
The FinTech Sector and Aspects on the Financial Inclusion of the Society in EU Countries

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Abstract:

Purpose: The purpose of the article is to analyze the impact of FinTech factors on the financial inclusion of the society. The explanatory variables define the level of development of the FinTech sector in a given EU country. The article analyzes the impact of the FinTech sector on the financial inclusion of society, defined as the 1-% model of people having a bank account and the 2 -% model -% of people with access to internet banking.

Design/Methodology/Approach: As part of the research, an analysis of factors was carried out from the universally understood banking environment influencing the FinTech digital inclusion of society in the European Union countries in 2012-2019. The data for the research was obtained from the IMF (Financial Access Survey), ECB (Statistical Data Warehouse), Eurostat, BIS, ESMA databases.

Findings: The article shows the important relationships between FinTech variables and the financial inclusion of society. The existing literature research was confirmed and new variables influencing financial inclusion were identified, including functioning of the regulatory sandbox and innovation hub as well as the level of employment in the area using information and communication technology - ICT.

Practical Implications: The article suggests creating an environment conducive to the implementation of financial innovations that improves the level of financial inclusion.

Originality/value: The digitization of banking services in recent years has considerably influenced the way the society uses banking services. The increasing use of the Internet to use banking services allows a wider group of people to access these services.

Keywords: FinTech, financial inclusion, banking.

JEL codes: G21, I25.

Paper type: Research article.

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1. Introduction

Innovation cycles have accelerated considerably, adapting to the needs reported by the society (OECD, 2019). The solutions proposed by FinTechs and BigTechs are gaining more and more popularity (ROFIEG, 2019). The FinTech sector can support economic growth and reduce exclusion in access to financial services (Ehrentraud *et al.*, 2020). The rapid technological development has influenced the functioning of the economic world so significantly that the main channel for providing financial services are electronic banking channels (Skan, 2015). Non-traditional institutions - using digital platforms, have become participants in the financial market, effectively challenging traditional financial institutions and using their financial capabilities and large databases. The emergence of FinTechs increasingly fills the gap in the financial inclusion of society (Salampasis *et al.*, 2018).

The purpose of the article is to analyze the impact of factors describing the FinTech sector on the financial inclusion of society. The explanatory variables were divided into two groups; macroeconomic - previously verified in the literature on the subject and FinTech, the impact of which on the society is increasingly significant.

Therefore, the article verified the research hypothesis (*H1*): *the FinTech sector has a significant impact on the financial inclusion of society. In addition, the article presents a research hypothesis (H2): the FinTech sector has a stronger impact on the improvement of the financial inclusion of society in countries recognized as innovation leaders than in countries classified as moderate innovators.* Panel models based on fixed and random effects were used to verify the hypotheses. The research sample consisted of the European Union countries (27), and the research period covered the years 2012-2019.

The article presents an in-depth analysis of the FinTech sector for the financial inclusion of society, i.e., in the 1% model of people having a bank account and the 2-% model of people with access to internet banking. Additionally, to verify the hypothesis (*H2*), the EU countries were divided into two groups of countries: innovation leaders (model 3) and moderate innovators (model 4). The article reviews domestic and world literature and describes the research methodology. Then, the most important research results are presented, and conclusions are presented.

2. Literature Review

New entities on the financial market offer financial services focused on consumer needs, using, among others, crisis of confidence in banks after the financial crisis of 2007-2009 (Ferrari, 2016). It is believed that the global financial crisis 2007-2009 weakened consumer confidence in banks, reduced their competitiveness and had a negative impact on the profitability of banks. Additionally, it had an impact on the lower availability of loans for individuals and SMEs and led to a high percentage of

unemployed people who were more willing to use new digital solutions offered by non-traditional financial institutions (Bhasin, 2018). According to, among others de Hann, one of the reasons for the rapid expansion of the FinTech sector is the decline in public confidence in traditional financial institutions because of the financial crisis (de Haan *et al.*, 2015). Nevertheless, one of the main barriers to the development of FinTechs is to convince the society of their services, therefore, despite the rich digital vision, gaining the trust of customers is a major obstacle for them (The World Bank, 2020). FinTech companies create new business models, influencing better adjustment of products to customer needs (Lee and Shin, 2018; Paul and Sandeep, 2019). Numerous factors influencing the development of the FinTech market affect the dynamic growth of the number of these companies in the post-crisis period. The number of FinTech companies has been systematically growing since 2009 (Szmigiera, 2019). However, determining the number of FinTech companies is difficult (Buchak, 2018; Thakor, 2020), and the FinTech sector, despite facilitating access to banking services, may also pose a threat to financial stability (FSB, 2017), especially in terms of systemic risk (Lumpkin and Schich, 2020).

