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Financial inclusion and poverty: evidence from Turkish household survey data

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ABSTRACT

Even though poverty is highly felt in developing economies, the lack of relevant and complete micro-level data limits understanding which households are more exposed to poverty and the role of financial inclusion in poverty in these countries. This research analyzes the effects of financial inclusion proxied by a multidimensional index on three poverty measures (the lowest-income poverty line, a lower-middle-income line, and an upper-middle-income line) by employing the recent Turkish Household Budget and Consumption Expenditure Survey data with 11,595 complete answers. In addition to the application of logistic regressions, this study addresses possible endogeneity issues by using access to the nearest bank as an instrument in a two-stage least-squares regression and employing the novel method as a robustness check. Empirical results point out that an increase in financial inclusion decreases poverty in Turkey. The adverse effect of financial inclusion on poverty is validated through a few robustness and sensitivity analyses. The outcome also indicates that health expenditure and income are essential through which poverty is influenced by financial inclusion. Thus, policies are required to enhance the financial inclusion of households to alleviate poverty. Further discussions are presented in this study.

KEYWORDS

Poverty; financial inclusion; endogeneity; Turkey

JEL CLASSIFICATION

B23; C22; C42; I30

I. Introduction

Financial inclusion (FI) refers to the ability to access and use at least a simple range of financial services such as having a deposit or transaction account at a financial institution that can be used to store, save or transfer money by all members of an economy (Sarma 2008; Demirgüç-Kunt et al. 2018). The promotion of financial inclusion and the provision of greater access to financial services for low-income households stand as significant policy objective, particularly for developing countries. Access to financial services is also repeatedly mentioned in the Sustainable Development Goals of the United Nations for 2030. The statement of financial inclusion as a policy objective by many authorities has its roots in financial-economic growth (King and Levine 1993; Levine 2005) and poverty reduction (Churchill and Marisetty 2020). Financial inclusion is expected to bring several benefits to households, financial system, and the economy as a whole. FI is assumed to decrease the cost of capital through an efficient allocation of funds in the financial system. By providing access to proper financial services, FI enables the households of an economy to manage

their finances. Moreover, FI alleviates the use of informal credit sources that create exploitative actions in the financial system (Sarma and Pais 2011). Accordingly, the financial inclusion level in a system is expected to increase efficiency and welfare by providing secure and safe means to access and accumulate various financial services to households.

According to theoretical and empirical evidence, financial systems provide the resources and mechanisms to aid low-income people pro-poor growth (Beck, Demirgüç-Kunt, and Maksimovic 2004). Financial services and mechanisms should be provided to all people in a society with the depth and extent of the available services. Consequently, growing evidence suggests that financial inclusion and providing services to the poor favorably influence growth and poverty alleviation. Without access to proper financial services, it is unlikely for low-income households to accumulate savings, hedge against risks that might be diminished through insurance and invest in income-generating activities (Hannig and Jansen 2010). Despite the relationship between finance and economic growth, there is

a controversial relationship between FI and poverty. The literature has accumulated an ample amount of evidence that FI is associated with lower poverty by providing services to diminish the poverty of low-income (Chibba 2009; Swamy 2014; Park and Mercado 2018). Alternatively, if there is an uneven income distribution within an economy, finance via economic growth is likely to increase the incomes of the rich and worsen the poverty of the poor (Churchill and Marisetty 2020). Given the income inequalities worldwide, it is highly crucial to investigate the impacts of FI on the households' poverty. Moreover, human development and civilization progress are hindered through poverty (Chen, Rong, and Song 2021).

This study for the first time in the literature investigates the impact of FI on poverty in Turkey, considering three poverty measures suggested by the World Bank Report (2020), namely the lowest-income poverty line (extreme poverty), a lower-middle-income line (lower poverty) and an upper-middle-income line (upper poverty). This study uses recent microdata from Turkish Household Budget and Consumption Surveys collected by the Turkish Statistical Institute (<https://www.tuik.gov.tr>). Furthermore, FI is uniquely constructed using four dimensions by following the existing literature and data limitation, namely insurance holder, habit of online shopping, credit card holder, and the saving behaviour of respondents. A small body of literature investigates the impact of FI on poverty (Koomson, Villano, and Hadley 2020a; Gutiérrez-Romero and Ahamed 2021). By following other studies, which analyse the effects of FI on poverty (Koomson and Danquah 2021; Dogan, Madaleno, and Taskin 2021), endogeneity issues might arise in the dataset, and for that we instrument financial inclusion with access to the nearest bank by employing the two-stage least-squares model (2SLS). Furthermore, the novel Oster's (2019) approach is employed as a robustness check since it allows dealing with omitted variable bias and unobservable selection (a common concern of non-experimental survey data). Given the United Nations millennium development goals, the most significant and perhaps most challenging goal is to end extreme poverty. Thus, the analysis of FI on different poverty measures is of crucial importance. Even though Turkey is one of the G-20 and OECD members, it is still witnessing

