adoption. The COVID-19 pandemic had a significant impact on daily life. However, the ongoing trends before it still impacted home banking adoption and usage during the pandemic.

For this reason, the literature review covering home banking is divided into two sections analysing the situation before and during the pandemic. It aims to explore what research was done, what methods were used and the main results. In addition, it is essential to understand the overall picture of online banking adoption. The review will cover the research on various countries but focus on Italy, trying to see it in the world or European context for comparability. Section 2, covering the empirical part, is divided into two subsections dedicated to the SSIH and SHIW, respectively.

1. Literature review

1.1. Digital technologies impact on financial behaviour

Part of the research analysing financial technology advancements concentrates on developing nations. It is a perfect way to see and measure how high-speed internet or credit cards, the tools that have been available for developed nations for a long time, can impact people's financial decisions or the economy in general. For example, D'Andrea et al. (2019) employ the difference-in-difference method to measure the effect of fibre-optic submarine cable arrival using data from banks in 52 African countries in 2000-2013. The submarine cables positively affected high-speed internet promotion and implementation. The main presumption of innovative financial technologies' arrival, in this case, high-speed internet, is that it can lower transaction costs on the interbank market and, in turn, generate market integration improving risk sharing or reducing liquidity risk. Indeed, they found out that the submarine cable arrival increased private sector lending by 15.7%, liquidity hoarding decreased by 9.6%, and interbank assets and liabilities grew by 20.2%.

Lee et al. (2021) studied the introduction of mobile banking in Bangladesh. Because of rapid urbanisation, many people in developing nations started migrating to the cities, leaving their relatives in poorer rural areas for whom remittances play a vital role in life. The authors randomly assigned a treatment group which got training on mobile financial services. Mobile banking usage is a peculiarity in developing nations as part of the population is unbanked. Traditional banks usually fail to penetrate the markets due to relatively high brick-and-mortar costs, especially in rural areas. Mobile money offers many traditional services, including deposits, transfers, or withdrawals of funds. The intervention, which cost less than $12 per family, led to great results: at the end of the study, 70% of the rural treatment groups were actively using their mobile banking account compared to 22% of the control group; urban-to-rural remittances increased by 30%, rural consumption increased by 7.5%, and extreme poverty fell.

Mobile money advantages were also tested in Niger by Aker et al. (2016). Many countries use cash transfers as a component of various social protection policies. Developed nations usually implement it via bank transfers or prepaid cards. However, it is not the case in developing nations, and governments resort to distributing money physically. Naturally, this method is neither cost-

saving nor transparent. Mobile money introduction was tested in 96 villages using randomised experiments. The treatment group received unconditional money transfers via an electronic channel, while the control group got it in physically distributed envelopes. The program was initiated responding to the devastating drought, with women being the primary beneficiaries. The experiment brought interesting results: participants receiving mobile transfers started buying more diverse types of goods, especially protein-rich food; hence their diet improved. The results can be explained partly by the fact that the transfers were not observable by other household members; ergo, women concealing the transfer were more likely to visit weekly markets and spend more money on higher-quality food for children. Mobile money transfers increased women's bargaining power and were time saving as the participants did not have to travel to get their payments physically.

Bachas et al. (2018) studied the rollout of debit cards to urban beneficiaries living in Mexico. The aim of the study was to capture the reduction of indirect transaction costs, namely reduced travel distance and foregone activities. Prior to receiving debit cards, the beneficiaries received their money transfers into saving accounts which were managed by the bank BANSEFI and could have been accessed only at that particular bank branch. The introduced cards were tied to their existing accounts and allowed them to withdraw money using any bank's ATM. Introducing debit cards reduced the median road distance to access the account by 3.5 kilometres. For this reason, the proportion of beneficiaries who walked to withdraw their transfers increased by 59%. This, in turn, saved some time: before receiving the card, 84% of beneficiaries had to forgo various activities like housework or childcare, and only 25% after receiving the card. Even more, most of the participants also became more active in their financial activity: they checked their balances more often, and the number of withdrawals and savings balances increased.

Naturally, the research analysing developed or high-income economies concentrate on different aspects and technologies as most of the population is banked, has debit or credit cards as well as is more likely to have access to the internet or computer. One of the biggest innovators in finance is the fintech industry, which is increasingly applying artificial intelligence (AI), which improves financial inclusion by overcoming the problem of asymmetric information. AI can gather large amounts of data using online shopping platforms or social networks, improving access to credit for vulnerable segments like minority groups or owners of small businesses. Digital technologies

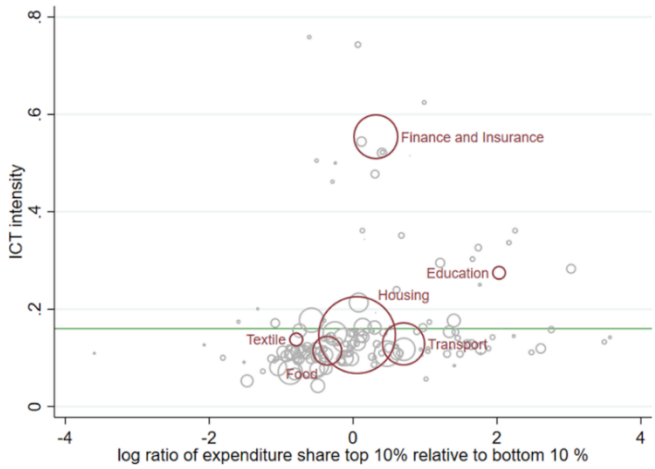
using AI can utilise credit score mechanisms to create collateral-free loan products. In addition, banks successfully adopt AI to increase customer support efficiency, like offering electronic virtual assistants (Mhlanga, 2020).

One of the most interesting studies on Italy and analysing digital technology's impact on financial behaviour was done by Viviano et al. (2021). The study examined the relationship between internet banking adoption and participation in financial markets. The study exploited two data sets, namely SHIW, spanning between 2012-2016 and bank data from Supervisory Reports (SR) by the Bank of Italy. The research presumes that households using internet banking should access their banking account more easily and change the composition of their investment over time. They find that households that start using online banking indeed also begin to hold at least one financial asset different than a simple bank deposit, and the effect is quite significant; the chances increase by 89 percentage points. On top of that, the adoption of home banking also increases financial literacy scores. Navigating internet banking essentially allows easier access to information and raises awareness about financial opportunities and concepts. More importantly, the heterogeneity in households' income, financial assets and wealth showed that the effects of home banking adoption were higher for the households with fewer financial resources meaning that the reduction in participation costs might contribute to the choice of participating in the financial market. Similarly, the households living in small cities or towns with less than two banks were also the ones that benefited the most from using home banking as lower costs of accessing banking services, or transaction costs were more important to the segments of the population that have limited access to the bank branches.

Nonetheless, the advantages of digital technologies must be examined with a grain of salt. Arvai et al. (2022) argue that digitalisation can actually increase economic inequality. Besides the argument that it increases income inequality when low-skill workers lose routine jobs because of technological advancements, it also affects consumption. They find that the richer the household, the higher the information and communications technologies (ICT) intensity of their consumption basket in the US, and as digitalisation makes most of the services or goods cheaper, they benefit more compared to the household of lower income deciles. For example, richer households spend more on finance and insurance, a highly ICT-intensive industry. Meanwhile, the services that are important for poorer families are food or textiles having relatively low ICT intensities. The

difference is significant: around 22.5% of the increase in consumption inequality between rich and poor households is due to the decrease in the prices of ICT-intensive goods.

1. ICT intensity by category and importance for income groups



Source: Arvai and Mann (2021)

Digital technologies bring many advantages. Mobile banking helps distribute cash transfers for socially vulnerable groups; debit cards reduce indirect costs like travel distance and foregone activities; high-speed internet lowers transaction costs in the interbank market and improves risk sharing; AI improves financial inclusion and allows the creation of collateral-free loans, home banking increases participation in financial markets and financial literacy scores. Online banking has another clear advantage which is the scope of this research: it allows accessing financial services in times of pandemics when physically going to the bank branches can cause the contraction of the virus. It is important to remember that digital technologies can also increase economic inequality as richer households consume more ICT-intensive goods, which prices tend to decrease. Even more, the consumption and usage of digital technologies are affected by the population's access to the internet or their abilities to navigate those technologies, which leads to the issue of the digital divide.

1.2. Digital divide

The term "digital divide" is a broad concept usually referring to "different levels of access and use of ICTs and, more specifically, to the gaps in access and use of Internet-based digital services".

Moreover, it can be observed between various groups, including individuals, households, geographic areas, or different socio-economic levels. (OECD, 2021). The concept of the digital divide can be analysed from various aspects. In the simplest terms, we can distinguish two groups of people: those who can access the Internet and those who cannot. However, this distinction has started losing its relevance recently. Six hundred million people were not covered by mobile Internet in 2019, representing 7% of the global population. Even though it is still a problem in developing regions, it is much less so in Europe (BEREC, 2021).

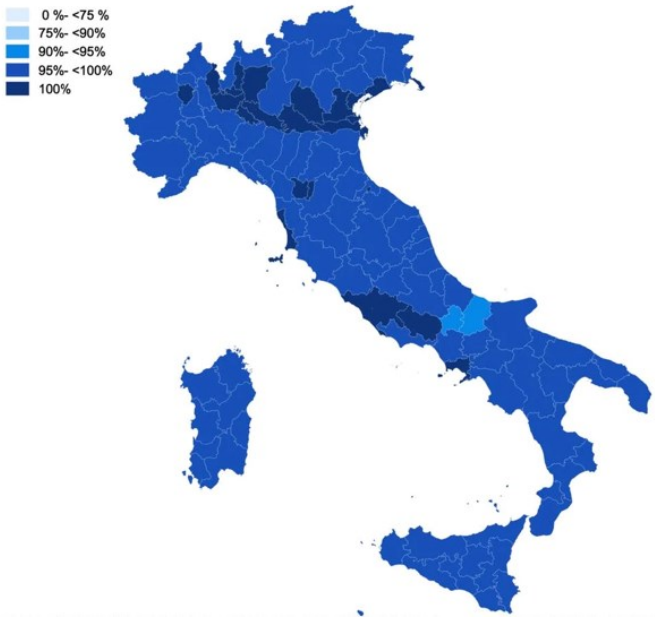
Access to the Internet becomes a crucial issue during epidemics or pandemics. For example, Chiou et al. (2020) showed that in the regions with greater internet penetration and high-income levels, people were less likely to leave the house during the first COVID-19 lockdown in the US. Meanwhile, Orkun et al. (2021) highlight the importance of the role of the internet infrastructure during the various epidemics in relation to online banking matching 1km-by-1km time-varying data on global 3G internet coverage. They found that individuals with better ex-ante internet coverage were more likely to shift towards internet banking. In addition, they failed to find any consistent effect for 2G, which is the system allowing only phone calls or sending text messages when it is included side by side with the 3G measure. We must also bear in mind that data traffic grew even more during the COVID-19 pandemic. Smart working and studying at home require using e-learning platforms, videoconference applications, or streaming services almost constantly and often simultaneously by the whole family (BEREC, 2021).

In general, Europe is estimated to have the highest coverage rate of at least a 4G network worldwide, covering 99,8% of the population in 2021. At least one broadband network has been available to all households in the European Union since 2013, while a fixed, very high-capacity network (VHCN) was available to 70% of EU households in 2021. Italy ranked 7th regarding connectivity in the EU, after Denmark, the Netherlands, Estonia, Germany, France, and Ireland. Italy had a breakthrough in 5G coverage which went from 8% in 2020 to 99.7% in the populated areas in 2021. For comparison, the EU average is 66%. The country also reached High Fast Broadband coverage of 97% (EU average 90%) even though the share of households having fixed Very High-Capacity Network were lower than the EU average, 44% compared to 70%. The broadband price index (the measure of prices of fixed, mobile, and converged broadband offers)

was 3 points higher than the EU average, 76 points compared to 73 (higher the score, lower the price), making Italy 12th in the list (DESI, 2022).

Nevertheless, even though Italy seems to have a pretty good internet coverage rate and prices that are not that high compared to other EU countries, there are two issues that should address. First, as in other European countries, the coverage rate in rural areas is lower. Second, the broadband subscription rate is low: only around 65% of households have a fixed broadband subscription making Italy one of the last compared to other European countries. One of the explanations could be a high fixed-mobile substitution. This is the case of Finland which has the lowest fixed broadband subscription rate in the EU, but its mobile broadband penetration rate is around 95%. In Italy, 80% of the individuals have mobile broadband subscriptions making Italy only score higher than Bulgaria and Greece. However, it should be interpreted carefully: even though it is low in the European context, it is not a particularly bad result, meaning that most of the population has access to internet services either via fixed broadband or via using mobile phone network (DESI, 2022). Indeed, 85% of the population had access to the Internet prior to the pandemic in 2019 (Lukovic, 2021), while based on Eurostat data it reached 90% in 2021.

2. Overall fixed broadband coverage in Italy (2020)



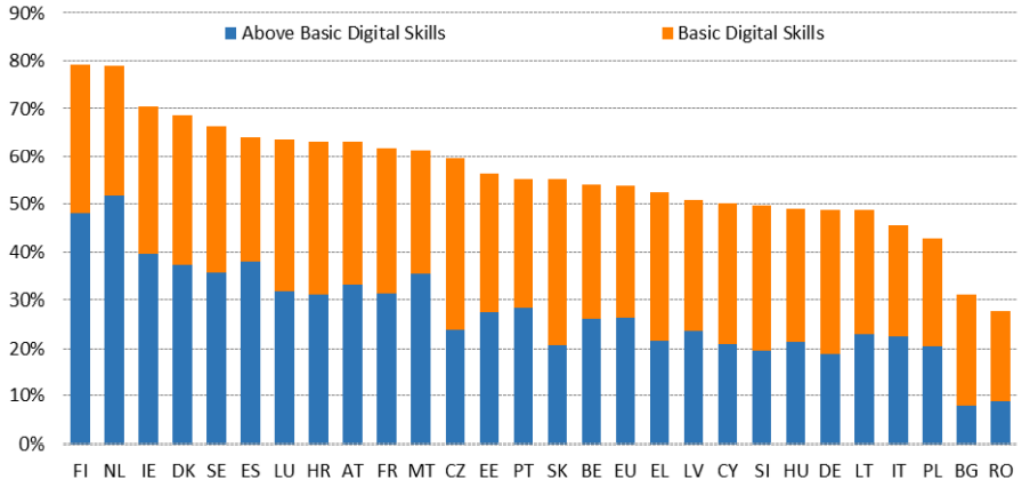
Source: Mapping Broadband Coverage in Italy, https://www.point-topic.com

As noted by Akhter (2015), simple accessibility to the internet connection is no longer a problem in developed nations. It is clearly visible in the Italian context: even though there are some issues

regarding subscription rates or Very High-Capacity Network coverage, it is not likely that it would have a definitive effect on home banking usage. Recently the research was focused more on the second type of digital divide, sometimes called digital inequality, as it parallels other social inequalities. It encompasses differences and divides between age, gender, income, or education with respect to the lack of skills and low use of digital technologies (BEREC, 2021). Generally, home banking usage could be perceived as one of the derivatives of this kind of digital divide as the adoption of it highly depends on the internet and digital skills, which are, in turn, affected by social inequalities. As we dedicate a separate section to online banking and its adoption by various groups, there is no point in discussing it now. Nonetheless, it is essential to observe Italy's general level of digital skills.

The European Commission has measured nations' digital skills since 2015 using the composite Digital Skills Indicator or DSI. It measures information and data literacy, communication, collaboration, problem-solving, safety, and digital content creation. The differences between European Union countries stand in stark. As seen in the table, Finland and the Netherlands scored the highest, as more than 70% of their population can be defined as having basic or above basic digital skills. Ireland, Denmark, Sweden, and Estonia have also shown promising results. Eight countries have not reached even 50%, with Romania, Bulgaria, Poland, Italy, and Lithuania ranking the lowest. (DESI, 2022). This issue could contribute to the already mentioned fact of Italy's low fixed broadband subscription rate. It might be that if part of the population has poor digital skills, high-speed internet is simply not needed even though available.

3. Basic and above basic digital skills (2021)



Source: Eurostat, Community survey on ICT usage in Households and by Individuals

46% of Italians possess at least basic digital skills, the EU average being 54%. The gap shrinks slightly when the above basic digital skills are compared, 23% in Italy and 26% in the EU in 2021 (DESI, 2022). There are also pretty high differences between possessing digital skills in the European context. In general, 4% more men possess at least basic digital skills than women in the EU. As expected, there are also differences between age groups: on average, 70% of individuals have at least basic skills in the age group of 16-34 but only 25% in the age group of 65-74 (DESI, 2022). Younger generations are usually described as "digital natives" as they grew up using ICT technologies and probably do not even imagine their life without them. So, they are naturally expected to have higher capabilities using the Internet or digital devices (Jiang et al., 2020). Apparently, it is not quite right. In 2018 46.561 students' abilities to use computers were tested, including collecting, managing, or exchanging information. All the students were 8th graders from 2226 schools and 12 countries[1]. 8% of the students failed to reach even the lowest level of the test scale, while 25% achieved the lowest level and only 2 % the highest. Indeed, it does not seem that growing with digital technologies naturally makes younger generations digitally savvy (Fraillon et al., 2018).

By the same token, only 32% of individuals having no or low formal education achieve at least basic digital skills; there is also a clear urban-rural divide as 15% more people gain the threshold skills in predominately urban areas compared to rural ones. 77% of students, 62% of people in the active labour force, and 49% of unemployed individuals could achieve the previously mentioned skills in EU (DESI, 2022). Lately, a new path of research has emerged, concentrating on the third and, so far, the last type of digital divide, which is salient in societies with almost universal internet access. The primary presumption of this kind of divide is that individuals possessing similar digital skills and internet access might not obtain the same objectives. An example could be that some can gain a better job by searching for it on the Internet and, in turn, increase their wage. Clearly, it is closely related to the second digital divide and parallels it with socio-economic inequalities (Deursen, 2015). In the case of online banking, people with similar digital skills and internet access probably would achieve different results because of their internet usage intensity, prior education, or income level.