Financial inclusion is most usually defined as a process in which citizens have no difficulties in accessing and/or using such financial products and services under the so-called main market, which correspond to their needs and enable them to lead a normal financial life in the society to which they belong (European Commission, 2008). Financial inclusion very often may take voluntary or compulsory form among the society (Beck *et al.*, 2009). Digital financial inclusion is a critical component of efforts to include groups of people who are not and do not want to be part of the formal financial system (Ozili and Peterson, 2018). The digitization of banking services enables servicing the rural and remote population, and through cheaper transactions, it enables access to the financial sector for clients with a small current account balance, low income and irregular income generated in the shadow economy (Optix, 2015). For that reason, in recent years, there have been initiatives based on the implementation of new technologies, aimed at increasing financial inclusion in society (de Koker and Jentzsch, 2013; Levin *et al.*, 2018; Hotchkiss *et al.*, 2018), and aimed at enabling public access to credit and reducing information asymmetry (Sapovadia, 2018). Additionally, digital financial services also help reduce the risk of loss, theft and other financial crimes related to cash transactions, as well as lower costs associated with cash transactions (Munezza *et al.*, 2018).

Financial integration, defined as the use of formal financial services, has a fundamental impact on economic development. People who are financially inclusive can invest in education and start businesses, what contributes to poverty reduction and economic development (Beck *et al.*, 2007). Financial inclusion is increasingly dependent on the digitization of financial services (Beck, 2018; Wang and Guangwen, 2020). Additionally, thanks to financial digitization, it is possible to have additional financial services tailored to the needs of clients and their financial situation (Bourreau and Valletti, 2015). The development of finance favors the financial inclusion of society (Stern *et al.*, 2017), and the first step towards financial inclusion is having a

bank account (Sarma *et al.*, 2015). As we can see, previous research studies and the World Bank report have used account numbers at formal financial institutions (% , age 15+), loans from financial institutions in the past year (% , age 15+), electronic means used to make payments (% , age 15+), and debit card ownership (% , age 15+), etc. as proxy variables for financial inclusion (Demirguc-Kunt, 2012; der Werff, 2013; World Bank, 2013; Dai-Won, 2018).

One of the most frequently used variables in the subject literature, determining financial inclusion, is economic growth and the level of education of society (Pickens *et al.*, 2009; Allen *et al.*, 2016; Dai-Won *et al.*, 2018; Grohmann *et al.*, 2018). The World Bank believes that greater use of digital finance contributes to greater financial integration (Malady, 2016). Digital financial inclusion is more and more often the subject of research in the literature on the subject, as it allows access to banking services to people who previously did not have such an opportunity (Peric, 2015). Therefore, banks and FinTech companies more and more often base their business models on the digitization of banking services (Milan, 2019; Alameda, 2020), as this allows them to offer services at lower costs, and this favors financial inclusion (Allen, 2012).

3. Research Methodology

As part of the research, an analysis was carried out of the factors characterizing the FinTech sector for the financial inclusion of society in the European Union countries in 2012-2019. The data for the research was obtained from the IMF (Financial Access Survey), ECB (Statistical Data Warehouse), Eurostat, BIS, ESMA and OECD databases. Ultimately, the 27 EU countries (excluding the UK) were included in the research in eight-year time series. To carry out statistical tests, it was decided to use panel models based on established random effects. To verify the H1 hypothesis, 1-2 models were created - describing panel studies, where the dependent variable was the financial inclusion of the society: model 1 -as % of people with a bank account (WL_FIN) and model 2 – as % of people with access to online banking (WL_FIN2). To verify the hypothesis H2 models 3 and 4 were created - describing panel studies, where the dependent variable was the financial inclusion of the society defined as % of people with access to internet banking (WL_FIN2). In countries considered to be innovation leaders, the % of people having a bank account is very often close to 100%, therefore, it was not valid to analyse the hypothesis (H2) for this dependent variable.

The EU countries have been divided into two groups - depending on the Global FinTech Index of Findexable (Othman, 2020). Within these groups the countries were included categorized as:

- innovation leaders - Lithuania, the Netherlands, Sweden, Estonia, Germany, Spain, Finland, France, Ireland, Denmark, Luxembourg, Italy, Austria, Belgium,

• moderate innovators - Portugal, Poland, Czech Republic, Malta, Greece, Cyprus, Latvia, Hungary, Slovenia, Bulgaria, Romania, Croatia, Slovakia.

Among the dependent variables, the model includes macroeconomic variables, the relationship of which was very often verified in the literature on the subject - increase in GDP (GDP), ROE indicator (ROE) and the number of commercial bank branches per 100 thousand people (L_ODDZ). As part of the variables defining the FinTech sector, the model includes: the level of employment in the knowledge-based services sector - an area using information and communication technology - ICT - (ZAT), the loans granted by FinTech companies (F_KRED), the functioning of the regulatory sandbox (PR) and innovation hub (IH) in a given EU country - defined variable 0 (none) or 1 (existence), % of people using mobile devices or handheld devices to access the Internet (MOB) and annual venture capital investments (V).