huge income inequalities (Filiztekin 2020). Besides, Turkey is ranked 16th on the financial inclusion index (Sarma and Pais 2011) and 62th in the list of countries by the share of the population with access to financial services (WDI 2021). It is noted that there are many credit card holders in the country (Demirguc-Kunt and Klapper 2013). Given these facts and explanations, the case of Turkish households is worth studying, and the analysis of FI and poverty nexus should provide essential information for developing and emerging economies.

The remainder of the paper is as follows: In Section 2, a brief framework and literature review are presented. Section 3 provides data and methodology, whereas section 4 presents and discusses the empirical results. Finally, Section 5 concludes this work.

II. Framework and literature review

Financial inclusion

There are different approaches to define financial inclusion in the literature. Some strand of literature explains FI as being linked to having a bank account at a bank and having access to affordable credit and payment systems. In another line of research, FI is explained as aiming at pulling the unbanked population into a formal financial system so that they will enjoy various financial services (Hannig and Jansen 2010). Several papers in the literature define financial inclusion through explanations of financial exclusion. Financial exclusion is explained as processes that prevent certain groups and households to gain access to the formal financial system (Leyshon and Thrift 1995). Financial exclusion from another perspective is related to the inability to access required financial services (Sinclair 2001; Carbo, Gardener, and Molyneux 2005). Given these definitions, many papers relate FI with distance to the nearest bank, to 22% of the adults in the world refer to distance as a barrier that hinders FI (Ghosh 2020). This percentage is higher for low-income and developing countries (Demirgüç-Kunt, Klapper, and Singer 2017).

Despite the common understanding that FI can be explained as access to credit from formal financial institutions, yet the magnitude of the concept is

wider. From one viewpoint, formal accounts of households involve loans and deposits and the frequency of the use, access modes, and the aims for holding these accounts should be of concern to evaluate FI. From another viewpoint, there may be alternatives to formal accounts, such as mobile money, and the existence of insurance, especially for health and agriculture that are significant dimensions of FI (Demirguc-Kunt and Klapper 2012). The measurement of FI has various dimensions, yet several criteria can be adopted to understand the level of FI. The households' access to financial services and products from formal institutions like costs or physical distance to the nearest financial service point or the proportion of the population with a bank account is a proxy for FI. The quality of the financial services provided, that is, their match with the needs of households and the nature and complexity of the relationship of the household with the financial institution is another aspect. The impact is another dimension of FI, in which FI can be measured by considering the changes in the lives of households that are related to the usage of financial services (Hannig and Jansen 2010), that is impact on poverty or economic development.

Financial inclusion and poverty relationship

FI within the broader context of inclusive development is viewed as an important means to tackle poverty and inequality (Chibba 2009). FI can facilitate the alleviation of poverty and inequality by enabling people to invest in the future, smooth consumption with significant welfare gains (Bacchetta and Gerlach, 1997) and cope with financial uncertainties (Demirgüç-Kunt, Klapper, and Singer 2017). FI is likely to reduce poverty by enabling better education, health, and provision of better employment opportunities (Stein, Yannelis, and Cornelli 2020; Banerjee et al. 2015). FI and poverty relationship is conveyed on direct and indirect channels (Zhuang et al. 2009; Koomson, Villano, and Hadley 2020a). The direct channel suggests that FI has a diminishing impact on poverty by providing households access to financial services such as credit and insurance. These services will boost the productive assets of low-income households, which will expand their

economic potential (Jalilian and Kirkpatrick 2002). Thus, those services will supply the resources the consumption and investment needs, which will augment economic growth (King and Levine 1993).