[1] Chile, Denmark, Italy, Finland, France, Germany, South Korea, Kazakhstan, Luxembourg, Portugal, The United States, Uruguay

Oggero et al. (2019) touched third digital divide problem by analysing poor digital skills and low financial literacy in the Italian context, trying to find what kind of impact they have on becoming an entrepreneur. Using the SHIW dataset of 2008 and 2010, they found that financial literacy is associated with a 3% higher probability of becoming an entrepreneur. Digital skills increased the probability of becoming an entrepreneur by 5%, considering the broader definition of it: a person who not only owns or runs the family business but who also is a business partner or self-employed craftsman. However, there were notable differences between women and men. First, financial literacy skills positively impacted becoming an entrepreneur only for men, being not statistically significant for women. Second, digital skills had a 5% higher positive effect on men than women. These results show that similar digital skills do not lead to the same results for females because of other external factors, one of them possibly being social norms. Interestingly, in this research digital skills variable was constructed as a dummy representing computer usage to access banks or other financial intermediaries, meaning that it might be a good instrument to measure general digital skills employed.

Undoubtedly, the digital divide and internet banking are closely interconnected, but looking at it in the Italian context is essential. There is a general consensus that internet accessibility or speed in developed, high-income economies is no longer the main issue. Italy is an example of it having one of the highest internet coverages in Europe and lower than the average price index. Low digital or internet skills seem to be the main problem, as Italy appears to be one of the last ones in Europe. More importantly, the diffusion of digital skills is not equal for women, older individuals, those who are not employed, have lower education or live in rural areas; these individuals usually do not possess sufficient skills to navigate the Internet, let alone to use online banking. Higher online skills most definitely will have a positive impact on home banking usage, but it is not necessarily sufficient for its adoption. For this reason, it is important to analyse that are the main drivers or by which population segments online banking specifically is adopted.

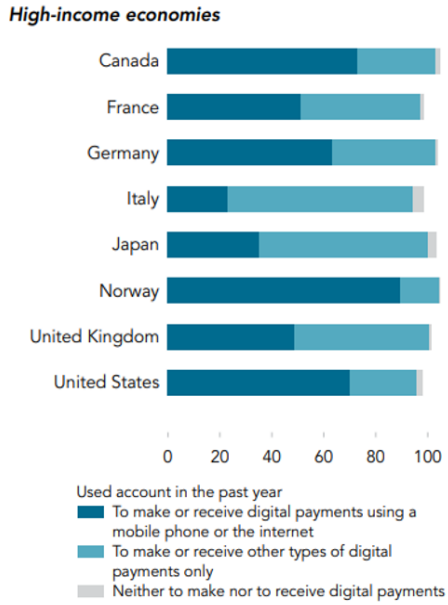
1.3. Home banking adoption before the COVID-19 pandemic

The first question that naturally arises when discussing home banking adoption is general bank account ownership. The relationship is straightforward; one must have a bank account to access internet banking. Nevertheless, simply owning a bank account does not necessarily lead to using

financial services, let alone home banking. Dupas et al. (2018) conducted an experimental study in Chile, Malawi, and Uganda. They found that giving a free bank account to previously unbanked people did not impact savings decisions. On the other hand, Agarwal et al. (2017) analysed the financial inclusion program in India, which fostered an increase in the new bank accounts for the unbanked part of the population in 2014-2016. They show that savings and transactions go up over time even though, in the beginning, the usage was relatively passive, which is consistent with the fact that it takes time to learn how to use banking services.

However, developed economies like Italy usually have near-universal account ownership; since 2011, average ownership in advanced economies has increased by 8% and reached 96% in 2021. Meanwhile, Italy saw an overall increase of 26% in the last ten years, from 71% to 97%. (Demirguc-Kunt et al., 2022). More importantly, countries with similar bank account ownership do not use online services at the same rate. Well before COVID-19, in 2017, Demirguc-Kunt et al. (2018) reported that in high-income economies, 51% of adults or 55% of accounts owners made at least one financial transaction in the last year using either the internet or mobile phone. And while in Norway it reached as high as 85%, it was only 22% in Italy. Notably, general digital payment usage, including debit or credit cards, was almost universal in both countries.

4. Share of adults a making transactions from their account using mobile phone or the internet in 2017



Source: Demirguc-Kunt et al. (2018), Findex

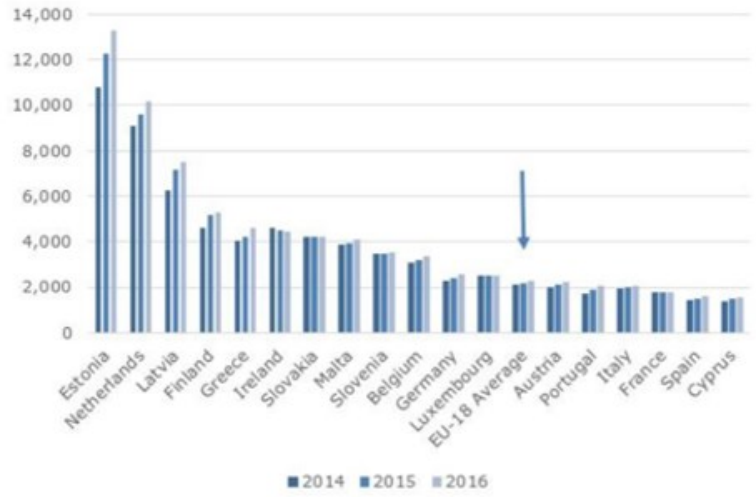
Home banking usage can also be analysed from the bank's perspective. The relationship between internet banking and bank branches is fundamentally different from, for example, online shopping. Internet banking generally does not require shipping or delivery. So, it is not limited to some geographical regions, which means that the possibility for market expansion in the banking industry might be larger. On top of that, banks can save quite a lot for rent after introducing remote working or reducing the number of employees after implementation of technological advancements. Indeed, Stefanovic et al. (2021) studied 25 commercial banks in Serbia and showed a direct relationship between intangible investments (software, licenses linked to digitalisation and IT) and achieved financial results.

The trend of closing brick-and-mortar branches in Europe was observed even before the pandemic; from 2007 to 2015, the number of physical branches declined by 16%. In addition, traditional banks started cooperating with Fintech or heavily investing in technological development. Nevertheless, the trend also had a negative effect as banking became more centralised. Many bank branches in smaller villages were closed, leaving many people without an option to go to the bank physically (Suter et al., 2019). The branch closing, in fact, can be quite problematic. Nguyen (2019) showed that banks' branch closing has a negative and sharp decline in credit supply to local small businesses. Even more, the loan origination decline remained for 6 years and was very localised, especially in low-income or high-minority neighbourhoods in the US. In addition, Kim (2021) examined the relationship of internet banking on market structure and consumers' welfare in the US. The results showed that consumers could gain because of bank branches closing, but only then the internet penetration is higher than 80%.

Italy has one of the lowest population sizes per local bank branch in Europe. For comparison, in the Netherlands, around 10.000 inhabitants shared one bank branch in 2016, while in Italy, only approximately 2000. Trend of closing bank branches was also not very pronounced here as the population per bank branch increased only by 88 inhabitants from 2014 to 2016 (Suter et al., 2019). It clearly reflects Italians' reluctancy adopt online banking, especially coupled with the rate of internet banking penetration; according to Eurostat, online banking services were accessed only by 36% of Italians in 2019, while the EU average was 55% (Filotto et al., 2021). It is important to note that all surveyed Italian banks in the 2019 Regional Bank Lending Survey had online

platforms and allowed their clients to access banking services using the Internet or mobile apps, so it is not likely that the main issue is the supply side (Viviano et al., 2021).

5. Population size per local bank branch in the Eurozone countries



Source: Statista

Most research on online banking adoption concentrates on the differences in adoption rates among various demographic or socio-economic groups. It considers gender, education, age, income level and sometimes psychological factors. For example, Chen et al. (2021) analysed the fintech gender gap and used data from 27.000 adults from 28 countries to investigate the adoption of new financial technology between men and women. They find that, on average, 29% of men reported using fintech entrants in the last six months compared to 21% of women. The difference was still present after controlling for other socio-economic factors and proxy for financial literacy. Interestingly, even though the divergence was reduced by 5.2 percentage points controlling for country-fixed effects, it was still statistically significant. These results must be interpreted cautiously as fintech and online banking products are not necessarily similar. In general, fintech products are innovative, technology-wise advanced and might look very unfamiliar to the users. Indeed, the mentioned gender gap becomes 50% smaller, considering fintech products that complement traditional banking services.

Jimenez et al. (2019) studied internet banking adoption in Spain using the Financial Survey of Families conducted by the Bank of Spain covering the years 2002-2014. The sample comprised 6120 families, of which 4316 answered the module related to internet banking. For the econometric

analysis probit model was used. They also found out that men seem keener to use internet banking. However, the relationship is altered when interaction term between gender and education is included, as men only showed a significant difference in home banking usage while having a higher level of schooling. Meanwhile, income and education itself positively affected internet banking adoption while age, as expected, negatively. Even though authors hypothesised that marital status might affect online banking usage as married clients tend to request more complex transactions, they did not find any statistically significant result. On top of that, individuals who used credit cards the most, used ATMs more often or received their periodic income in the form of bank transfers were more likely to use home banking.

Garín-Muñoz et al. (2017) also studied e-banking adoption in Spain, comparing it with e-commerce and e-government usage. They used the data from the Survey of Equipment and Use of Information and Communication Technologies consisting of 16.290 individuals in 2016 and a generalised framework following the standard utility maximisation approach. The probability of the usage was modelled using a logistic function. They found that being a male increases the odds of adopting e-banking services and having higher education. Interestingly, individuals belonging to the age group of 55-64 had the largest probability of adopting e-banking services, while for e-commerce, it was 35-44. The odds of adopting e-banking were 2.53 higher also for the respondents with a monthly net income above 3000 euros compared to the ones who earned less than 900 euros. The individuals with very high computer and internet skills were 3.31 and 26.52 times more likely to adopt online banking services, respectively, compared to those with low skills. Internet skills were much more important in adopting e-banking than other online services.

One of the most common models used to study internet banking is TAM (Technology Acceptance Model) or its variations. TAM was initially designed to predict general technology acceptance and is based on two cornerstone determinants: perceived usefulness and perceived ease of using the technology. Perceived usefulness can be described as “the degree to which a person believes that using a particular system would enhance the performance”, and perceived ease as “the degree to which a person believes that using a particular system would be free of effort” (Jiang et al., 2020). Different research papers alter the model, usually adding other determinants. For example, Martins et al. (2014) used a more comprehensive model of the Unified Theory of Acceptance and Use of Technology (UTAUT), which included determinants like performance expectancy, effort

expectancy, social influence, facilitating conditions and performance, financial, time, privacy, social as well as psychological risk. These types of studies usually have the advantage of creating questionnaires specifically designed to grasp users' perceptions and motivations to use e-banking. The respondents must answer questions regarding their opinions about various online banking services, measured on the Likert scale.

Nevertheless, the research that uses these models quite often has sampling problems. An already mentioned article by Martins et al. (2014) found that performance expectancy, effort expectancy and social influence (opinions of user's friends or relatives) coupled with perceived risk could explain 81% of usage behaviour variance. Performance (the possibility that results fail to deliver the desired benefits), financial (the potential monetary loss), time (loss of time by making poor purchasing decisions) and privacy (potential loss of control over personal information) risks were the most salient concerns regarding perceived risk. However, the sample mainly consisted of university students and ex-students who were contacted by email, so the respondents were young and highly educated, also clearly using internet technologies as they were contacted by email, so the results probably do not represent the population average very well. Lu et al. (2011) studied factors affecting the transition from offline to online channels through the lenses of internet banking, considering perceived risk and perceived framework in China. The sample had the same issue as it consisted of 217 university students.

Jiang et al. (2020) research concentrated on generational cohort comparison, arguing that banks should benefit from bringing older (over 65 years old) consumers online. It would reduce costs associated with brick-an-mortal branches, generate greater profits as older adults usually have accumulated more wealth, and facilitate a credible form of communication about their banking experiences since older generations are more likely to share their experiences with others. Three generations were compared: Millennials (1977-1992), Baby Boomers (1946-1954) and Silent (born 1945 or earlier). They found that trust was a positive predictor of online banking for older generations but not Millennials. Younger cohorts probably already have a higher level of trust in ICT technologies as they grew up with them. In addition, the perceived benefit was a positive predictor only for Millennials and Baby Boomers. It seems that the Silent generation simply does not understand how they could benefit from using e-banking. It shows how it is important to consider different age groups as their motivation to adopt home banking can vastly differ.

Picoto et al. (2021) choose a very interesting approach to analyse mobile banking adoption, introducing cultural dimensions. The authors defined culture following Hofstede's typology of cultural dimensions, which include power distance, uncertainty avoidance, individualism-collectivism, masculinity-femininity, and long-term orientation. Four countries were analysed: the United Kingdom, India, Brazil, and the US. Naturally, the countries showed different cultural characteristics. For example, the US scored very high on individualism and masculinity, meaning that the society is more materialistic and values achievements. The authors found that societies with low uncertainty avoidance, high long-term orientation and power distance have the highest level of mobile banking usage. Low uncertainty avoidance means that society does not feel uncomfortable with novel or unknown situations which foster new technology adoption. In societies with a long-term orientation, individuals accept and engage in societal advantages, like a technology advancement. Power distance means that people have more respect for the fact that power is distributed unequally and thus have more respect for authority. It might be that societies like this are more influenced by technology usage propagation by the state or their employees.

One of the most comprehensive articles so far on online banking adoption in Italy was written by Filotto et al. (2021). The research was divided into two parts consisting of qualitative interviews with the focus groups with an emphasis on the second quantitative stage, which consisted of 688 interviews representing the banked Italian population. The respondents were divided into three groups: those who did not adopt e-banking, those who used it occasionally, and those who only operated through direct (online) banking as opposed to traditional banking. Respondents to the questionnaire in the first two groups were predominately male, which signals that the gender difference in banking activities is still a strong characteristic in Italian society. Non-adopters were also more mature in terms of age and had a lower percentage of university graduates. One of the most important findings is that clients belonging to different groups should not be approached in the same manner. User-friendliness and security are the main determinants for the initial acceptance to use online banking and account for 47.75% of the variance. On the other hand, an economic advantage is more important when switching from the early adoption phase to the retention phase (from the second to the third group). Meanwhile, structural assurance mechanisms like clear security policies or guarantees are important in keeping customers loyal to the electronic channel.

The review of home banking adoption before COVID-19 allows drawing a general picture of the situation. Italians seem to be reluctant to adopt internet banking even though the majority of the population is banked, has bank accounts, and, as mentioned in the section analysing the digital divide, generally has access to the internet. Even though all the Italian banks offer online services, Italy still has one of the lowest population sizes per local bank branch in Europe, and the situation does not seem to change fast. The pre-covid situation can affect internet banking adoption during the pandemic in two ways. Logically countries like, for example, Norway should not see a steep increase in home banking usage as most of the population was already using online services before. Nonetheless, it is not the case in Italy, and e-banking usage might grow abruptly. On the other hand, it might be that reluctance will persist.

It can also be expected that the population segments that will be more likely to use home banking services during the pandemic will follow a similar pattern as before. Based on previous research usually, younger, better-educated, higher-income earners use online banking. Probably there also will be differences between women and men. At this point, we can also draw a parallel with the observation of Arvai et al. (2022) about consumption inequality and ICT. One of the most common findings about home banking usage is that people of higher income deciles use it more, meaning that poorer households still go to the branches and thus pay more for the services conducted physically, which increases income dispersion even more.

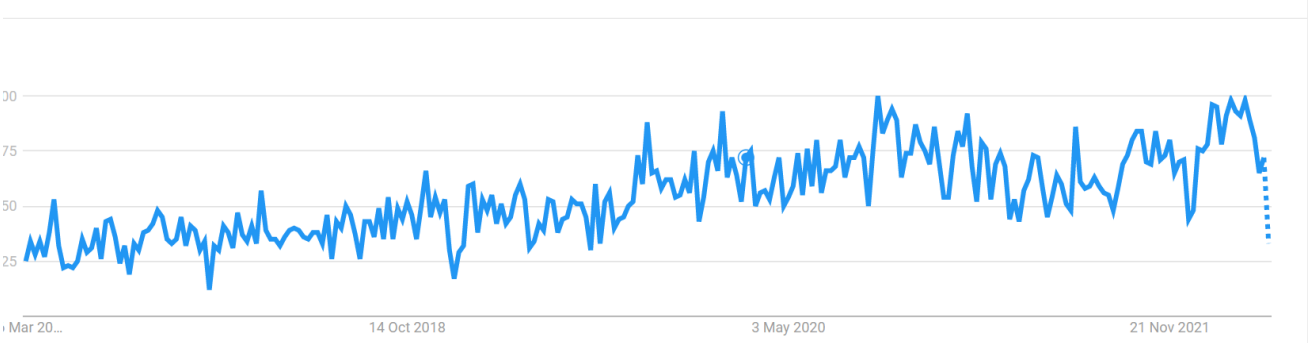
1.4. Home banking adoption during the COVID-19 pandemic

Before analysing internet banking adoption by the population during COVID-19, it is essential to review its on the banking sector. First, a long-lasting shutdown threatened the banking industry as the value of non-performing loans and write-offs increased because of economic contraction and a rise in unemployment (Lukovic, 2021). At the same time, banks were critical for economic recovery ensuring populations access to liquidity, support to entrepreneurs and businesses, and distribution of various social or welfare benefit payments. Operational resiliency became crucial as banks had to transition fast and efficiently to online channels. Around 25% of the bank branches closed in Europe during the pandemic, and the remaining had to reduce working hours and adjust to new job conditions. Nonetheless, the simple implementation of new technologies was not necessarily enough, as not all the customers were willing to switch to the online channel. For this

reason, proper guidance, help, friendly interference, and security became crucial for keeping the clientele loyal (Marcu, 2021).