4. Research Results and Conclusions

The analysis of the impact of the FinTech environment (explanatory variables) on the financial inclusion of the society (dependent variable) concerned the verification of the research hypothesis H1 in models 1 and 2 (Table 1).

Table 1. Results of the panel study on determinants of the financial inclusion of society (*WL_FIN* and *WL_FIN2*), in the years 2012 - 2019, EU countries

	Model 1: WL_FIN			Model 2: WL_FIN2		
	factor	value "p"		factor	value "p"	
const	65,6460	***	0,0000	3,5040		0,3548
GDP	0,4199	**	0,0413	0,8541	***	0,0017
ROE	0,0786	***	0,0086	0,0719	*	0,0667
L_ODDZ	-0,0134		0,7050	-0,3245	***	0,0000
ZAT	2,9613	***	0,0000	9,6235	***	0,0000
F_KRED	-0,0012		0,5119	-0,0039		0,1222
PR	0,9304		0,7011	12,1929	***	0,0002
IH	4,5348	***	0,0044	8,5024	***	0,0000
MOB	0,2648	***	0,0000	0,3778	***	0,0000
V	0,0053	***	0,0082	0,0087	***	0,0010
within R-kwadrat			0,4121			0,7497
number of observations			216			216
units of time			8			8
number of crosssectional data per unit time			27			27

Source: Own calculations based on panel research.

Through the panel studies used to develop models 1 and 2 (Table 1), the research hypothesis (H1) was verified. the FinTech sector has a significant impact on the

financial inclusion of society. As a result of the conducted research, it can be clearly indicated that the FinTech sector has a significant impact on improving the financial inclusion of society in EU countries. The variables defining the sector of new technologies used in the financial sector have a significant impact on the financial inclusion of society, defined both as the % of people having a bank account, and access to internet banking. Models 1 and 2 prove a statistical relationship between the financial inclusion of society and: the level of employment in the knowledge-based services sector, the functioning of the innovation hub in a given EU country, the % of people using mobile devices or pocket devices to access the Internet and venture capital investments.

Therefore, in order to improve financial inclusion in a given society, the above variables defining the FinTech sector should be supported. In addition, it has been shown that the functioning of the regulatory sandbox contributes to the improvement of public access to online banking. There was no statistically significant correlation between financial inclusion and loans granted by FinTech companies. The different level of financial inclusion of the society - especially in terms of the % of people with access to internet banking, directed more detailed research, leading to the division of EU countries into two categories: innovation leaders and moderate innovators. In order to verify the H2 hypothesis, panel studies were carried out in models 3 and 4 (Table 2).

Table 2. Results of the panel study on determinants of the financial inclusion of society (*WL_FIN2*), for innovation leaders (model 3) and moderate innovators (model 4), in the years 2012-2019, the EU countries

	Model 3: innovation leaders			Model 4: moderate innovation		
	factor	value "p"		factor	value "p"	
const	18,0795	***	0,0000	17,1901	**	0,0280
GDP	-0,1246		0,5888	-0,4293		0,3932
ROE	0,3651	***	0,0011	0,0286		0,5313
L_ODDZ	-0,2069	***	0,0000	-0,4840	***	0,0010
ZAT	8,1338	***	0,0000	9,4171	***	0,0000
F_KRED	-0,0013		0,4354	0,0285	*	0,0703
PR	5,4772	**	0,0288	6,0305		0,4753
IH	6,4673	***	0,0000	-0,5187		0,8894
MOB	0,2137	***	0,0026	0,1378		0,1574
V	0,0049		0,1520	-0,1991	***	0,0066
within R-kwadrat			0,8302			0,4749
number of observations			112			104
units of time			8			8
number of crosssectional data per unit time			14			13

Source: Own calculations based on panel research.

Models 3 and 4 verified the hypothesis H2, which states that the FinTech sector has a stronger impact on the improvement of the financial inclusion of the society in countries considered to be innovation leaders than in countries classified as moderate innovators. Table 2 presents the significant impact of the variables describing the financial inclusion of society in countries considered to be strong innovators. In these countries, a significant correlation was indicated between the % of people with access to online banking and the level of employment in the knowledge-based sector, the functioning of the regulatory sandbox and innovation hub, and the % of people using mobile devices or pocket devices to access the Internet. In the case of countries defined as moderate innovators, such significant correlations between the FinTech sector and financial inclusion have not been demonstrated (even a negative correlation with venture capital investments has been demonstrated). This may signal that in countries considered to be moderate innovators, other factors affect the faster financial inclusion of the society, or the activity of FinTechs is so weak that they do not affect the improvement of financial inclusion.

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