The indirect channel between FI and poverty relationship proposes that funds pooled in the financial system escalate economic growth that will reduce the poverty of the lower-income households by creating employment and increasing government spending to improve social services such as health and education (Abosedra, Shahbaz, and Nawaz 2016). First, economic growth could provide jobs for the poor, and an increase in economic growth might reduce wage differentials between skilled and unskilled workers (Galor and Tsiddon 1996). Higher tax revenues because of higher economic activity could increase social spending and benefit lower-income households who can then invest more in human capital (Perroti 1993). The income of the poor could increase as more funds become available with the resulting increase in capital accumulation. Several studies noted that FI decreased poverty in various country settings. Burgess and Pande (2005) considered the success of state-led branch expansion programs in India and noted that rural branch expansion is linked with a 14% to 17% decline in rural poverty headcount ratio but not urban poverty. Neaime and Gaysset (2018) focused on the impact of FI on income inequality, poverty conditions, and financial stability for MENA countries, and FI is found to have no significant effect on the poverty ratio. Park and Mercado (2016) investigate the role of FI in diminishing poverty and income inequality in 177 countries by constructing a composite indicator of FI, using commercial bank branches, ATMs, and borrowers with and depositors from commercial banks per adult and domestic credit-to-GDP ratio. Their findings report a significant correlation of FI with a lower poverty ratio. Park and Mercado (2018) provide a new FI index through principal component analysis for 151 countries and analyze the impact of FI on poverty and income inequality. The results of the analysis suggest that higher FI has a significant association with economic growth and lower poverty rates; nevertheless, this is valid only for high- and middle-high income economies. Kar, Agir, and Peker (2011) investigate the

direction of causality between financial development, economic growth, and poverty reduction in Turkey. They report that economic growth Granger causes poverty reduction, but they also note a weak causality from FI to poverty in a short period.

Furthermore, Koomson, Villano, and Hadley (2020a) examine the FI–poverty relationship for Ghana. The findings support that FI has decreasing effects on household poverty by 27%. The literature notes significant impacts of innovative financial products that increase access to credit and savings on the adoption of risk-reducing technologies for households (Hallegatte et al. 2016). Emara and Mohieldin (2020) focus on the impact of FI on extreme poverty for a sample of 34 countries. Financial access measures are found to decrease extreme poverty for both the full sample and the MENA region. Some of the literature investigating finance and poverty relationships note inconclusive results such as Beck, Demirgüç-Kunt, and Levine (2007), Jalilian and Kirkpatrick (2002), Jeanneney and Kpodar (2008). Despite an ample number of papers reporting inconclusive outcomes on finance, growth, and poverty reduction relationship, a consensus has recently been reached suggesting that FI reduces poverty (Abosedra, Shahbaz, and Nawaz 2016). As a summary and critical evaluation of the existing literature, the majority of the studies investigating poverty determinants focus mostly on low-income countries in which financial inclusion as a determinant is considerably low. A study of the FI-poverty relationship for an emerging country like Turkey is expected to provide interesting outcomes for policymakers.

III. Data and methodology

The data employed in this study come from the 2018 Household Budget and Consumption Surveys provided with special permission by the Turkish Statistical Institute (<https://www.tuik.gov.tr>). All data, descriptions of variables, and summary statistics are provided in Table 1. The entire dataset consists of 11,595 respondents who completely answered the survey in 2018. Poverty-related measures are described by ExtremePOV, LowerPOV, and UpperPOV, whose definitions besides being

included in Table 1 are to be presented in the following subsection. Household characteristics include gender, age, educational level, civil status, the number of persons living within the property, the ownership or not of the home, and the employment status of the respondent. As for the ownership of the home, it is recognized in the literature that homeownership ameliorates poverty and inequality in Turkey (Tekgüç 2018). Also, for Turkey, Acar, Anil, and Gursel (2017) show that the identification of poor changes significantly depending on which definition is used and that the probability of not being poor increases if we verify home ownership, better education, and employment.

From Table 1, we can infer that most of the respondents are males, their average age is about 50, and most respondents are married. On average, the highest majority of respondents have a high school or fewer diplomas and three people live on the property. Only 61% of the respondents are homeowners and on average almost the same percentage, 66.7% are employed. Going back to financial inclusion variables, we see that Turkish people are keen on risk management since almost all the respondents own insurance. A similar finding was specified by Koomson, Villano, and Hadley (2020a) but for Ghanaians. Moreover, Turkish households, on average, use more credit cards than do savings, leading them to be more vulnerable in the face of unstable situations.