One of the main concerns for the banking industry was the increased number of cybersecurity attacks during the pandemic. The crises like natural disasters or significant public events are a perfect environment for attackers. Hurricane Catrina, earthquakes in Japan in 2016, and ongoing Russian-Ukraine were followed by cybersecurity threats increase, and the pandemic was no exception. It was calculated that phishing attacks created to steal data like credit card numbers and login credentials increased by 600% in March 2020, while general cyber-attacks grew by 50.1% (Lallie et al., 2021). 74% of financial organisations experienced a rise in cybercrime during the pandemic, and 42% of banks and insurers admitted that the remote working model made them less secure. Even more, one-fifth of the consumers in the US were targeted at least once from 2020 to 2021 and the average amount of money stolen reached $1174 (The Covid Crime Index Report, 2021). It is an important detail as security is one of the main catalysts for adopting and using home banking services, as proven by the TAM model and its variations (Lu et al., 2011; Martins et al., 2014; Burak et al., 2021), especially for older generations (Jiang et al., 2020). The population concerns because of cybersecurity can be seen using the Google trends platform. As seen below, the interest in the topic and the number of search results have grown constantly since the beginning of the pandemic.[2]

6. Google search interest for cybersecurity topics worldwide



Source: Google trends

Kwan et al. (2021) tested how important digital capabilities are for banks during times of pandemic in the US. They constructed an IT index measuring 14 various technologies useful for remote work

[2] Numbers in the chart represent search interest relative to the highest point on the chart. A value of 30 means that the interest was one-third as popular as the most searched one.

like VPN or VoIP (voice over internet phone) and measured how it affected PPP (Paycheck Protection Program) loan origination. PPP loans were potentially forgivable and made to help small businesses keep their workers on the payroll. They find that the banks with higher IT indexes were faster to react to the pandemic on their websites, experienced more significant shifts from offline to online channels by their customers as well as an increase in deposits (which possibly means customers switching banks) and originated significantly greater amount of PPP loans (one standard deviation increase in IT was associated by 21% increase the volume of loans generated). The effects of the IT index were more potent in the counties with higher COVID-19 cases confirmed and stronger in the areas with better high-speed internet connection.

Erel et al. (2020) studied PPP in light of Fintech companies which were included in the program at the last minute because of a huge demand for loans. Apparently, Fintech improved financial inclusion as it disproportionately served the areas with a larger share of minority groups and lower income and in the places where the COVID-19 economic effects were more severe. The authors also compared borrowers located in the same county and found that Fintech was also used more in ZIP codes with fewer bank branches. In addition, traditional banks were providing more PPP loans to firms in industries that usually have closer ties to the banking industry. These findings signal two important things. First, traditional bank loans were at least partly based on the past relationship with the businesses, unlike Fintech. Second, the lending was still constrained to the geographical location of their physical branches. It was not the case for the Fintech companies, which mainly operate online. Even more, the response of Fintech was more than ten times greater economically. It shows that traditional banks' methods and work models of the pre-covid period were not entirely suitable for the new reality and Fintech companies, having strong digital capabilities, became the crucial players.

Core et al. (2021) also conducted a similar style study in Italy, investigating the relationship between banks' I.T. capabilities, the presence of branches and government credit distribution to SMEs during the pandemic. Between April and August 2020 Italian government issued loans to 900.000 small businesses, an aggregate amount reaching €79 billion. As in the case of the U.S., the banks with better I.T. infrastructure as well as higher Google Play store ratings of their apps made 25% more guaranteed loans as s fraction of their total lending, even after controlling for standard banks' characteristics like the size. Interestingly, the bank branch network was still

relevant for the allocation of credit, notwithstanding the fact that the number of branches declined during the pandemic in Italy. As emphasised by the authors, lending relationships are very sticky, especially knowing the Italians were especially reluctant to use online banking prior the COVID-19. In fact, even though most of the applications were filed online, 77% of borrowers got their loan from a bank with a branch in the same municipality. The relationship can also be explained by local banking competition, as banks with similar I.T. capabilities have to offer loans with lower rates in highly concentrated local markets.

Operational resiliency and high-quality digital services most definitely played an essential role in the banking sector and helped customers smoothly switch from offline to online channels. So how many people actually used internet banking during the pandemic? And if the numbers that different compared to the pre-covid situation? It is possible to get some hints from various surveys conducted from 2020 to 2021. For example, Deloitte's (2020) survey showed that in Switzerland, the trend of using online banking services was reinforced during the time of the pandemic. The most used online service was payment transactions, as 91% of bank customers used it, of which 9% did it for the first time in 2020. 15% of the customers took out a mortgage and obtained advice on a bank product for the first time using the internet, while 14% invested in securities. PWC reported that 27% of surveyed consumers were more likely to use online banking services due to COVID-19 in June 2020 (Lukovic, 2021). Meanwhile, one of the biggest U.S. banks, Well Fargo, reported an 81% surge in the amount of money deposited using mobile devices and a 23% increase in customers signing to online banking in March 2020 (Kwan et al., 2021).

Extensive information on digital payments and financial inclusion during COVID-19 can be found in the Global Findex Database 2021 (Demirgüç-Kunt et al., 2022). The database represents 123 countries and 125.000 adults containing indicators like the use of credit cards, access to formal and informal financial services or the use of the internet to access them. 64% of adults worldwide made or received at least one digital payment (using mobile money, debit or credit card or the internet) in the year 2021, and it reached 95% in high-income economies. 35% of the adults used their mobile phone or internet to make a transfer to their friends or relatives. The number was higher for high-income economies (43%), while in developing countries, it was 10% lower. It seems that the COVID-19 outbreak catalysed online financial services adoption: 80 million adults made their first digital merchant payment in India, while in China, the number reached 100 million

in 2021. Moreover, more than one-third of adults paid their utility bills directly from the account for the first time in the developing nations during the pandemic.

Fu et al. (2020) studied the COVID-19 impact on fintech adoption by analysing data from 71 countries. The research concentrated on the rate of daily downloads of financial apps, including both Android and iOS markets from January 2019 to December 2020. They estimated that the pandemic outbreak led to a 21-26% increase in the amount of mobile financial applications downloaded. Most of the apps, over 50%, belonged to traditional banks, and the relative increase in adoption was around 7% on aggregate. The adoption positively correlated with brand recognition, longevity and with the provider having its headquarters domestically. Nonetheless, it was the case only at the beginning of the pandemic. As it progressed, the most significant trait of the adoption became innovativeness; namely, the number of patents providers had. It suggests that at the beginning of the pandemic, just aftershocks, people tend to choose what seems familiar and stable to them. Nonetheless, as COVID-19 evolved, the providers having better innovative capabilities started playing the main role as they could offer lower costs and more targeted products.

An already mentioned paper by Orkun et al. (2021) analyses home banking adoption in the light of large-scale epidemics like Ebola or Zika and not particularly in the case of COVID-19. However, it can be expected that the patterns of online banking might be similar but probably much more pronounced because of the severity of the latest pandemic. The authors used the Findex database of 140 countries covering the years 2011, 2014 and 2017 and constructed a dummy variable representing the exposure to the epidemic in each country by using the official announcement date from WHO (World Health Organization). Not all the countries were affected by all epidemics allowing difference-in-difference estimation. This type of binary measure also ensured exogeneity of treatment as the epidemic occurrence is not likely to be correlated with specific countries' characteristics as opposed to intensity. It is important to note that in the case of COVID-19, this measurement would be very complicated or barely possible as the pandemic affected 228 countries and territories almost at the same time. On December 12, 2019, people started experiencing novel virus symptoms and only after three months, on March 11, 2020, COVID-19 was announced as a global pandemic (Cucinotta et al., 2020).

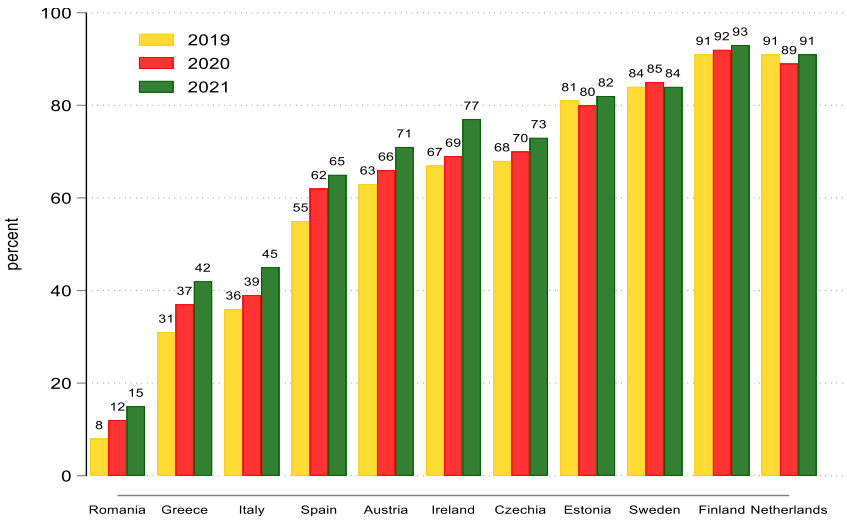
They find that exposure to an epidemic leads increased likelihood of engaging in an online or mobile transaction using a bank account by 10.6 percentage points. The likelihood of using an ATM also increases by 20 percentage points while withdrawals using a bank branch decrease by 23.8 percentage points (it is basically perfectly reversed). As expected, younger (26-34) individuals and households in full employment and having higher annual incomes were more likely inclined to switch to online banking. The treatment effects were also larger in the case of more severe epidemics. Interestingly, the effects were not persistent. Individuals who are already familiar with online banking and have sunk the cost of learning and navigating it can easily switch their methods of accessing services. Conversely, if one must invest their time and resources in learning how to use a banking app in the time of the epidemic, there is a higher chance that they will keep doing it to a greater extent, even when the epidemic has ended. It seems that, in this case, most of the individuals were, indeed, already familiar with both modalities. The authors also considered the placebo test as an increase in the ownership of bank accounts or debit cards, which showed insignificant results meaning that epidemics change the type of access to financial services but do not improve financial inclusion.

The research brings a few important messages regarding the COVID-19 pandemic and online banking. Technological capabilities and resilience were very important for the banking sector. Besides extraordinary situations, branch closing, shorter working hours, and increased volume of requests for loans by the firms because of stagnant economic activity, banks had also to deal with cybersecurity attacks. Indeed, Fintech companies and banks with high I.T. and innovative capabilities performed the best. The use of online banking services swiftly increased. People started downloading more finance-related apps, for the first time taking out mortgages, asking for consultation or even investing online. It is important to note that not only COVID-19 but also other pandemics in the period 2011-2017 increased the likelihood of engaging in online or mobile transactions and the use of ATMs.

2. Empirical analysis

Before analysing home banking usage during the pandemic in Italy particularly, it is important to compare it to other European countries. The information of a singular country investigated in isolation might be not very telling and possibly misleading. This kind of data can be extracted from the Eurostat database. The figure below represents the percentage of the population who used e-banking within the last three months before the survey for various European countries covering the period of 2019-2021. Italy, like Greece, has one of the lowest home banking usages. However, it has been steeply growing. It becomes clear that the analysis of countries like the Netherlands or Sweden would not be fruitful in the context of this research, as those countries have already achieved almost near-universal e-banking utilisation, and the pandemic did not impact it heavily.

7. Home banking usage in Italy during the COVID-19 pandemic



Source: Author's elaboration from Eurostat database

Nonetheless, some trends can be observed. First, in the Netherlands and Estonia, the usage was slightly lower in 2020 compared to 2021. The peak of COVID-19 was in 2020. Namely, Italy announced a nationwide lockdown on 2020 March 9, which was followed by other countries. It might be that this year, because of severe lockdowns and slowed down economic activity, some people simply did not need to use banking services, neither online nor at the physical branches. It can be especially the case of older people who tend to shop less online, and their pensions payments were not interrupted compared to the working-age population. Second, in Sweden, the usage

slightly increased in 2020 but decreased in 2021. This phenomenon was described by Orkun et al. (2021). In the countries with high e-banking use, people easily switch between the banking services methods, meaning that after the restrictions were eased out in 2021, some of the population simply started going to the physical branches as it is their preferred method for accessing banking services. In Italy, on the other hand, the usage of online banking services increased by 3% in 2020, and it kept growing, reaching 45% in 2021. Nevertheless, it is not intelligible what part of the growth was caused because of the pandemic and what part represents just a natural path of adopting the technologies. This reason and the fact that it is unclear which part of the population used it requires further investigation.

2.1. Special Survey of Italian Households

One of the earliest sources of home banking usage in Italy during the pandemic comes from one of the special surveys conducted by the Bank of Italy. The survey's primary purpose was to grasp the household's economic conditions during the extraordinary crisis. The interviews were conducted online to avoid the virus's spread and protect the households' health. The survey had six waves spanning from April 2020 to September 2021. The first three waves were carried out using three different methods: computer-assisted telephone interviews, computer-assisted web interviews and multimedia touchscreen devices. Zanichelli (2020) noted that other interviewing techniques impacted the quality of the answers and the respondents' socio-demographic composition. For example, the web-based survey was dominated by younger and better-educated people; the pensioners were mostly interviewed by telephone-assisted technique; over half of the interviewees via Dialogue (multimedia touchscreen devices) had at most a middle school diploma, and nearly 40% had permanent employment. By the same token, the respondents gave more neutral answers via telephone than other methods, probably because of an unconscious desire to look better in front of the interviewer.

Wave number 5 is of particular interest in the case of this research as it contains questions relating to home banking usage. The wave includes interviews of 2489 households and was carried out at the end of April 2021, just before easing up virus containment measures. Differently than in the first three waves, the information was gathered using only one method, a multimedia touchscreen device. Naturally, the survey contains much fewer questions than the usual SHIW. There is

principal information on the main socio-demographic variables as well as some economic ones. For example, it does not contain the size of the city from which the respondent comes, which can be quite useful in trying to determine home banking usage, or the exact amount of net income, which canonically showed a substantial impact on the use of e-banking services. Similarly to SHIW, it relates to the head of the household. However, it does not contain socio-demographic information on other family members.

Most of the respondents in the sample fall under the 65-74 age category. Meanwhile, 38.5% of them are between 45 and 64 years old. The results reflect that Italy has the highest share of the elderly population in Europe, which in turn can impact low online banking use as older people tend to choose branch banking. As usual, only 31.6% of the household head are women. The head of the household to which the surveys refer is described as the primary income earner and the person accountable for making economic and financial decisions. In the Italian context, it is usually a man. There is a common practice in the literature to replace the female member of a couple when she is indicated as the household head to the male one. In this case, the division is left as it might be a significant predictor for home banking. Chen et al. (2021), Garín-Muñoz et al. (2017), and Jimenez et al. (2019) showed that being a woman is correlated negatively with home banking usage. As mentioned before, the head of the household is responsible for making the major financial decisions and consequently dealing with financial institutions, hence also choosing how to access them.

The survey does not contain information on the exact net income situation. Nevertheless, the question about the ability to make ends meet is included, which can be used as the proxy. The questions ask how easily the available income allows the families to reach the end of the month and have six possible answers: with much difficulty, with difficulty, with some difficulty, quite easily, easily, very easily. To make things more straightforward, it was divided into three categories. The families who chose the first two answers were assigned to the bad income situation and the ones that chose the answer “with some difficulty” or “quite easily” to the medium income one. The rest of the households were assigned a good income situation. Only 11.8% of the families fall under the last category, while 59.7% are in the medium. In general, the fifth wave of the survey reflects improving expectations of future economic prospects and the labour market compared to the previous ones, as the pandemic situation was getting better after the vaccination campaign

started on December 27, 2020. Notwithstanding, it still shows lowered consumption since most families declare reduced expenses for various services like bars or restaurants (Zanichelli, 2020).

1. Descriptive statistics of the 5th wave of SSIH

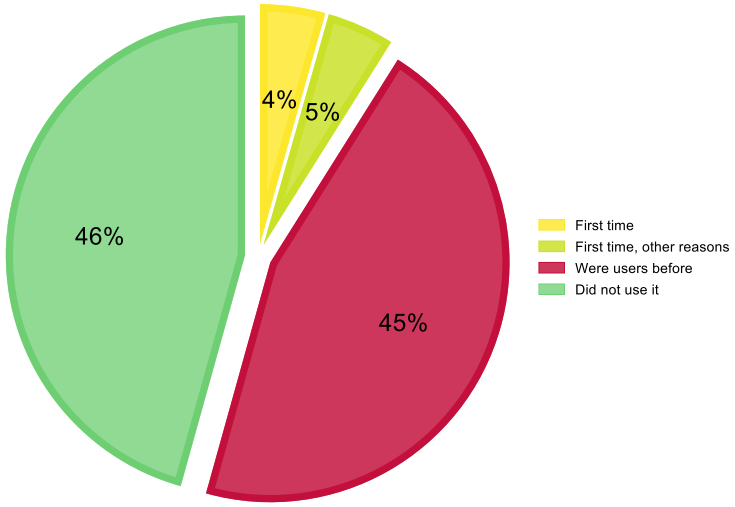
Age classes	**%**	**Gender**	**%**
34 and under	7.0	Women	31.5
34-44	15.6	Men	68.5
44-54	20.5		
55-64	18.0	**Education**	
65-74	21.9	Middle school or lower	56.7
over 75	17.1	High school	29.5
		Bachelor's degree	3.6
Employment status		Master's degree or higher	10.3
Employed	40.4		
Self-employed	11.8	**Area of residence**	
Unemployed	9.8	North-West	29.2
Retired	34.0	North-East	19.6
Other	4.1	Center	19.6
		South	18.1
Marital status		Islands	13.5
Single	18.3		
Marrie/cohabitant	57.8	**Income situation**	
Widowed	15.3	Bad	28.6
Separated/divorced	8.7	Medium	59.7
		Good	11.8

Source: Author's elaboration

Naturally, the question of interest is about home banking. It is important to note how it is formulated. It asks if the head of the household or someone in the family in general used remote connection to access banks or financial companies (home banking, online account, and mobile banking, which, in general, is the extension of internet banking). The notion of remote connection encompasses using a tablet, smartphone, phone, computer, or SMS. The question also relates to the whole period of the pandemic; thus, it asks if it has been used from March 2020 till the end of April 2021. In general, 54% of households have used online banking services since the pandemic's beginning. 45% were users before, and 9% used it for the first time. That 9% can be further divided into those who used it for pandemic-related reasons and those who did not. 5% of the first-timers who accessed banking services online for other reasons can be interpreted as natural growth because of technology adoption. Meanwhile, the COVID-19 pandemic is directly responsible for a 4% increase in new online banking users. The result of 54% seems high compared to the data from Eurostat of 45% in 2021. It can be explained by the fact that the latter number contains the

part of the population who used online banking services in the last three months while the former one considers the period of one year and a month.