Measures of poverty

Even though the definition of poverty can take different forms according to governments and policymakers, the World Bank expresses it in absolute terms. According to the World Bank Report (2020), extreme poverty (ExtremePOV) is the International Poverty Line 4.2 in the Turkish lira (2018) or US\$1.90 (2011 PPP) per day per capita; lower poverty (LowerPOV) is the Lower Middle Income Class Poverty Line 7.1 in Turkish lira (2018) or US\$3.20 (2011 PPP) per day per capita; upper poverty (UpperPOV) is the Upper Middle Income Class Poverty Line 12.2 in Turkish lira (2018) or US\$5.50 (2011 PPP) per day per capita. This was the poverty measure followed in the current study. These three poverty measures allow us

Table 1. Summary statistics of control variables.

Variable	Description	Obs	Mean	Median	Std. Dev.
<i>Poverty-related measures</i>					
ExtremePOV	equals 1 if per day per capita is below 4.2 in Turkish lira or US\$1.90 (2011 PPP)	11,595	0.0015	0.0	0.038
LowerPOV	equals 1 if per day per capita is below 7.1 in Turkish lira or US\$3.20 (2011 PPP)	11,595	0.0080	0.0	0.089
UpperPOV	equals 1 if per day per capita is below 12.2 in Turkish lira or US\$5.50 (2011 PPP)	11,595	0.0448	0.0	0.207
<i>Household characteristics</i>					
Female	equals 1 if household is female	11,595	0.150	0.0	0.357
Age	Age of household	11,595	50.680	50.0	14.456
Edu	equals 1/2/3/ 4 if household's highest education level achieved is no diploma/less than bachelor diploma/bachelor diploma/graduate diploma	11,595	2.059	2.0	0.554
Married	equals 1 if household gets married	11,595	0.822	1.0	0.383
Hsize	The number of adults and children living on the property	11,595	3.451	3.0	1.745
Own	equals 1 if household owns a home	11,595	0.611	1.0	0.488
Job	equals 1 if household is with a job	11,595	0.667	1.0	0.471
<i>Financial Inclusion</i>					
Saving	equals 1 if household does saving	11,595	0.386	0.0	0.486
Insurance	equals 1 if respondent owns insurance	11,595	0.950	1.0	0.217
Credit_card	equals 1 if household use credit card	11,595	0.504	1.0	0.499
Online_shopping	equals 1 if household does online shopping via internet	11,595	0.102	0.0	0.304

to consider distinct poverty dimensions based on income poverty. By exploring the effects of socio-demographic variables and financial inclusion effects over poverty, we can capture distinguishing features of the Turkish population, their poverty situation, and state, but also analyse poverty lines and ways to get out of those levels through financial inclusion.

Financial inclusion

This research uses an index of financial inclusion (FI) that is composed of four dimensions; namely, insurance holder, habit of online shopping, credit card holder, and the saving behaviour of respondents (Churchill and Marisetty 2020; Koomson, Villano, and Hadley 2020a; Koomson and Danquah 2021; Dogan, Madaleno, and Taskin 2021) as well in line with the World Bank's definition of FI 'Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way'. First, each dimension is equally weighted 0.25 and used to make the respondents' financialization scores. Then, a household is given a value of 1 if the score is equal to or above the threshold level of 0.5, and the value 0 if otherwise. Table 1 indicates the descriptive statistics for the four variables. In detail, 95% of the households own insurance while about half of the respondents use a credit card. Online shopping behaviour is low, whereas one-third of households make savings.

Regarding insurance holders' questions, the respondents had to answer the question: 'Whether the household has any member, who pays premiums for health insurance, individual retirement fund or discretionary retirement fund, etc., or Not'. The answer was of the dichotomous form Yes or No, as in the question of credit cardholders: 'Whether the household has any member, who use a credit card, or not'. Concerning the habit of shopping online, households had to answer: 'Whether the household has the habit of shopping via the internet, or not'; so Yes or No. Finally, about the saving behaviour of respondents, 'Whether the household has any member, who has habit of savings (i.e. real estate, membership to house co-operatives, gold, foreign currency, bank account, stock certificate, bill of exchange, bond; fund participation certificate; investments for work; lend money with an interest); or, Not'.

In Turkey, there are 47 banks, 10.128 branches and 46.749 ATMs actively participating in the system as of 2019 (TBB 2019). The literature regarding the determinants of bank branch location in developing countries suggest population size, percentage of urban residents, workforce size, and literacy level are significant determinants (Ansong, Chowa, and Adjabeng 2015; Zhang, Arora, and Colombage 2021). On the other hand and more importantly Turkish Banking Association explores that branch location is not clearly determined by the level of economic development, population size or the amount of deposits and loans used in the city, which indicate that households of the less developed regions almost have the equal opportunity to access financial services (TBB 2019).