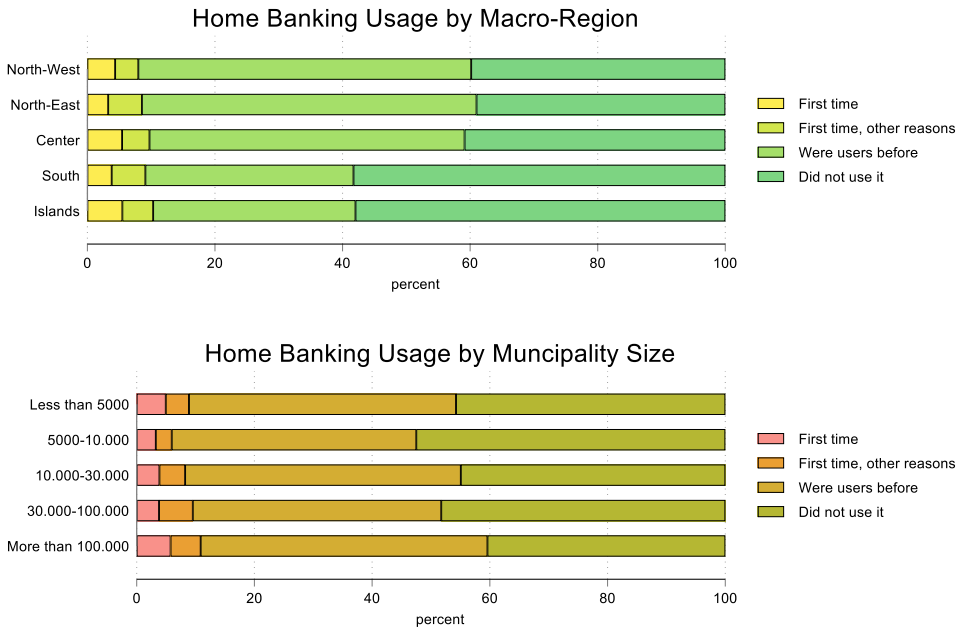
8. Share of the Italian households who remote accessed banking services (2020 March-2021 April)



Source: Author's elaboration

Slightly more than 60% of the population living in in North-East part of the country accessed banking services online. The North-West and Central Italy shows similar results. More problematic is the South part or Islands, as the results are around 20% lower. Interestingly, more than 57% of the national total of bank branches were located in the North part of the country (mostly in Lombardy, Veneto and Emilia-Romania), while only 22% located in the South and Islands in 2021 (Banca d'Italia, 2022) which in implies that in the Northern part of the country is actually easier to access bank branches. However, most of the Italian industry is also concentrated in the North, which in turn means that people there should have higher digital skills compared to the South, where agriculture activity dominates. In addition, South of Italy has a higher level of informal employment and economy, meaning that cash is much more widely used (and in that case, not even the bank is needed, let alone online banking). It is worth mentioning that the biggest share of inhabitants that used e-banking for the first time because of COVID-19 related reasons was in the Islands. Indeed, Sicily was the region with one of the highest infection rates throughout the discussed period (the exact calculations are in the Appendix).

9. Share of the Italian households who remote accessed banking services by macro-region and municipality size

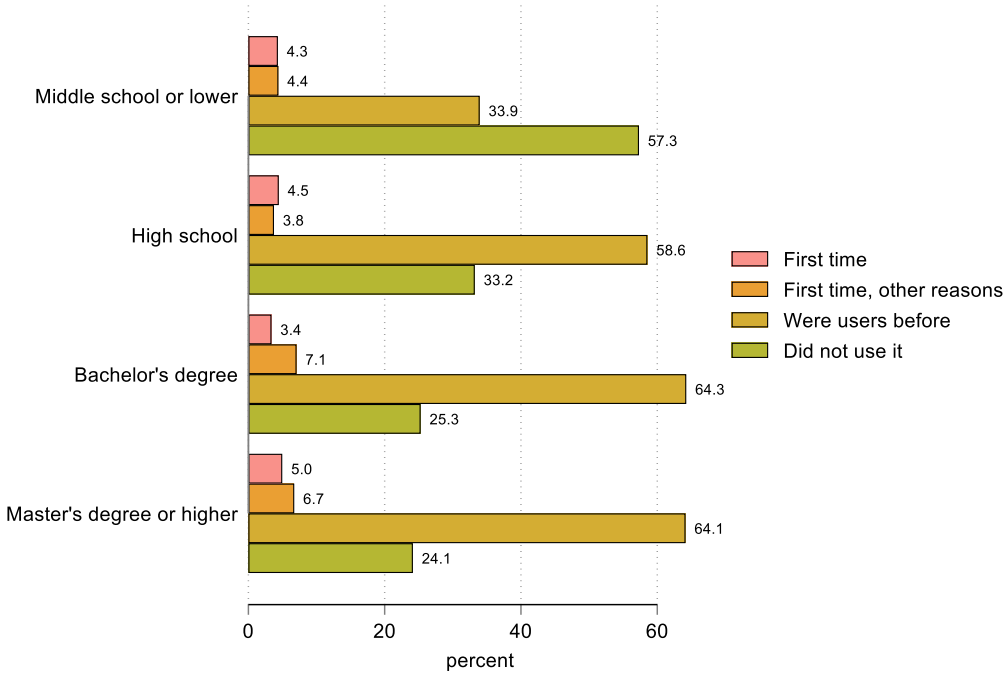


Source: Author's elaboration

Viviano et al. (2021) noticed that people living in small cities benefit the most from using home banking as the number of branches is lower; ergo, the cost of accessing banking services physically is higher. Nonetheless, it does not necessarily mean the use will be higher there. Most of the inhabitants of smaller villages or towns are older, while the youth concentrates in bigger cities where job opportunities are better, so the effect can be reduced. Furthermore, the effect can be reinforced because of the pandemic: bigger cities having a higher concentration of the population, sometimes crammed in tiny apartments, also had skyrocketing infection rates, which in turn might have positively impacted e-banking adoption. As mentioned, the survey did not include the question about the size of the city, but the size of the municipality was added. The graph shows that the highest share of new adopters indeed comes from municipalities with the highest amount of inhabitants. At the same time, the second-highest use of online banking services comes from the smallest municipalities, which probably grew because of new adopters who were severely affected by shorter bank branches working hours or closing because of the various restrictions during the pandemic period.

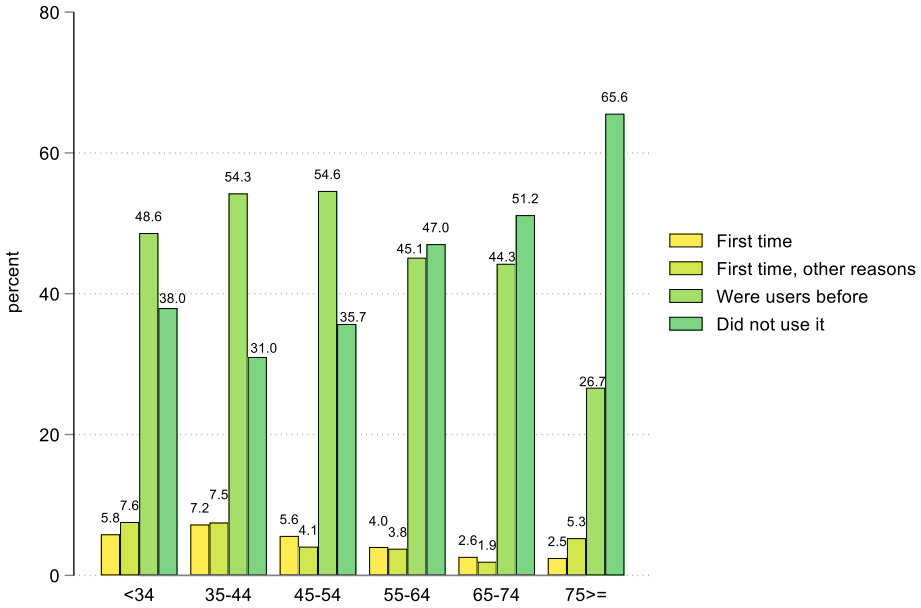
As anticipated, the higher the education, the higher the use of online banking services. 57% of the households where the head of the family has a middle school diploma or lower did not use it, compared to 24% with a master's degree or higher. Moreover, households where the head of the family has a bachelor's or at least master's degree, have the highest share of first-time users, 11% and 12%, respectively. Similarly, the older the age, the lower the use. It is problematic in the context of COVID-19 as the older part of the population was more vulnerable to the disease but used online banking services the least. 66% of the households where the head of the family is older than 75 years old did not use e-banking, and 51% in the age category of 65-74. The highest share of the new adopter was in the age group of 35-44. In the literature analysing consumption or households' wealth, a hum-shaped curve is usually observed regarding age. It is not the case with home banking use, as the relationship is more linear, with a bit of a downfall in the beginning.

10. Share of the Italian households who remote-accessed banking services by education



Source: Author's elaboration

11. Share of the Italian households who remote-accessed banking services by age group



Source: Author's elaboration

To further analyse home banking use, a regression is run applying binary response model probit:

$$P = (y = 1|\boldsymbol{x}) = P(y = 1|x_1, x_2 \dots x_k) = G(\beta_0 + \beta_1 x_1 \dots + \beta_k x_k)$$

Where G is a function taking on values between 0 and 1. The primary interest is to estimate the effect of independent variables x on the response probability. The dependent variable, y, takes on values 1 or 0 depending on if the household remotely accessed banking services in the period of 2020 March-2021 April. All the households, including those who accessed it for the first time, were assigned the value 1. As the probit model is used, G becomes the standard cumulative distribution function expressed as the integral:

$$G(z) = \phi(z) \equiv \int_{-\infty}^{z} \phi(v)dv$$

Jimenez et al. (2019) applied a probit model studying home banking usage in Spain, while Garín-Muñoz et al. (2017) logit as they both used for modelling binary response models. In this case, the probit model is chosen because it is simply more popular in econometric analysis and is favourited because of its normality assumption for e (Woodridge, 2012). For the independent variables, various socio-demographical and economic variables are included like the gender of household head, age (the squared term is not included as the age profile for home banking is more

linear)[3], education, income situation, employment, marital status, municipality size and number of children. In addition, some specific variables that might be important during the pandemic are added, like the number of adults over 65 in the household (not including the household head) and if someone in the family was working remotely. The latter variable impact is straightforward; accessing your work remotely might foster accessing other services in the same way as well. A higher number of adults over 65 years might motivate taking more precautionary actions and choose to use online services more often. Lastly, the variable "investments" is included, which constitutes if the household had any investments, including government and private bonds, securities, mutual or pension funds. Logically, households having investments should use banking services more often to check, for example, their performance.

Being the woman and the head of households has a negative impact on home banking usage; it is significant at a 1% level and remains stable in all three specifications. Age, as expected, also correlates negatively with online banking use along with being from the South or Islands (the reference category is North-West). Having a high school diploma, bachelor's or master's degree increases the probability of remote accessing banking services compared to the reference category of having a middle school education or lower. All the education predictors are significant at a 1% level. Interestingly, neither marital status nor municipality size are significant. It might be that the city size would be a much better predictor, while marital status, after controlling for other variables, simply is not a good predictor for home banking. Consistent with the literature, a good income situation correlates positively (the reference category is a bad income situation) and is significant at a 5% level. The variable of the number of adults who are over 65 years, besides being statistically insignificant, is also negative, differently than expected. Meanwhile, the remote-working dummy correlates positively and is significant at a 1% level. The specified model does not have a very high predictability power (the pseudo R^2 varies between 0.097 and 0.105) as some of the important variables are missing, like, for example, internet usage of financial knowledge. Nonetheless, a much wider SHIW survey which will be analysed in the next chapter, will allow specifying the more precisely.

[3] Including the age polynomial in the regression either makes the age variable statistically not significant or significant at only a 10% level, depending on the specification

2. Probit regression for home banking usage (SSIH, 2021)

Home banking usage	(1)	(2)	(3)
Female	-0.265***	-0.257***	-0.262***
	(0.0954)	(0.0959)	(0.0964)
Age	-0.00902***	-0.00891**	-0.00917**
	(0.00345)	(0.00362)	(0.00427)
Area of residence:			
North-East	-0.00711	-0.0121	-0.00526
	(0.105)	(0.104)	(0.104)
Centre	-0.0894	-0.0901	-0.0788
	(0.0997)	(0.102)	(0.103)
South	-0.409***	-0.401***	-0.395***
	(0.0953)	(0.0965)	(0.0972)
Islands	-0.344***	-0.334***	-0.329***
	(0.117)	(0.117)	(0.117)
Education:			
High school	0.465***	0.441***	0.422***
	(0.0724)	(0.0730)	(0.0738)
Bachelor's degree	0.553***	0.519***	0.481***
	(0.161)	(0.163)	(0.164)
Master's degree or higher	0.698***	0.654***	0.593***
	(0.108)	(0.111)	(0.113)
Employment status:			
Self-Employed	-0.177*	-0.167*	-0.175*
	(0.100)	(0.101)	(0.102)
Unemployed	-0.249**	-0.211*	-0.170*
	(0.125)	(0.127)	(0.127)
Retired	-0.276**	-0.268**	-0.225**
	(0.109)	(0.109)	(0.114)
Other	-0.546***	-0.525***	-0.481**
	(0.188)	(0.188)	(0.189)
Marital status:			
Married/Cohabitant	-0.116	-0.144	-0.156
	(0.101)	(0.106)	(0.107)
Widowed	0.0700	0.0601	0.0576
	(0.165)	(0.170)	(0.171)
Separated/Divorced	0.0392	0.0482	0.0521
	(0.150)	(0.151)	(0.152)
Municipality size:			
More than 30.000 inhabitants		0.0342	0.0210
		(0.0715)	(0.0713)
Income situation:			
Medium		0.0425	0.0352
		(0.0833)	(0.0837)
Good		0.312**	0.293**
		(0.126)	(0.127)
Number of children		0.0422	0.0437
		(0.0475)	(0.0484)
Number of adults over 65			-0.00115
			(0.0684)
Someone in the household was remote working			0.298***
			(0.0917)
Investments			-0.0433
			(0.0704)
Constant	0.856***	0.773***	0.775***
	(0.209)	(0.229)	(0.260)
Observations	2489	2489	2489
Pseudo R^2	0.097	0.101	0.105

Robust standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

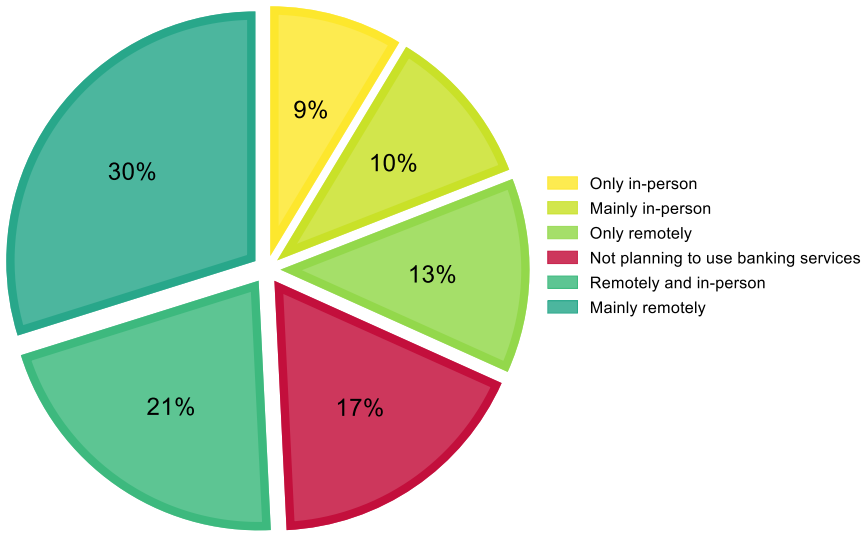
One of the drawbacks of the probit model is that, unlike the linear probability model, it allows seeing only the direction of the effect of x on y, but not the magnitude. The magnitudes can be observed only after computing marginal effects. To analyse the relationship between the variables in a better light, the marginal effects at means are calculated for the third and fullest specification of the model. At this point, the change in probability when the independent variable increases by one unit can be observed. It is important to emphasise that it is computed for the average person in the sample, meaning that all the independent variables are set at the mean (the computations are in the Appendix). Households when the head is a woman have a 10% lower probability of using internet banking. The likelihood is also 16% and 12% lower if the head of the household is from the South or Islands compared to being from the North-West part of the country. High school education increased the probability of using online banking services by 17%, while bachelor's and master's by 19% and 23% compared to having only diploma of middle school or lower. Indeed, education is one of the strongest predictors of e-banking use.