Methodology

We begin the empirical analysis by applying logistic regression to the poverty measures identified previously. Logistic regression is appropriate when the dependent variable is dichotomous (binary), and the poverty measures we consider as dependent variables respect the assumption. It consists of predictive analysis used to describe data and to explain the relationship between one dependent binary variable and one or more nominal, ordinal, or interval independent variables. As mentioned previously, variables are described in Table 1, where we have all these sorts of data variables to be included in the analysis. Mathematically, logistic regression estimates a multiple linear regression function defined as in Equation (1) and considers the data used.

$$Y_i^* = \log\left(\frac{P_i}{1 - P_i}\right) = \alpha_0 + \alpha_1 FI_i + \alpha_2 HC_i + \varepsilon_i \quad (1)$$

where is Y_i^* a latent variable that stands for the log of the odds ratio ($P_i = 1$ if the respondent belongs to one of the poverty-related measures ExtremePOV, LowerPOV or UpperPOV, and 0 otherwise), FI means households financial inclusion level and HC represents Table 1 identifies household characteristics. α represent the coefficients of the variables and ε_i the error term. Y_i denotes a random binary variable that in this article equals 1 if the respondent is in any poverty-related measures/situations, and 0 otherwise. The probability of being below the respective poverty line π_i can be expressed as $\pi_i = P(Y_i = 1) = P(Y_i^* > \gamma)$. Considering that sometimes logistic regressions are difficult to interpret, we should resort to odds ratios for easier coefficient reading. As additional features of logistic regression, we could mention the fact that it does not require a linear relationship between the dependent and independent variables.

Additionally, the error terms do not need to be normally distributed and the homoscedasticity property is not required. To test the robustness of our estimates, we follow the baseline literature (Dogan, Madaleno, and Taskin 2021; Koomson and Danquah 2021; Koomson, Villano, and Hadley 2020a) and adopt the two-stage least-squares specification (2SLS). Following

this same literature vein, financial inclusion is instrumented by the variable access to the nearest bank considering that the lower the geographical space the lower will be the costs that occur while reaching the bank's financial services. Thus, in the first stage of the 2SLS model (see Equations (2) and (3)) we regress FI on access to the nearest bank and a set of independent variables (household characteristics). In the second stage, different poverty measures are regressed based on the previously obtained FI estimates and the same set of household characteristics.

$$\begin{aligned} \text{First - stage : } FI_{it} \\ = \theta + \gamma Dist_{it} + \eta HC_{it} + \mu_t + v_t + \varepsilon_{it} \end{aligned} \quad (2)$$

$$\text{Second - stage : } P_{it} = \alpha + \beta \widehat{FI}_{it} + \lambda HC_{it} + \mu_t + v_t \quad (3)$$

P stands for poverty level, which is measured in three ways; thus, = three estimations are to be performed, of household i in the period t = 2018, FI is the financial inclusion status of the respondent household, HC is the set of household characteristics covariates included within the analysis, θ , and α represent the constant terms, μ_t represents 2SLS fixed effects and ε and v are random error terms.

IV. Empirical results

Table 2 presents our baseline results from the logit model for household characteristics and financial inclusion effects over different poverty lines. On average, Turkish survey respondents are on the upper-middle-income class poverty line, followed by those on the lower poverty line. Fortunately, only a small percentage of respondents is classified within our three measures of poverty (see Table 1).

The null hypothesis of no endogeneity is rejected, implying that the standard logit model is inconsistent to explain financial inclusion effects on poverty. Therefore, we concentrate the analysis on the 2SLS estimation for financial inclusion and poverty (results presented in Table 3). However, before moving on, it should be noted that age, education, having a job and being an owner of the property decrease the likelihood of poverty while being a female increase the probability of being in

the lower and upper poverty income lines. As to the variable of interest, financial inclusion decreases poverty. By using the FI original scores instead of FI dummy score as a robustness check, we can confirm that empirical results are almost identical to Table 2 (see Table A1). When we try comparing the magnitude of the marginal effects of the 2SLS (see Table 3) to estimates obtained from the standard logit (see Table 2; which does not account for endogeneity), we see that the logit markedly overestimates, biasing upwards, the effect of financial inclusion on poverty.