The reference category for the variable of employment status is set to "employed". The fact that being self-employed reduces the probability by 7% is quite surprising. Self-employed people should independently take care of their activities or communicate with their clients, for example, by email, hence should use technologies more often. Notably, being unemployed reduces the probability by 7% while being in a good income situation increases by 11%. It is a canonical result in most of the literature and, unfortunately, reflects the digital divide and the situation described by Arvai et al. (2021) when wealthier households consume more digitally intensive services and benefit more, while the poorer ones end up spending more on physically delivered services and in the case of COVID-19 also risking being infected while visiting the brick-and-mortal bank branches.

The fifth wave of the SSIH contains another essential question in the context of this research: the head of the households' plans on accessing banking services online in the future. Orkun et al. (2021) mentioned that households who sunk the cost of learning how to use home banking should keep using online banking services, at least partly, even though in their research, this hypothesis was not true. However, it seems true in Italy. 43% of heads of households answered planning to do it only remotely or mainly remotely, while 21% chose the equally remotely and in-person option. Naturally, the plans cannot be straightforwardly interpreted as the fact that home banking

usage will increase that much: 45% were users before the pandemic, and 64% are planning to use it at least partly in the future. Nevertheless, it shows that the experiences gained because of the pandemic should persist in the future.

12. The plans of the household's head to access banking services online in the future



Source: Author's elaboration

2.2. The Survey on Household Income and Wealth

The second source of information for analysing home banking in Italy during the pandemic is SHIW 2020. Originally the survey had to be carried out in 2020, representing the year 2019 but was postponed due to the health crisis; thus, the newest version of SHIW was conducted in reference to 2020, the first year of the pandemic. Significant methodological changes were introduced compared to the previous waves. Namely, the sample of households was constructed regarding their income and indebtedness, and not only traditional socio-demographic variables like age or area of residence as before. It improved the identification of the segments that are usually underrepresented in the surveys due to their limited size but hold higher shares of core variables. Indeed, average income, net wealth and indebtedness are higher obtained with the new survey design, confirming the improved identification. Meanwhile, the new design does not introduce significant changes in the positions of socio-demographic variables (Banca d'Italia, 2022).

The households in the sample were assigned weights depending on how many units in the population they represented. The attribution of weights consisted of three steps. First, the weight was calculated as the inverse of the probability of inclusion in the sample. Second, it was adjusted for total non-response as some households could not be found at their addresses or refused to respond. Third, the weights were adjusted again in reference to the known total of socio-demographic variables and corresponding sample estimates. The sample design includes a two-stage selection process, which was corrected for the year 2020. Before the correction, the first-stage units were municipalities, whereas the second households. The first-stage units were divided into strata based on the region and population size class, and then the second-stage units were drawn randomly; in 2020, the second-stage units were drawn after grouping them into strata based on households' debt and income (Bank of Italy, 2022).

For the purpose of comparability, another two waves, representing the years 2014 and 2016, will be used. It will allow seeing the evolution of the adoption of online banking in Italy. Nevertheless, it imposes some issues as the waves' weighting process differs. For this reason, the Bank of Italy constructed different weights for historical comparability; the weights were adjusted to reduce the differences in the selection probability of households between the waves. It makes the 2020 sample distribution as similar as possible to the previous ones. So, for the descriptive statistics calculation and a graphical representation, while comparing the results between the waves, these special weights will be used. For the cross-sectional analysis, the other, previously described, weighting scheme will be used. Namely, it will be applied running the probit regression. The question of whether weights should be used in regression analysis is widely discussed in the literature. In the setting of this research, the weights will be applied as it was advised by Faiella (2008) in the article discussing the weighting process in the SHIW. The weights in regression analysis should produce unbiased parameters that are robust to model misspecification.

Before the survey of 2020, the main method of collecting data was Computer-Assisted Personal Interviewing program which is basically electronic questionnaire storing the data and performing checks. 90% of the interviews were conducted like this while the remaining part was gathered using paper-based questionnaires. Naturally, in 2020 because of virus spread all the interviews were administered using computer-based method. 8156, 7420 and 6239 households in 2014, 2016

and 2020, respectively, participated in the surveys. As usual, the information relates to the head of the household.

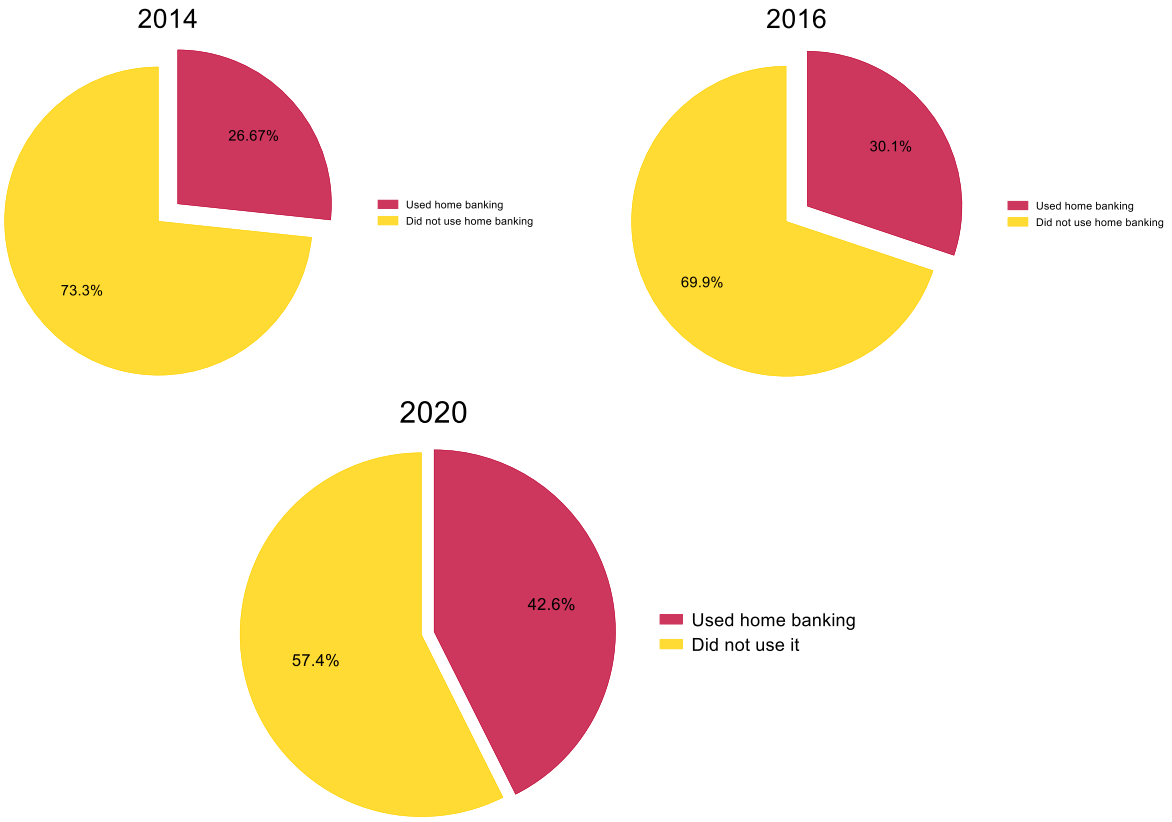
3. Descriptive statistics of SHIW of 2014, 2016 and 2020

	SHIW 2014 (%)	SHIW 2016 (%)	SHIW 2020 (%)
Gender:			
Women	35.3	37.4	36.4
Men	64.7	62.6	63.6
Age classes:			
34 and under	9.3	8.7	7.1
35-44	17.9	17.1	14.4
45-54	21.4	21.3	20.1
55-64	17.2	17.7	20.8
over 65	34.3	35.1	37.6
Education:			
Primary school or lower	22.5	21.5	19.5
Middle school	28.0	29.4	29
Training school	9.2	9	7.6
High school	26.5	26.4	28.8
University degree	13.8	13.7	15
Employment status:			
Blue-collar	23.4	23.2	24
Office worker/teacher	17.6	18.9	18.4
Manager	4.8	4.6	4.4
Business owner	4.7	5	5.8
Other self-employed	5.7	5.4	3
Pensioner	38.2	37.2	38.1
Not employed	6.0	5.8	6.2
Area of residence:			
North-West	22.1	19.6	21.9
North-East	25.4	27.9	24.9
Centre	20.2	20.5	20.1
South	24.4	24.4	21.4
Islands	8.1	7.6	11.8
Marital status			
Married/cohabitant	54.6	51.8	50.7
Single	20.0	21.4	23.6
Separated/divorced	9.3	9.3	9.4
Widow/er	16.2	17.5	16.3
Number of households	8156	7420	6239

Source: Author's elaboration

In the descriptive statistics table, we can see the main demographical trends. The most evident is that households' heads are getting older through the discussed period. In 2014 the share of households' heads in the age category of 65 and more was 34.3%, while in 2020, 37.6%. The same can be said about the category 55-64, which increased by 3.6%, representing the population ageing. At the same time, the level of education increased. The share of the households' heads having a university degree or high school diploma increased by 1.2% and 2.3%, respectively. The number of households' heads that declared being single also rose from 20% in 2014 to 23.6% in 2020. Based on the information published on Reuters.com, Italy's job market was hit especially hard in the first year of the pandemic, as around 724000 jobs were lost, and employment declined by 3%. Such a steep increase is not visible in the SHIW survey of 2020, as the share of household heads not having a job increased by only 0.4%.

13. Home banking usage in Italy in 2014, 2016 and 2020

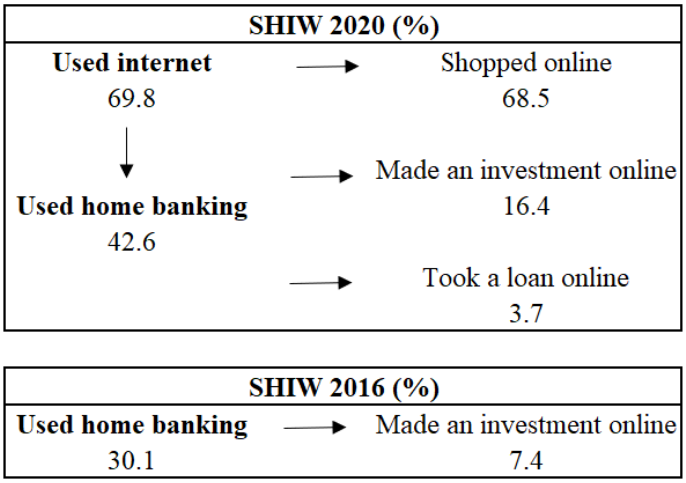


Source: Author's elaboration

Needless to say, the most important question is the use of home banking. The question was included in all three waves and asked if any member in the household did business with banks or

financial intermediaries by telephone or computer in the last calendar year and not from the beginning of the pandemic as in the case of SSIH. The share of households that used online banking in the last year substantially increased in 2014-2020, from 26.7% to 42.6%. The increase is higher between 2016 and 2020 than between 2014-2016 because the time window is larger. The number is higher compared to the Eurostat result of 39%, mainly, as mentioned before, because the latter result takes into account the users of the last three months and not the whole year. However, it is lower than the results of the SSIH, where the number of users reached 54%. This discrepancy could have arisen because SHIW considers the year 2020, which started normally, and not particularly the COVID-19 pandemic period as the SSIH. Nevertheless, the SHIW result is probably closer to reality as its sample much larger.

4. The share of Italian households who engaged in various online activities in 2016 and 2020



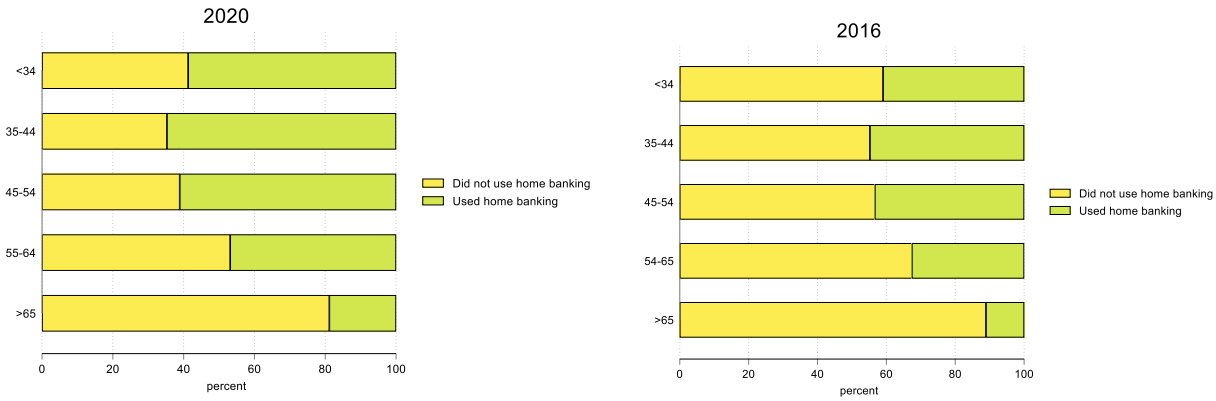
Source: Author's elaboration

Of those households that used home banking services, 16.4% also invested, and 3.5% took a loan online. In 2016, only 7.3% of them traded online. Unfortunately, the 2014 wave does not include a question regarding online investments or loans. SHIW 2020 also includes the question about the usage of the internet or email in the last year, which is not present in the oldest versions of the survey. 69.8% of the households answered yes, of which 68.5% also shopped online. According to Eurostat, 90% of Italian households had access to the internet in 2021, while DESI (2022) presents that 65% of the households had fixed and 80% of individuals had a mobile broadband subscription in the same year. So, it seems that not all households with access to the internet

necessarily navigate it. The internet use variable is especially important in the context of this research and can be perceived as the proxy for digital skills.

The age profile of the users is similar between 2016 and 2020. As in the SSIH, it has a bit of downfall in the beginning, but generally, it is pretty linear, decreasing with age. The pattern of the lower use of households where the head is very young might be caused by the fact that there are not that many finances to manage because of the young age; hence the banking services are used more rarely. The usage of home banking increased in all age groups, but despite that, it is more pronounced in the categories where the household head is younger. In 2016 around 89% of households where the head was 65 years old and older did not use online banking services, and it got lower only by 8% in 2020. On the other hand, the use in the age categories of 35-44 and 45-54 increased by almost 20% and 18%, respectively.

14. Home banking usage by age group in Italy in 2016 and 2020

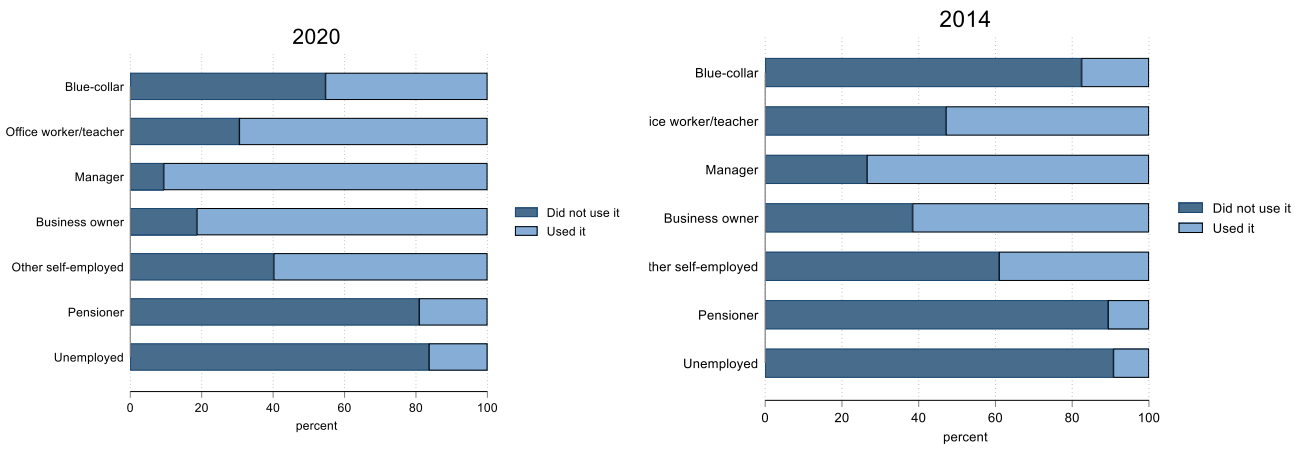


Source: Author's elaboration

The digital divide pattern arises in home banking usage and employment status. The two categories where online banking is used the least are pensioners (which is expected because of older age) and unemployed heads of households. The situation also did not change that much from 2014 to 2020. This motif has arisen several times in this research and represents a vicious loop: households in a precarious financial situation and jobless consume less technology-intensive goods and benefit less from them, spending more getting services at the brick-and-mortar branches. The issue is also more severe in the time of the pandemic as health is also at stake. Business owners and managers are the categories where internet banking is used the most, as these jobs usually require higher

education and digital skills. The optimistic pattern is seen in the category of blue-collar workers, where use increased from 18% to 45%.