The weak instrument effect is tested using the F-statistic of the first-stage regression (see Table 3). Being values greater than 10 for each poverty level leads us to the rejection of the null hypothesis of weak instruments. From Table 3 results we observe that financial inclusion reduces a household's likelihood of being in the extreme poverty line by 1.6%, in the lower poverty line by 7.2%, and in the upper-income poverty line by 40.6%. Therefore, and

considering that on average the Turkish survey respondents were more on the upper-middle-income class poverty line (see Table 1), we can say that financial inclusion reduces a household's probable risk of future poverty by 41%. By using the FI original scores instead of FI dummy score as a robustness check, we can confirm that the empirical results are almost identical to Table 3 (see Table A2).

Robustness and sensitivity analysis

In a way to test the robustness and sensitivity of the results presented thus far, we have used different weights for each dimension of the financial inclusion index considered. In the previous section, the weights have been considered equal (25%) to each of the considered dimensions (results in Tables 2 and 3). Following Koomson and Danquah (2021) and Dogan, Madaleno, and Taskin (2021) four different approaches have as well been used,

Table 2. Empirical results from the logit model for FI and poverty.

	ExtremePOV		LowerPOV		UpperPOV	
	Coeff.	Robust Std. Err.	Coeff.	Robust Std. Err.	Coeff.	Robust Std. Err.
Financial inclusion	-0.283	0.782	-1.781***	0.585	-2.468***	0.292
<i>Household characteristics</i>						
Female	0.191	0.733	0.797**	0.334	0.507**	0.219
Age	-0.051***	0.016	-0.060***	0.010	-0.055***	0.005
Edu	-0.996**	0.505	-0.670**	0.308	-0.907***	0.136
Married	0.685	1.052	0.680*	0.415	0.532**	0.244
Hsize	0.487***	0.086	0.553***	0.043	0.644***	0.032
Job	-1.244**	0.599	-1.327***	0.285	-1.054***	0.139
Own	-1.171**	0.524	-0.872***	0.261	-0.388***	0.117
Constant	-3.806**	1.948	-2.645***	0.945	-1.006**	0.479
Obs#		11,595		11,595		11,595
Chi ²		192.680***		289.38***		728.18***
Prob. (Chi ²)		0.00		0.00		0.00
Pseudo_R ²		0.209		0.294		0.338

*, **, *** represent 10%, 5% and 1% level of significance.

Table 3. 2SLS estimations for FI and poverty.

	ExtremePOV		LowerPOV		UpperPOV	
	Coeff.	Robust Std. Err.	Coeff.	Robust Std. Err.	Coeff.	Robust Std. Err.
Financial inclusion	-0.016**	0.0067	-0.072***	0.017	-0.406***	0.047
Household characteristics included?		YES		YES		YES
First-Stage						
Access to the nearest bank	-0.043***	0.003	-0.043***	0.003	-0.043***	0.003
<i>Diagnostics</i>						
Obs#		11,595		11,595		11,595
F-stat (first-stage)		339.72***		339.72***		339.72***
Chi ²		15.64**		83.32		553.82

*, **, *** represent 10%, 5% and 1% level of significance.

assigning a larger weight to each of the four dimensions. Therefore, panel A in Tables 4–6 attributes a weight of 40% to savings and 20% for each of the other three dimensions. In panel B, the 40% weight is attributed to insurance, in C to credit cards, and finally in panel D to online shopping. To validate our results, different estimations were performed using alternative weights for financial inclusion (see Tables 4–6, for extreme poverty, lower poverty, and upper poverty income lines, respectively). In all these, it is seen that we reject the null hypothesis of weak instruments validating the 2SLS model employed in empirical estimations, and in all the chi-squared test validates the robustness of the variables included to explain poverty in all its three absolute levels considered. To sum up, financial inclusion remains an important variable to reduce the likelihood of being in any of the poverty line levels, especially in the upper-middle-income class poverty line, where the probability of reducing poverty varies between 79.2% and 40.1%.

Moreover, access to the nearest bank, as an instrument, continues to play an important role to explain the avenue through which financial inclusion could lead to lower poverty in Turkey. FI further decreases the risk of being in extreme poverty, lower poverty, or upper poverty lines when the weight is placed more on savings (panel A of Tables 4–6, respectively). This is followed in all Tables as well by the use of credit cards. From our results, we take that financial inclusion is critical to decreasing poverty, which might be erased sustained by higher savings and credit card use. Thus, savings are the strategic channel to erase

Table 4. Estimations using alternative weights for financial inclusion: ExtremePOV.

	Panel A	Panel B	Panel C	Panel D
Financial inclusion	−0.030** (0.013)	−0.015** (0.006)	−0.025** (0.011)	−0.018** (0.008)
Household characteristics included?	Yes	Yes	Yes	Yes
First-Stage				
Access to the nearest bank	−0.022*** (0.002)	−0.043*** (0.003)	−0.027*** (0.002)	−0.037*** (0.003)
<i>Diagnostics</i>				
Obs#	11,595	11,595	11,595	11,595
F-stat (first-stage)	161.89***	322.99***	217.64***	247.31***
Chi ²	15.42*	15.64**	15.51**	15.62**

*, **, *** represent 10%, 5% and 1% level of significance. Robust standard errors in parentheses.

Table 5. Estimations using alternative weights for financial inclusion: LowerPOV.

	Panel A	Panel B	Panel C	Panel D
Financial inclusion	−0.140*** (0.035)	−0.071*** (0.017)	−0.116*** (0.029)	−0.084*** (0.020)
Household characteristics included?	Yes	Yes	Yes	Yes
First-Stage				
Access to the nearest bank	−0.022*** (0.002)	−0.043*** (0.003)	−0.027*** (0.002)	−0.037*** (0.003)
<i>Diagnostics</i>				
Obs#	11,595	11,595	11,595	11,595
F-stat (first-stage)	161.89***	322.99***	217.64***	247.31***
Chi ²	81.05***	83.27***	81.93***	82.77***

*, **, *** represent 10%, 5% and 1% level of significance. Robust standard errors in parentheses.

Table 6. Estimations using alternative weights for financial inclusion: UpperPOV.

	Panel A	Panel B	Panel C	Panel D
Financial inclusion	−0.792** (0.116)	−0.401*** (0.046)	−0.657*** (0.088)	−0.476*** (0.059)
Household characteristics included?	Yes	Yes	Yes	Yes
First-Stage				
Access to the nearest bank	−0.022*** (0.002)	−0.043*** (0.003)	−0.027*** (0.002)	−0.037*** (0.003)
<i>Diagnostics</i>				
Obs#	11,595	11,595	11,595	11,595
F-stat (first-stage)	161.89***	322.99***	217.64***	247.31***
Chi ²	460.85***	553.04***	497.83***	524.84***

*, **, *** represent 10%, 5% and 1% level of significance. Robust standard errors in parentheses.

poverty in less developed countries or those that are still facing major issues in poverty alleviation despite being considered already developed.

Finally, the bounding approach by Oster (2019) is followed (see Table 7). Oster's (2019) bound estimates to address endogeneity due to omitted variable bias, dealing with movements in coefficients after including control variables. Both the coefficient and R-squared movements in the Oster test are needed for robustness evaluation, and results are presented in Table 7. Reading the identified bounds for each poverty income line, these exclude the number '0'. Therefore, the estimation results reported previously in Tables 3–6 are all robust to both unobservable selection and the bias of omitted variables.

Channels/Mechanism

Finding that financial inclusion decreases poverty, it is also needed to highlight how does financial inclusion reduce energy poverty. By this, we mean through which channel. Tables 8 and 9 present

additional estimates on the impact of financial inclusion on both household income and health expenditure.

From Table 8 we can observe that the financial inclusion impact on both household income and health expenditure is positive; therefore, the higher the household's financial inclusion the higher will be their income and health expenditure. Financial inclusion is essential for social inclusion (Omar and Inaba 2020), especially by reducing poverty and income inequality. If people are involuntarily excluded from the financial system, savings are lost, investable fund opportunities are denied, and the accumulation of wealth is harder or even inexistent (Omar and Inaba 2020). For a study conducted covering more than 6200 Chinese households, Zhang and Posso (2019) find that financial inclusion has a strong positive effect on household income, as we do for Turkey. Results also indicate that financial inclusion alleviates poverty by allowing increased health expenditure. Thus, policy-makers are encouraged to design and implement programmes in Turkey able to scale up the level of financial inclusion. This is so provided that higher levels of financial inclusion seem to have the potential to ease the demand for health, allowing health expenditure increases as does with household income (Table 8).

As a robustness check, Table 9 also presents the reverse effects of income and health expenditure on poverty. It is visible that the results are consistent.

Table 7. Oster (2019)'s bound estimates.