15. Home banking and employment status in Italy in 2014 and 2020



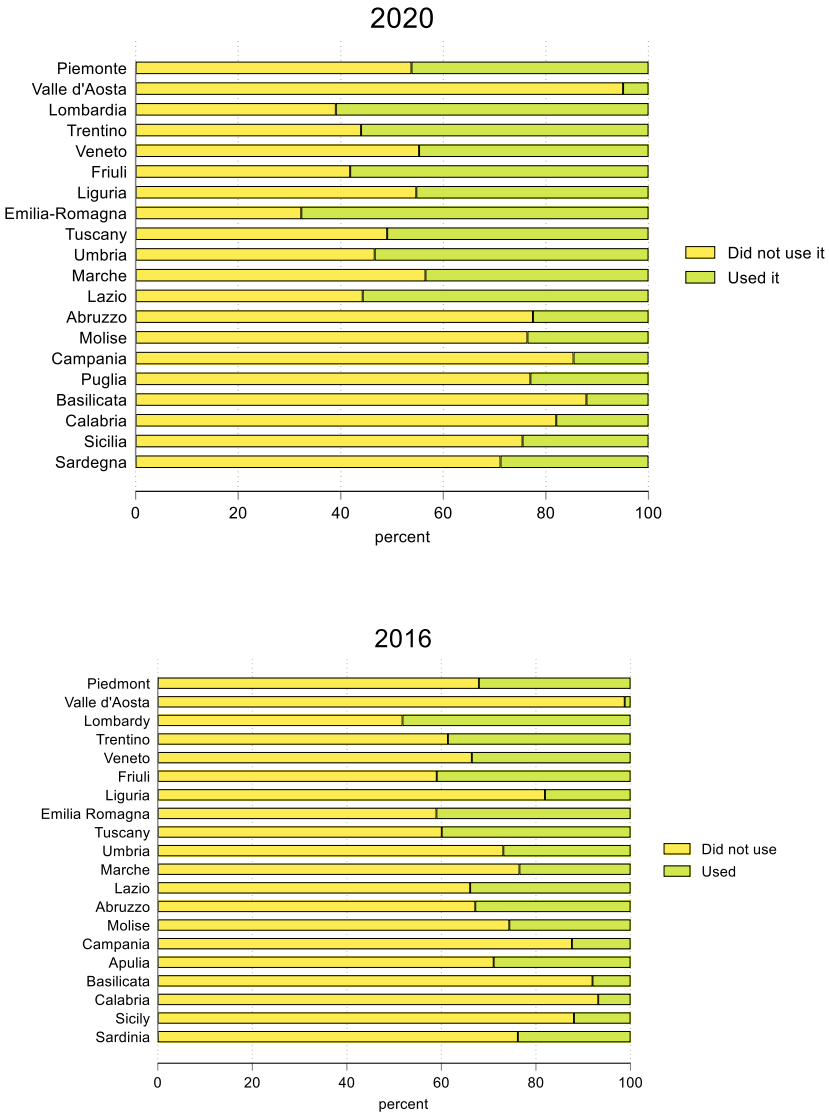
Source: Author's elaboration

The COVID-19 pandemic was a distinctive event, and its comparability to other, lighter epidemics like Zika or Ebola must be done with caution. The SHIW 2020 survey contains information on the regional level. Throughout 2020 Veneto, Piemonte, Lombardy, Emilia-Romagna, Tuscany, Lazio, Campania, and Sicily constantly had higher-than-average new infection rates (for precise calculation, please see the Appendix). It is tempting to assume that those regions should have used home banking the most, which would probably be partly true. However, most of the regions are in the North part, and already before the pandemic, in 2016, had a higher propensity for online banking, as seen in the figures below. So, what part of the increase was caused by the pandemic and not by other factors like better infrastructure or cultural factors? Orkun et al. (2021) applied a difference-in-difference estimator measuring epidemics' impact on home banking use, the treatment group being the countries affected by the virus and holding country and time-varying effects fixed. The same methodology was also applied as the treatment variable choosing the intensity of the epidemic, even though it is endogenous.

Technically this method could be applied on the regional level, as the treatment using the intensity of the pandemic, as all the regions were affected by COVID-19, considering the number of new confirmed infections or death rates. Nevertheless, it would not take into account that during 2020 Italian government applied different laws and restrictions to control the spread of the virus. From

March 9, 2020, the quarantine was announced in the whole country, no matter the intensity of the pandemic in a particular region, meaning that the same rules restricted all the regions from that point onwards. From November 2020, Italy started dividing regions into different zones like green, yellow, and red, depending not only on the new infection rate but also, for example, the number of vacant beds in the hospitals. For this reason, it is not fruitful to follow the same methodology. Nevertheless, the already discussed SSIH let us grasp how many households started using home banking specifically for pandemic-related reasons.

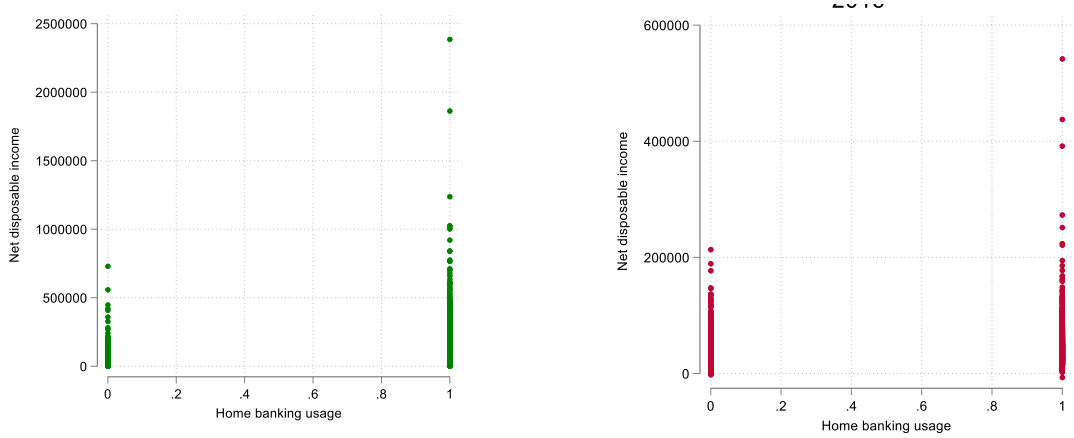
16. Home banking usage in Italian regions in 2016 and 2020



Source: Author's elaboration

The SHIW includes much more variables that can be very useful in analysing online banking in Italy, one of them being net disposable income which is an aggregate calculated by adding payroll income, pensions and net transfers, net self-employment income and property income. Orkun et al. (2021), Jimenez et al. (2019), and Garín-Muñoz et al. (2017) found that income is one of the strongest predictors of online banking adoption. The simple scatter plots below represent the relationship between income and internet banking usage. The horizontal axis shows home banking use where the values can be only 0 (meaning it was not used in the last year) and 1. The horizontal axis takes on values representing net disposable income. In both years, a clear pattern emerged; the richest households exclusively used online banking. The dots representing 0 almost disappear when the income of the household crosses 200.000 in 2016 and 500.000 in 2020.

17. The relationship between home banking and net disposable income



Source: Author's elaboration

All three waves of SHIW include the variable representing the household's ownership of at least one bank or postal deposit. The relationship with home banking is straightforward; one must have a bank account to perform banking operations or remotely connect to the bank, besides contacting the financial institution to seek some information not being its client. Having the deposit is not precisely the same as having a bank account, as it could simply be empty, but it can be treated as similar. As discussed in the literature review, developed economies usually have near-universal account ownership. It was shown by Demirguc-Kunt et al. (2022) that the general account ownership reached 97% in Italy in 2021, while the ownership of the deposit was 95% in 2020,

meaning that the absolute majority of Italian households are banked and have a relationship with financial intermediaries. The result changes only by 2% compared to the previous years.

The use of online banking also should be affected by the general population's preference for cash. Vice versa, the preference for paying by credit or with debit card might mean an inclination for electronically carried services. Indeed, Sweden, having one of the highest internet banking usage rates, sometimes is called a cashless society, as the proportion of Swedes using cash fell from 39% to 9%, according to their central bank ("In Sweden, technology is close to making cash a thing of the past", 2021). Why some societies prefer using cash is out of the scope of this research; the reasons can vary from cultural factors to the avoidance of taxation. Italy is famous for being especially fond of using cash for everyday transactions and was among the 35 most cash-intensive societies in the world before COVID-19 (Furber, 2020). Nonetheless, the average amount of cash spent in the month by the head of household was steadily declining from €835 in 2014 to €553 in 2020 in Italy, while the rate of credit and debit card ownership by households increased by 10% and 7% in the same period, signalling gradual switch to more electronic or digital payment tools. In addition, contactless payments were especially promoted during the pandemic because of the potential risk of spreading the virus through money banknotes.

5. Ownership of bank deposit, credit or debit card and the average amount of cash spent in the month in Italy in 2014-2020

	SHIW 2014	SHIW 2016	SHIW 2020
Ownership of at least one bank/postal deposit (%)	93.2	93.0	95.4
Ownership of debit card (%)	75.0	75.8	85.3
Ownership of credit card (%)	29.3	30.5	36.1
The average amount of cash spent in the month (€)	835.4	758.5	552.8

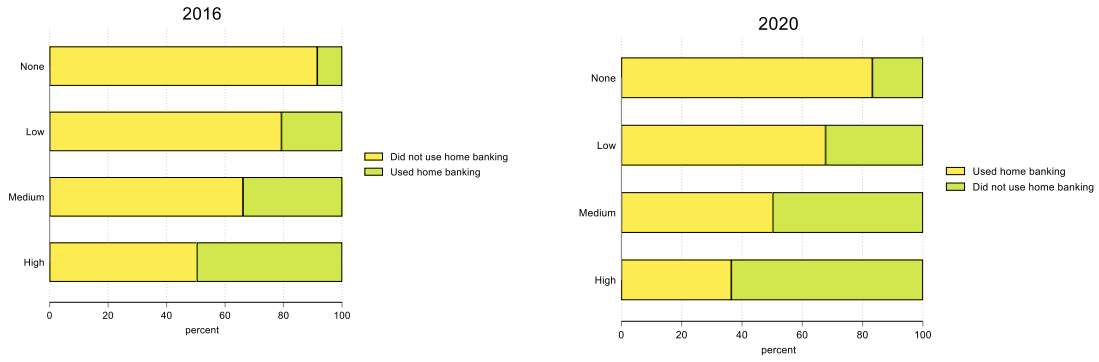
Source: Author's elaboration

Finally, financial literacy should be discussed. Better knowledge of main financial concepts leads to better investment decisions and planning. It is probable that many banking services or promotions on online web pages for some users can be overwhelming and demotivate them to engage in online activities. For some, it might cause doubts or suspicions and ignite distrust. Individuals with better financial literacy should also understand the benefits of home banking and its cost-saving feature. Recently, the Bank of Italy performed a detailed study of Italian adults'

financial literacy, which was later analysed by D'Alessio et al. (2020). The main results showed that Italy's average financial literacy score was 11.2 out of 21 in 2020. The result, unfortunately, placed Italy at the bottom of OECD countries, close to Malta and Romania, even though the score, compared to 2017, improved.

Very conveniently, SHIW includes three questions measuring the financial literacy of the heads of Italian households in the waves of 2016 and 2020. The first question relates to the interest rate, the second to the interest rate and inflation, and the third asks if purchasing single company shares is riskier than investing in mutual funds or a wide range of companies. The financial literacy score can be divided into four categories, excluding those households that did not answer at least one question out of three. Based on the number of correct answers, we divided it into four categories ranging from "high" financial knowledge (3 correct answers) to "none" (0 correct answers). The answer "don't know" was also interpreted as wrong. 29% of the households were assigned to the category "high, 31% to "medium", 19% to "low", and 21% to "none" in 2016. The results were a little bit better in 2020 but not substantially. 29% of the heads of the household answered all three questions correctly, 31% to two, 22% to one and 19% to zero, so the improvement is visible only between the categories "low" and "none". There must be a strong connection between online banking usage and financial literacy, as seen in the tables below. Online banking is widely used when the head of the household reaches the highest financial literacy score in both years, and usage swiftly declines in the lower categories. Even more, the use increased much more in the category "high" throughout the discussed period, namely 14%, from 50% to 64%. The category "none" increased only by 8%, from 9% to 17%.

18. Relationship between home banking and financial literacy in Italy



Source: Author's elaboration

Lastly, as with the SSIH, we run probit regression to check the main predictors of home banking usage in Italy in the first year of the COVID-19 pandemic. The dependent variable, as before, takes on values 0 or 1 depending on if the household remotely connected to the banks or financial institutions in 2020. The independent variables can be divided into three broad categories:

1. Socio-demographic variables include gender, age (again, not squared as the relationship is quite linear and not humped-shaped)[4], education, employment and marital status, area or residence, income, and town size.

2. Payments instruments' variables include if someone in the household owns a debit or credit card, the amount of cash spent in the month by the head of the household and the number of cash withdrawal points available in the area (the head of the household was asked to assign the score ranging from 1 to 10 (the best one) regarding the number of points available in the area where they live or work; it includes ATMs, post-office ATMs and bank/postal branches).

3. Digital and financial knowledge variables represent if anyone in the households navigated the internet or sent the email and financial knowledge, based on three SHIW questions.

In addition, the remote-working variable is included, which represents how many days a month head of the household was remote working during the emergency. The variable of deposit ownership is not included as it basically does not vary. The number of observations was reduced to 5945 due to the fact that not all the heads of the households answered questions regarding financial literacy.

In the first column, we control only for socio-demographic variables. All the variables have expected signs. Age, as before, is a negative predictor and is statistically significant at a 1% level. A high school diploma or university degree, compared to the reference category "middle school", increases the probability of home banking usage. Consistently to the SSIH being from the South or Islands compared to being from East-North lowers the probability. The town's size is clearly a much better predictor than the municipality used in chapter 2.1, as it is statistically significant at 1% in all categories and has positive signs. Income, in line with the previous research, is a positive

[4] Including the age polynomial in SHIW 2020 makes the age variable not statistically significant from the third specification onwards

6. Probit regression for home banking usage (SHIW, 2020)

Home banking usage	(1)	(2)	(3)	(4)	(5)
Woman	0.000216	0.0157	0.0198	0.0188	0.0120
	(0.0707)	(0.0731)	(0.0771)	(0.0767)	(0.0774)
Age	-0.0208***	-0.0214***	-0.0138***	-0.0165***	-0.0165***
	(0.00308)	(0.00327)	(0.00355)	(0.00361)	(0.00362)
Education:					
Primary school or lower	-0.279**	-0.239**	-0.0990	-0.131	-0.121
	(0.117)	(0.121)	(0.137)	(0.137)	(0.137)
Training school	0.135	0.125	0.118	0.0975	0.0981
	(0.125)	(0.127)	(0.132)	(0.135)	(0.135)
High school	0.633***	0.621***	0.491***	0.439***	0.424***
	(0.0776)	(0.0791)	(0.0838)	(0.0838)	(0.0842)
University degree	0.935***	0.927***	0.852***	0.781***	0.750***
	(0.0963)	(0.0962)	(0.105)	(0.106)	(0.107)
Employment status:					
Self-employed	0.377***	0.408***	0.332***	0.291***	0.296***
	(0.0937)	(0.0958)	(0.0947)	(0.0952)	(0.0953)
Not employed	-0.279***	-0.210**	-0.122	-0.112	-0.0931
	(0.0893)	(0.0954)	(0.0976)	(0.0996)	(0.100)
Marital status:					
Single	-0.254***	-0.285***	-0.127	-0.160*	-0.166*
	(0.0845)	(0.0871)	(0.0934)	(0.0940)	(0.0945)
Separated/divorced	0.182*	0.108	0.192*	0.208*	0.208*
	(0.106)	(0.108)	(0.113)	(0.114)	(0.114)
Windowed	-0.154	-0.197*	-0.0404	-0.0144	-0.00992
	(0.113)	(0.116)	(0.130)	(0.131)	(0.131)
Area of residence:					
North-West	0.152	0.142	0.0887	0.127	0.138
	(0.0966)	(0.0981)	(0.106)	(0.103)	(0.103)
Centre	0.110	0.116	0.0176	0.00880	0.0168
	(0.0958)	(0.0974)	(0.106)	(0.104)	(0.104)
South	-0.781***	-0.660***	-0.735***	-0.701***	-0.690***
	(0.0981)	(0.103)	(0.114)	(0.114)	(0.114)
Islands	-0.404***	-0.352***	-0.488***	-0.480***	-0.467***
	(0.105)	(0.110)	(0.121)	(0.121)	(0.121)
Ln(income)	0.552***	0.544***	0.495***	0.465***	0.459***
	(0.0648)	(0.0670)	(0.0665)	(0.0642)	(0.0641)
Town size:					
20.000-40.000	0.359***	0.388***	0.335***	0.336***	0.342***
	(0.0858)	(0.0887)	(0.0982)	(0.0989)	(0.0988)
40.000-500.000	0.317***	0.333***	0.268***	0.265***	0.268***
	(0.0704)	(0.0707)	(0.0784)	(0.0789)	(0.0793)
More than 500.000	0.276***	0.326***	0.218**	0.236**	0.229**
	(0.0967)	(0.0983)	(0.107)	(0.106)	(0.107)
Credit/debit card		1.043***	0.964***	0.846***	0.844***
ownership		(0.142)	(0.155)	(0.157)	(0.157)
Ln(cash)		-0.195***	-0.198***	-0.176***	-0.173***
		(0.0424)	(0.0449)	(0.0447)	(0.0448)
The number of cash		-0.0305*	-0.0392**	-0.0419**	-0.0422**
withdrawal points		(0.0175)	(0.0196)	(0.0197)	(0.0197)
Internet usage			1.789***	1.755***	1.751***
			(0.149)	(0.148)	(0.149)
Financial knowledge:					
Low				0.127	0.127
				(0.117)	(0.116)
Medium				0.516***	0.513***
				(0.106)	(0.106)
High				0.641***	0.637***
				(0.108)	(0.108)
Remote working					0.0145*
					(0.00866)
Constant	-4.816***	-4.350***	-5.594***	-5.483***	-5.447***
	(0.669)	(0.675)	(0.693)	(0.671)	(0.670)
Observations	5945	5945	5945	5945	5945
Pseudo R^2	0.397	0.418	0.491	0.505	0.506

Robust standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

predictor. Being a woman has a positive sign, but it is not statistically significant, differently from the SSIH**.**

In the second column, the payment instrument variables are added. Consistently with the hypothesis, owning a credit or debit card correlates positively with online banking usage, while the amount of cash spent in the month negatively. It is an important observation, signalling that electronic payment methods lead to the adoption of other digital services. The amount of cash withdrawal points correlates negatively with internet banking usage, meaning that if it is easily reachable, it is still preferred to get cash than to make digital payments in Italy. In the third specification, we add an internet usage dummy, which, as expected, has a positive sign and is statistically significant at a 1% level. In the fourth column, financial literacy, a categorical variable is added, which confirms the observation made in this chapter that financial literacy affects internet banking positively. Compared to the reference category ("none" financial knowledge), having medium and high financial literacy increased the probability of internet banking usage. Finally, the remote-working variable in the fifth specification also has a positive sign and is statistically significant.

In the SSIH being self-employed had a negative sign compared to the reference category "employed", contradicting our hypothesis that people who work for themselves should be more involved with technology since they must communicate with their clients or take care of various aspects of their business online. This regression has an expected positive sign and is statistically significant at all five specifications. Meanwhile, being unemployed becomes not statistically significant even though with a negative sign after adding an internet usage dummy. All payment instruments, as well as financial and internet literacy variables, remain stable in all five specifications. The same can be said about town size, income level, age, area of residence and education. Marital status is not a strong predictor of home banking, especially after adding other controls. The model has a much stronger predictive power than SSIH since it has many more variables and a bigger sample. The Pseudo R^2 increases from 0.397 to 0.506 throughout the specifications. The increase is especially evident after adding the internet usage dummy, rising by 7%.

To check the magnitudes as in chapter 2.1., marginal effects at means are calculated for the last and preferred specification, which can be found in the Appendix. The strongest predictor for online

banking use is the internet usage dummy which increases the probability by 48%, holding other variables constant. Other strong predictors are debit card ownership (25%), high financial knowledge (22% increase compared to the reference category "none"), university degree (28% rise from having a primary school diploma or lower) and being from South (22% decrease). Notably, the remote-working dummy has much less predictability than the SSIH regression (15% vs 5%), probably mainly because we control for internet usage.

Even though our primary interest is home banking predictors during 2020, we also run the probit regressions for 2016 and 2014, which can be found in the Appendix. We construct models similarly, even though they are missing some variables as they were not included in those waves. SHIW 2016 does not have internet usage and remote-working dummies. Age, education, town size, income, the amount of cash in a month spent, debit or credit card ownership, and financial knowledge all have the same sign as in 2020 and are stable along all three specifications. The model's pseudo R^2 varies from 0.305 to 0.360, a little lower since some variables are missing. It is worth noticing two things. First, differently to the 2020 regression, the female dummy in all three specifications has a negative sign, even though it is still statistically insignificant. Second, being from Central Italy lowers the probability of using online banking compared to being from the Nort-East, which is statistically significant in the first column. It had a positive sign in SHIW 2020 and was statistically insignificant.

The SHIW 2014 regression contains socio-demographic variables, credit or debit card ownership and the average amount of cash spent. As in 2016, most variables have the same sign and stay relatively stable in all three specifications. Meanwhile, being from the Centre not only has a negative sign but also becomes statistically significant at a 1% level in all three specifications. It represents home banking adoption evolution and spread; 8 years before, there were significant differences in adoption not only between the North part of the country and the South or Islands but also between the Centre. However, internet banking usage also started spreading to the southern direction as time passed. Being a woman and the head of the household also has a negative sign and is statistically significant in all three specifications in 2014, representing blurring differences between the digital divide between men and women throughout the years.

SSIH and SHIW complement each other. From the former, we find that due to COVID-19, the share of households that started accessing banking services online increased by 4%. In comparison,

5% noted doing so for other, not specifically pandemic-related reasons. We also find that the trend should persist, at least partly. After running probit regressions, both surveys demonstrated that age and being from the South or Islands correlates negatively to e-banking, while education, income level and being able to remote work positively. Marital status is a weak predictor in both. Nevertheless, only socio-economical predictors cannot explain much of the variance. After adding various other variables like financial instruments use, financial literacy and digital literacy proxy, the model's predictive power increases substantially in SHIW 2020. The surveys demonstrate different results for being a female and head of the household. Namely, it is a negative predictor in the SSIH and positive and SHIW, even though not statistically significant. However, it becomes positive considering the 2014 wave.

Conclusions

The thesis allows us to draw a detailed picture of home baking usage in Italy. Before the pandemic, Italy had one of the lowest e-banking usages in Europe. Namely, based on the Eurostat, only 36% of Italians used remote banking services in the last three months in 2019, similar to Greece. However, it steeply increased during the pandemic, reaching 39% in 2020 and 45% in 2021. The SHIW 2020, considering the usage during the whole year, indicates that 43% of households used internet banking in 2020, a huge advancement compared to 30% in 2016. Even more, based on SSIH, which takes into account the period from the beginning of 2020 to April 2021, 9% of the households did it for the first time, while 4% indicated doing it for pandemic-related reasons, meaning that COVID-19 outbreak induced online banking in the country. Meanwhile, 43% of them plan to use remote banking services only or mainly remotely, while 30% equally remotely and in-branch, which signals that usage will be at least partly sticky.

In line with existing literature, we find that the digital divide persisted during the pandemic. After running probit regressions for the fifth wave of the SSIH and SHIW 2020, we find that age, lower income, and education level reduce the probability of internet banking usage. In addition, being from the South of the country or Islands lower the probability as well. Interestingly, the variable sign of being from Central Italy compared to the North-East changes the sign throughout 2014-2020. The probability of using home banking was lower in 2014 for the households from the Centre, while it became positive albeit not statistically significant in 2020, reflecting the diffusion of remote banking services deeper into the country.

The municipality size and marital status are not strong predictors for internet banking while being from a bigger town has a positive effect. Being “self-employed” compared to the reference category “employed” increases the probability of the usage of remote banking services in all three SHIW waves and is statistically significant at a 1% level. Moreover, after exploring raw data of SHIW 2020 and 2014, we find that households where the head of the household is blue-collar or unemployed used online banking the least, while managers and business owners the most, which is consistent with the digital divide paradigm.

Finally, other variables are crucial for home banking usage as they majorly increase pseudo R^2. For example, owning a debit or credit card positively affects online banking, meaning that adopting

one digital payment instrument leads to adopting another. Similarly, the propensity to use cash has a negative effect, as well as the number of cash withdrawal points in the area where the head of the household lives or works.

Consistently with the pre-existing literature, we find that most of the Italian population is banked, as 95% of the households indicated owning at least one bank or postal deposit in 2020. Moreover, 70% used the internet in the last year. Based on Eurostat statistics, 90% of the Italian population had access to the internet, meaning that having it not necessarily leads to using it. However, it was one of the strongest predictors of home banking usage. The crucial prerequisite for increasing e-banking in Italy is fostering general digital technologies like internet usage. Indeed, the country scores one of the lowest for digital skills in the EU, which is a considerable obstacle to promoting digital technologies and services. In addition, financial knowledge is also a strong predictor for the usage of remote banking services. It might be that people with lower financial knowledge do not know the cost-saving benefits of online banking or simply do not trust it.

Appendix

7. Sars-CoV-2 positive infection rate in Italian regions

	29-02-2020	Difference	30-06-2020	Difference	30-09-2020	Difference	31-12-2020	Difference	31-03-2021
Abruzzo	2	3.3	3287	1.1	4419	30.9	35314	29.9	65237
Basilicata	0	0.4	402	0.4	808	10.0	10826	8.6	19458
Calabria	1	1.2	1181	0.8	1985	21.9	23920	23.0	46958
Campania	13	4.7	4690	8.1	12742	176.9	189673	147.6	337289
Emilia-Romagna	217	28.3	28492	6.8	35311	136.2	171512	164.3	335820
Friuli-Venezia Giulia	0	3.3	3308	1.4	4666	45.4	50027	47.5	97490
Lazio	6	8.1	8110	8.4	16475	146.6	163051	122.4	285447
Liguria	42	9.9	9977	3.4	13335	47.1	60469	28.9	89324
Lombardy	615	93.3	93901	12.8	106727	372.2	478903	256.6	735484
Marche	11	6.8	6785	1.2	7955	33.7	41624	46.5	88146
Molise	0	0.4	445	0.2	655	5.9	6528	5.7	12270
Piemonte	11	31.3	31349	4.1	35402	162.4	197828	111.5	309280
Puglia	3	4.5	4531	3.3	7786	83.2	90964	102.0	193012
Sardinia	0	1.4	1366	2.5	3900	27.2	31113	14.4	45503
Sicily	4	3.1	3080	4.0	7118	86.5	93644	80.5	174123
Trentino	1	7.2	7231	2.3	9531	41.8	51334	58.9	110185
Tuscany	11	10.2	10250	4.6	14827	105.5	120328	75.0	195374
Umbria	0	1.4	1441	1.0	2454	26.5	28960	21.9	50908
Valle d'Aosta	0	1.2	1195	0.1	1314	6.0	7273	2.0	9298
Veneto	191	19.1	19286	8.2	27451	226.4	253875	129.0	382838
AVERAGE		**12.0**		**3.7**		**89.6**		**73.8**	

The table represents the regions with higher-than-average positive Sars-CoV-2 infection rates from the end of February 2020 to the end of March 2021. For every period, the cumulative measure was used. Then the difference between the two periods was calculated, which later was divided by 1000 to see the infection rate for 1000 inhabitants in every region in 3 months. The red numbers represent the regions with higher than Italy's average positive infections rate in that time window (4 regions in the first period, 8 in the second and third, and 9 in the fourth). The pattern is visible as four regions (Veneto, Piemonte, Lombardy, Emilia-Romagna) had higher than the country's average new infections rate in all the time windows; and four regions (Tuscany, Lazio, Campania, and Sicily) in 3-time windows. The data was taken from: https://github.com/pcm-dpc/COVID-19/tree/master/dati-regioni.

8. Marginal effects at means (SSIH, 2021)

Home banking usage	Predicted probability	Std. errors
Female	-0.104***	0.03816
Age	-0.00363**	0.00169
Area of residence:		
North-East	-0.00206	0.04019
Centre	-0.031	0.04005
South	-0.156***	0.03800
Islands	-0.120***	0.04519
Education:		
High school	0.166***	0.02858
Bachelor's degree	0.188***	0.06098
Master's degree	0.228***	0.04083
Employment status:		
Self-employed	-0.069*	0.04037
Unemployed	-0.067*	0.05035
Retired	-0.088**	0.04509
Other	-0.190**	0.73439
Marital status:		
Married/cohabitant	-0.062	0.04188
Widowed	0.022	0.06612
Separated/divorced	0.020	0.05881
Municipality size:		
More than 30.000 inhabitants	0.008	0.02822
Income situation:		
Medium	0.140	0.03326
Good	0.114**	0.048
Number of children	0.017	0.19174
Number of adults over 65	-0.000455	0.02707
Someone in the household was remote working	0.115***	0.03440
Have investments	-0.017	0.02787
Observations	2,489	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
NOTE: All predictors at their mean value

9. Marginal effects at means (SHIW, 2020)

Home banking usage	Predicted probability	Std. errors
Female	0.00429	0.02772
Age	-0.00589***	0.00133
Education:		
Primary school	-0.03837	0.04432
Training school	0.031	0.04347
High school	0.146***	0.02904
University degree	0.275***	0.04054
Employment status:		
Self-employed	0.112***	0.03643
Unemployed	-0.032	0.03490
Marital status:		
Single	-0.058*	0.03204
Separated/divorced	0.078*	0.04376
Widow/er	-0.004	0.04716
Area of residence:		
North-West	0.054	0.03988
Centre	0.006	0.03958
South	-0.221***	0.03584
Islands	-0.186***	
Ln(income)	0.164***	0.02311
Town size:		
20.000-40.000	0.123***	0.03582
40.000-500.000	0.095***	0.02723
More than 500.000	0.080**	0.03769
Credit/debit card ownership	0.245***	0.03279
Ln(cash)	-0.062***	0.01624
The number of cash withdr. points	-0.015**	0.00707
Internet usage	0.479***	0.02201
Financial knowledge		
Low	0.038	0.03427
Medium	0.172***	0.03364
High	0.219***	0.03503
Remote working	0.0052*	0.00310
Observations	5945	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

NOTE: All predictors at their mean value

10. Probit regression for home banking usage (SHIW, 2016)

Home banking usage	(1)	(2)	(3)
Female	-0.00967	-0.0187	-0.00489
	(0.0632)	(0.0663)	(0.0669)
Age	-0.0212***	-0.0202***	-0.0206***
	(0.00282)	(0.00298)	(0.00302)
Education:			
Primary school or lower	-0.250**	-0.183*	-0.151
	(0.104)	(0.107)	(0.108)
Training school	0.372***	0.347***	0.310***
	(0.101)	(0.108)	(0.108)
High school	0.492***	0.454***	0.400***
	(0.0686)	(0.0700)	(0.0708)
University degree	0.909***	0.855***	0.769***
	(0.0898)	(0.0924)	(0.0941)
Employment status:			
Self-employed	0.347***	0.419***	0.406***
	(0.0849)	(0.0882)	(0.0865)
Unemployed	-0.101	-0.0842	-0.102
	(0.0809)	(0.0847)	(0.0852)
Marital status:			
Single	-0.0708	-0.0994	-0.0900
	(0.0771)	(0.0796)	(0.0799)
Separated/divorced	0.0876	0.0950	0.0599
	(0.0937)	(0.0951)	(0.0961)
Widow/er	-0.0747	-0.0894	-0.0789
	(0.0965)	(0.0998)	(0.102)
Area of residence:			
North-West	0.0151	-0.00539	-0.0263
	(0.0750)	(0.0764)	(0.0768)
Centre	-0.181**	-0.0826	-0.127
	(0.0764)	(0.0792)	(0.0798)
South	-0.381***	-0.164*	-0.139*
	(0.0856)	(0.0921)	(0.0942)
Islands	-0.483***	-0.384***	-0.421***
	(0.106)	(0.107)	(0.109)
Ln(income)	0.761***	0.796***	0.743***
	(0.0581)	(0.0664)	(0.0679)
Town size:			
20.000-40.000	0.191**	0.198**	0.234***
	(0.0749)	(0.0770)	(0.0786)
40.000-500.000	0.115*	0.102*	0.106*
	(0.0599)	(0.0613)	(0.0626)
More than 500.000	0.252***	0.227**	0.273***
	(0.0967)	(0.101)	(0.102)
Credit/debit card ownership		0.988***	0.914***
		(0.145)	(0.142)
Ln(cash)		-0.402***	-0.389***
		(0.0458)	(0.0462)
Financial knowledge:			
Low			0.227**
			(0.111)
Medium			0.449***
			(0.101)
High			0.651***
			(0.101)
Constant	-7.388***	-6.147***	-5.988***
	(0.600)	(0.670)	(0.678)
Observations	7056	7056	7056
Pseudo R^2	0.305	0.346	0.360

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

11. Probit regression for home banking usage (SHIW, 2014)

Home banking usage	(1)	(2)	(3)
Female	-0.151**	-0.145**	-0.163***
	(0.0597)	(0.0607)	(0.0615)
Age	-0.0140***	-0.0124***	-0.0116***
	(0.00264)	(0.00278)	(0.00283)
Education:			
Primary or lower	-0.318***	-0.231**	-0.221**
	(0.0930)	(0.0992)	(0.0992)
Training school	0.155*	0.143	0.132
	(0.0901)	(0.0928)	(0.0944)
High school	0.634***	0.616***	0.598***
	(0.0610)	(0.0622)	(0.0627)
University degree	0.932***	0.892***	0.868***
	(0.0815)	(0.0813)	(0.0829)
Employment status:			
Self-employed	0.279***	0.337***	0.356***
	(0.0768)	(0.0786)	(0.0800)
Not employed	-0.224***	-0.200**	-0.194**
	(0.0813)	(0.0838)	(0.0852)
Marital status:			
Single	-0.108	-0.0883	-0.0966
	(0.0687)	(0.0707)	(0.0718)
Separated/divorced	0.0270	-0.00131	-0.0156
	(0.0891)	(0.0914)	(0.0909)
Widow/er	-0.186*	-0.204**	-0.224**
	(0.101)	(0.103)	(0.106)
Area of residence:			
North-west	-0.0216	-0.0293	-0.0469
	(0.0646)	(0.0654)	(0.0661)
Centre	-0.207***	-0.213***	-0.161**
	(0.0693)	(0.0704)	(0.0715)
South	-0.570***	-0.538***	-0.413***
	(0.0784)	(0.0804)	(0.0819)
Islands	-0.453***	-0.438***	-0.348***
	(0.0870)	(0.0901)	(0.0900)
Ln(income)	0.698***	0.610***	0.700***
	(0.0561)	(0.0578)	(0.0608)
Town size:			
20.000-40.000	0.175***	0.184***	0.151**
	(0.0657)	(0.0671)	(0.0672)
40.000-500.000	0.206***	0.214***	0.194***
	(0.0549)	(0.0557)	(0.0562)
More than 500.0000	0.161*	0.156*	0.154*
	(0.0876)	(0.0889)	(0.0909)
Credit/debit card ownership		1.033***	0.955***
		(0.125)	(0.128)
Ln(cash)			-0.292***
			(0.0406)
Constant	-7.011***	-7.159***	-6.138***
	(0.588)	(0.616)	(0.637)
Observations	8156	8156	8156
Pseudo R^2	0.298	0.317	0.329

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Bibliography

1. Agarwal, S., Alok, S., Ghosh, P., Ghosh, S., Piskorski, T., Seru, A. (2017). Banking the Unbanked: What Do 255 Million New Bank Accounts Reveal about Financial Access? *Columbia Business School Research Paper No. 17-12*, DOI: http://dx.doi.org/10.2139/ssrn.2906523
2. Aker, J.C., Boumnijel, R., McClelland, A., Tierney, N. (2016). Payment Mechanisms and Antipoverty Programs: Evidence from a Mobile Money Cash Transfer Experiment in Niger. *Economic Development and Cultural Change*. DOI: https://doi.org/10.1086/687578
3. Akhter, S.H. (2015). Impact of Internet Usage Comfort and Internet Technical Comfort on Online Shopping and Online Banking". *Journal of International Consumer Marketing*, 27:3, 207-219. DOI: https://doi.org/10.1080/08961530.2014.994086
4. Arvai K. & Mann K. (2022). Consumption inequality in the digital age. *Eco Notepad nr. 267, Banque de France*. Available at: https://blocnotesdeleco.banque-france.fr/en/blog-entry/consumption-inequality-digital-age
5. Bachas, P., Gertler P., Higgins, S., Seira E. (2018). Digital Financial Services Go a Long Way: Transaction Costs and Financial Inclusion. *AEA Papers and Proceedings*, 108: 444-48. DOI: https://doi.org/10.1257/pandp.20181013
6. Bank of Italy (2021). Annual Report. Available at: https://www.bancaditalia.it/pubblicazioni/relazione-annuale/2020/index.html
7. Bank of Italy (2022). Banks and Financial Institutions: Branch Network - Year 2021. *Statistics.* Available at: https://www.bancaditalia.it/pubblicazioni/banche-istfin/2022-banche-istfin/en_statistiche_STAATER_20220331.pdf?language_id=1
8. Bank of Italy, Special Survey of Italian Households, wave number 5. Available at: https://www.bancaditalia.it/statistiche/tematiche/indagini-famiglie-imprese/indag-straord-famiglie-italiane/index.html
9. Bank of Italy, Survey on Household Income and Wealth, waves 2020, 2016 and 2014. Available at: https://www.bancaditalia.it/statistiche/tematiche/indagini-famiglie-imprese/bilanci-famiglie/distribuzione-microdati/index.html

10. Batsaikhan, U. & Demertzis, M. (2018). Financial literacy and inclusive growth in the European Union. *Policy Contributions 25536*, Bruegel. Available at: https://ideas.repec.org/p/bre/polcon/25536.html
11. Benni, N. (2021). Digital finance and inclusion in the time of COVID-19: Lessons, experiences and proposals. *FAO*. Available at: https://www.fao.org/3/cb2109en/cb2109en.pdf
12. Bensley, E., Chheda, S., Schiff, R., Stephens, D., Zhou, N. (2020). Remaking banking customer experience in response to coronavirus. *McKinsey & Company*. Available at: https://www.mckinsey.com/industries/financial-services/our-insights/remaking-banking-customer-experience-in-response-to-coronavirus.
13. BEREC (2021). Study on post-Covid measures to close the digital divide. Final report. Available at: https://www.berec.europa.eu/en/document-categories/berec/reports/study-on-post-covid-measures-to-close-the-digital-divide
14. Breza, E., Kanz, M., Klapper L. (2020). Learning to Navigate a New Financial Technology: Evidence from Payroll Accounts. *Policy Research Working Paper No. 9495*. Available at: https://openknowledge.worldbank.org/handle/10986/34939
15. Burak, E. & İpek, A.F. (2021). COVID-19's Impact on Attitude & Intention to Use Mobile Banking Applications. *International Journal of Recent Technology and Engineering*. DOI: https://doi.org/10.35940/ijrte.B6226.0710221
16. Callen M., De Mel S., McIntosh C., Woodruff C. (2019). What Are the Headwaters of Formal Savings? Experimental Evidence from Sri Lanka. *The Review of Economic Studies*, vol. 86, issue 6, 2491–2529. DOI: https://doi.org/10.1093/restud/rdz020
17. Chen, S., Doerr, S., Frost J., Gambacorta, L., Shin H.S. (2021). The fintech gender gap. *BIS Working Papers 931*. Available at: https://ideas.repec.org/p/bis/biswps/931.html
18. Chiou, L. & Tucker, C. (2020). Social Distancing, Internet Access and Inequality, *NBER Working Papers 26982*. Available at: http://www.nber.org/papers/w26982
19. Consiglio, V., Jones, G. (2022). Italy lost more jobs than EU partners during COVID crisis; statistics bureau says. *Reuters*. Available at:https://www.reuters.com/markets/europe/italy-lost-more-jobs-than-eu-partners-during-covid-crisis-istat-2022-07-08/

20. Coury, S., Huang, J., Kumar, A., Prince, S., Krikovich, A., Yee, L. (2020.) Women in the workplace. *McKinsey & Company*. Available at: https://www.mckinsey.com/featured-insights/diversity-and-inclusion/women-in-the-workplace
21. COVID-19 boosts the digitalisation of retail banking. (2020). *Deloitte.* Available at: https://www2.deloitte.com/ch/en/pages/financial-services/articles/corona-krise-digitalisierungsschub-im-retailbanking.html
22. Cucinotta, D., Vanelli M. (2020). WHO Declares COVID-19 a Pandemic. *Acta Biomed*. DOI: https://doi.org/10.23750/abm.v91i1.9397
23. D'Alessio, G., De Bonis, R., Neri, A., Rampazzi, C. (2020). Financial literacy in Italy: the results of the Bank of Italy's 2020 survey. *Questioni di Economia e Finanza.* Available at: https://www.bancaditalia.it/pubblicazioni/qef/2020-0588/QEF_588_20_EN.pdf?language_id=1
24. De Marco, F.& Core F. (2021). Public Guarantees for Small Businesses in Italy during COVID-1. *CEPR Press Discussion Paper No. 15799*. Available at: https://cepr.org/publications/dp15799
25. Dedehayir, O., Ortt, R.J., Riverola, C., Miralles, F. (2017). Innovators And Early Adopters In The Diffusion Of Innovations: A Literature Review. *International Journal of Innovation Management,* vol. 21(08), 1-27. DOI: https://doi.org/10.1142/9781786347602_0004
26. Demirguc-Kunt, A., Klapper L., Singer D., Ansar S. (2022). The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19. *World Bank*. Available at: https://openknowledge.worldbank.org/handle/10986/37578
27. Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., Hess, J. (2018). Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. *World Bank*. Available at: https://openknowledge.worldbank.org/handle/10986/29510
28. Demirgüç-Kunt, A., Pedraza, A., Ruiz-Ortega C. (2021). Banking sector performance during the COVID-19 crisis. *Journal of Banking & Finance*, vol. 133. DOI: https://doi.org/10.1016/j.jbankfin.2021.106305
29. Deursen, A. & Helsper, E. (2015). The Third-Level Digital Divide: Who Benefits Most from Being Online? *Communication and Information Technologies*, 29-52. DOI: https://doi.org/10.1108/S2050-206020150000010002

30. Dupas, P., Karlan D., Robinson, J., Ubfal D. (2018). Banking the Unbanked? Evidence from Three Countries. *American Economic Journal: Applied Economics*, 10 (2), 257-97. DOI: https://doi.org/10.1257/app.2016059
31. Erel I. & Liebersohn, J. (2020). Does Fintech Substitute for Banks? Evidence from the Paycheck Protection Program. *NBER Working Paper No. w27659*. Available at: https://ssrn.com/abstract=3670494
32. Eurostat, E-banking and e-commerce, ISOC_BDE15CB. Available at: https://ec.europa.eu/eurostat/databrowser/view/isoc_bde15cbc/default/bar?lang=en
33. Faiella, I. (2008). Accounting for sampling design in the SHIW, *Banca d'Italia, Temi di Discussione (Working Papers*), 662. Available at: https://www.bancaditalia.it/pubblicazioni/temi-discussione/2008/2008-0662/en_tema_662.pdf?language_id=1
34. Filotto, U., Caratelli, M., Fornezza F. (2021). Shaping the digital transformation of the retail banking industry. Empirical evidence from Italy. *European Management Journal*, vol. 39, issue 3, 366-375. DOI: https://doi.org/10.1016/j.emj.2020.08.004
35. Fraillon, J., Ainley, J., Schultz, W., Friedman, T., Duckworth, D. (2018). Preparing for life in a digital world. *International Computer and Information Literacy Study*. Available at: https://www.iea.nl/studies/iea/icils/2018
36. Fu, J. & Mishra, M. (2020). The Global Impact of COVID-19 on Fintech Adoption. *Swiss Finance Institute Research Paper Series 20-38*, Swiss Finance Institute. Available at: https://ideas.repec.org/p/chf/rpseri/rp2038.html
37. Furber, S. (2020). Cash still king in Italy, but fintechs see a wealth of opportunity. *S&P Global Market Intelligence.* Available at: https://www.spglobal.com/marketintelligence/en/news-insights/trending/f2A6Cgx5E35nUYPRIye5Sg2
38. Garín-Muñoz, T., López, R., Pérez-Amaral, T., Herguera García, I., Valarezo, A. (2017). Models for individual adoption of eCommerce, eBanking and eGovernment in Spain. *28th European Regional Conference of the International Telecommunications Society (ITS)*. Available at: http://hdl.handle.net/10419/169460

39. Hantrais L., Allin P., Kritikos M., Sogomonjan M., Anand P.B., Livingstone S., Williams M., Innes M. (2021). Covid-19 and the digital revolution. *Contemporary Social Science*, 16:2, 256-270. DOI: https://doi.org/10.1080/21582041.2020.1833234
40. In Sweden, technology is close to making cash a thing of the past. All aboard with the cashless society? (2021). Available at: https://sweden.se/life/society/a-cashless-society
41. Jiang, M., Rifon, M.J., Cotten, S.R., Alhabash, S., Tsai, K.S., Shillair, R., LaRose, R., (2022). Bringing older consumers onboard to online banking: a generational cohort comparison. *Educational Gerontology*, 48(3), 114–131. DOI: https://doi.org/10.1080/03601277.2021.2021730
42. Jiménez, J.R.Z. & Díaz, I.A. (2019). Educational level and Internet banking. *Journal of Behavioral and Experimental Finance,* vol. 22, 31–40. DOI: https://doi.org/10.1016/j.jbef.2019.01.004
43. Kim, M. (2021). Does the Internet Replace Brick-and-Mortar Bank Branches? Available at: https://minhaekim.org/research/Kim_internet_and_bank_branches.pdf
44. Kwan, A., Lin C., Pursiainen, V., Tai M. (2021). Stress Testing Banks' Digital Capabilities: Evidence from the COVID-19 Pandemic. DOI: http://dx.doi.org/10.2139/ssrn.3694288
45. Lallie, H.S., Shepherd, L.A., Nurse, J.R.C, Erola, A., Epiphaniou G., Maple, C., Bellekens, X. (2021). Cyber security in the age of COVID-19: A timeline and analysis of cyber-crime and cyber-attacks during the pandemic". *Computers & Security*, vol. 105. DOI: https://doi.org/10.1016/j.cose.2021.102248
46. Lee, J. N., Morduch J., Ravindran S., Shonchoy A., Zaman H. (2021). Poverty and Migration in the Digital Age: Experimental Evidence on Mobile Banking in Bangladesh. *American Economic Journal: Applied Economics*, 13 (1), 38-71. DOI: https://doi.org/10.1257/app.20190067
47. Lu, Y., Wang, B., Yang, S. (2011). A study on factors that affect users' behavioural intention to transfer usage from the offline to the online channel. *Computers in Human Behavior*, vol. 27, issue 1, 355-364. DOI: https://doi.org/10.1016/j.chb.2010.08.013
48. Lukovic, V. (2021). Online Banking and Information Technology During the COVID-19 Pandemic: Between the Need and the Ability. *EasyChair Preprint no. 5778*. Available at: https://easychair.org/publications/preprint/KVxm

49. Ma, C., Rogers, J. H., Zhou, S. (2020). Global economic and financial effects of 21st-century pandemics and epidemics. *Covid Economics 5*, 56–78. Available at: https://cepr.org/publications/covid-economics-issue-5
50. Marcu, M. R. (2021). The Impact of the COVID-19 Pandemic on the Banking Sector. *Management Dynamics in the Knowledge Economy*, *9*(2), 203–224. Available at: https://www.managementdynamics.ro/index.php/journal/article/view/416
51. Martins, C., Oliveira, T., 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*, vol. 34, 1-13. DOI: https://doi.org/10.1016/j.ijinfomgt.2013.06.002.
52. Matar, A. & Abdelbaset, M. A. (2022). Adoption of Electronic Cards Using Wi-Fi Platform Services by Clients of Banking Sector During COVID-19 Pandemic. *International Journal of Engineering Business Management*, vol. 14. DOI: https://doi.org/10.1177/18479790221112797
53. Mhlanga, D. (2020). Industry 4.0 in Finance: The Impact of Artificial Intelligence (AI) on Digital Financial Inclusion. *International Journal of Financial Studies*, 8(3):45. DOI: https://doi.org/10.3390/ijfs8030045
54. Moşteanu, N. R., Faccia, A., Cavaliere, L. P. L., Bhatia, S. (2020)."Digital Technologies' Implementation within Financial and Banking System during Socio Distancing Restrictions – Back to the Future. *International Journal of Advanced Research in Engineering and Technology*, 11(6), 307-315. Available at: https://ssrn.com/abstract=3650810
55. Naeem, M., Ozuem W. (2021). The role of social media in internet banking transition during COVID-19 pandemic: Using multiple methods and sources in qualitative research. *Journal of Retailing and Consumer Services*, vol. 60. DOI: https://doi.org/10.1016/j.jretconser.2021.102483
56. Nguyen, H.L.Q. (2019). Are credit markets still local? Evidence from bank branch closings. *American Economic Journal: Applied Economics*, 11(1), 1–32. DOI: http://dx.doi.org/10.1257/app.20170543
57. OECD. (2021). Bridging digital divides in G20 countries. *OECD Publishing*. DOI: https://doi.org/10.1787/35c1d850-en

58. Oertzen, A.S. & Odekerken, G. (2019). Achieving continued usage in online banking: a post-adoption study. *International Journal of Bank Marketing*. DOI: https://doi.org/10.1108/ijbm-09-2018-0239
59. Oggero, N., Rossi, M.C., Ughetto, E. (2020). Entrepreneurial spirits in women and men. The role of financial literacy and digital skills. *Small Bus Econ 55*, 313–327. DOI: https://doi.org/10.1007/s11187-019-00299-7
60. Orkun, S., Eichengreen, B., Aksoy, C.G. (2021). Epidemic Exposure, Fintech Adoption, and the Digital Divide. *Working Paper nr. 29006*, National Bureau of Economic Research. DOI: https://doi.org/10.3386/w29006
61. Picoto, W.P. & Pinto I. (2021). Cultural impact on mobile banking use – A multi-method approach. *Journal of Business Research*, vol. 124, 620-628. DOI: https://doi.org/10.1016/j.jbusres.2020.10.024
62. Rinderud, P. (2021). Seniors and technology during COVID-19: The latest insights. *Ericsson Blog*. Available at: https://www.ericsson.com/en/blog/2021/1/seniors-and-technology-during-covid
63. Sang, N. M. (2021). Critical Factors Affecting Consumer Intention of Using Mobile Banking Applications During COVID-19 Pandemic: An Empirical Study from Vietnam. *The Journal of Asian Finance, Economics and Business*. 8(11), 157–167. DOI: 10.13106/JAFEB.2021.VOL8.NO11.0157
64. Servon, L. & Kaestrner, R. (2008). Consumer Financial Literacy and the Impact of Online Banking on the Financial Behavior of Lower-Income Bank Customers. *Journal of Consumer Affairs*, vol. 42, 271 – 305. DOI: https://doi.org/10.1111/j.1745-6606.2008.00108.x
65. Sostero, M., Milasi, S., Hurley, J., Fernandez-Macias, E., Bisello, M. (2020). Teleworkability and the COVID-19 crisis: A new digital divide? *A Joint European Commission–Eurofound Report* (No JRC121193). Available at: https://ec.europa.eu/jrc/sites/jrcsh/files/jrc121193.pdf
66. Stefanovic N., Barjaktarovic, L., Bataev, A. (2021). Digitainability and Financial Performance: Evidence from the Serbian Banking Sector. *Sustainability*, 13(23):13461. DOI: https://doi.org/10.3390/su132313461

67. Suter, J., Landzaat, W., Natriaj, A. (2019). Behavioural study on the digitalisation of the marketing and distance selling of retail financial services: final report. DOI: https://data.europa.eu/doi/10.2818/982380
68. The Covid Crime Index Report (2021). Available at: https://www.baesystems.com/en-financialservices/insights/the-covid-crime-index
69. The Digital Economy and Society Index (DESI) (2022). Available at: https://digital-strategy.ec.europa.eu/en/policies/desi
70. Viviano, V. & Michelangeli, V. (2021). Can Internet Banking Affect Households' Participation in Financial Markets and Financial Awareness? *Bank of Italy Temi di Discussione,* No. 1329. DOI: http://dx.doi.org/10.2139/ssrn.3852384
71. Williams, R. (2012). Using the margins command to estimate and interpret adjusted predictions and marginal effects. *The Stata Journal,* 12(2), 308-331. Available at: https://journals.sagepub.com/doi/pdf/10.1177/1536867X1201200209
72. Wooldridge, J. M. (2012). *Introductory Econometrics. A Modern Approach*. 5th edition. Mason, Ohio: South-Western Cengage Learning.
73. Zanichelli, F. (2020). Principali risultati dell'indagine straordinaria sulle famiglie italiane nel 2020. *Banca d'Italia*. Available at: https://www.bancaditalia.it/pubblicazioni/note-COVID-19/2020/Evi-preliminari-ind-straord-famiglie.pdf
74. Zheng, Y. & Walsham, G. (2021). Inequality of what? An intersectional approach to digital inequality under COVID-19. *Information and Organization*, 31(1). DOI: https://doi.org/10.1016/j.infoandorg.2021.100341