	ExtremePOV	LowerPOV	UpperPOV
Financial inclusion	(-0.004, -0.014)	(-0.007, -0.017)	(-0.045, -1.714)
Household characteristics	Yes	Yes	Yes
<i>Diagnostics</i>			
Obs#	11,595	11,595	11,595
R ²	0.070	0.039	0.150

Table 8. Impact of financial inclusion on mechanisms.

	lhexp		linc	
	Coeff.	Robust Std. Err.	Coeff.	Robust Std. Err.
Financial inclusion	0.43***	0.029	0.49***	0.011
Covariates included?	YES		YES	
Observations#	10,452		11,595	
F-stat	110.47***		101.69***	

*** represents 1% level of significance; linc: log of income; lhexp: log of health expenditure.

Table 9. Impact of mechanisms on poverty.

	Robust Std. Err.		Robust Std. Err.	
	Coeff.	Err.	Coeff.	Err.
Financial inclusion	-0.040***	0.003	-0.019***	0.003
linc	--		-0.131***	0.006
lhexp	-0.011***	0.001		
Covariates included?	YES		YES	
Observations#	10,452		11,595	
F-stat	50.77***		97.62***	

*** represents 1% level of significance. linc: log of income; lhexp: log of health expenditure.

Being significant at the 1% level, both household income and health expenditure reduce poverty. As well, the higher the financial inclusion level of households, the lower is poverty. The power of coefficient on FI is expected to be lower after the health and income variables are introduced into the model as mechanisms, and Table 9 results confirm the initial predictions. Thus, both income and health expenditure are important mechanisms to consider in the relationship between financial inclusion and poverty reduction. Therefore, financial inclusion is crucial in health care financing as it avails avenues for resource mobilization for households, increased income, but also for private firms and government to finance health care expenditure.

Discussion of results

Results from the baseline logistic and 2SLS models point out that financial inclusion, access to the nearest bank, and household characteristics are very important to decrease poverty in Turkey. Financial inclusion was as well reported to drive to lower poverty by Koomson, Villano, and Hadley (2020a) and Koomson, Villano, and Hadley (2020b), but we add to these findings that financial inclusion is more capable of preventing future risk of poverty for households that are already in the upper-middle-income class poverty line. This as well leads us to state that to surpass extreme poverty and lower poverty income lines, financial inclusion is the path to be followed provided the increased probability of financial inclusion in reducing poverty as the income poverty line increases.

Similar to Koomson, Villano, and Hadley (2020a) we also find that access to the nearest bank plays a key role to solve the financial inclusion – poverty level nexus, provided it reduces the probability of being in any level of income poverty by 4.3% in Turkey. Thus, if concerted efforts are made to increase the number of bank branches, this would probably increase the number of owners and users of bank products connecting both the supply and demand sides, respectively. Additionally, results seem to highlight that in Turkey the financial system can be transformed into increasingly inclusive through accessibility. This also turns valid previous empirical findings of the existence of a positive effect of financial inclusion over poverty reduction, providing higher access to bank services will increase income, enhance consumption and thus lead to poverty reduction.

It was as well possible to infer that age, education, having a job, and being an owner of the property decrease the likelihood of being in poverty group while being female increases the probability of being in the lower and upper poverty income lines. Concerning homeownership, our results agree well with those of Tekgüç (2018) and Acar, Anil, and Gursel (2017). Besides, better education and having a job are also pointed by Acar, Anil, and Gursel (2017) as leading to poverty reduction. Savings are the most important channel through which financial inclusion could drive households to get out of poverty lines, or equivalently reducing poverty.

V. Conclusions

The finance sector is known to enhance the economic welfare of the countries; thus, it is also normal to assume that financial inclusion should be related to personal welfare. FI impacts the poverty of households through providing credit and insurance, which is likely to increase the productive assets and decrease their poverty (direct channel), and the finance sector increases economic activity, which will result in higher levels of employment and more government spending that will enhance the quality of life especially for low-income households (indirect channel).

This paper examines the impact of financial inclusion (FI) on different levels of poverty defined by the World Bank Report (2020), lower poverty,

upper poverty, and extreme poverty. For measuring FI, saving behaviour of households, ownership of insurance, usage of credit cards and habit of online shopping are assigned as equally weighted dimensions. Despite the vast majority of papers on FI and various other socioeconomic factors, the impact of FI on poverty is still overlooked in the literature. Accordingly, this paper focuses on the effects of FI on three different poverty levels defined by the World Bank. Our baseline results from the logit models suggest that age, education, employment and ownership of a property decrease the likelihood of being in poverty for all poverty levels, whereas being female increases the likelihood of poverty in the upper and lower poverty lines. 2SLS regression results clearly show that FI reduces a household's likelihood of being in the extreme poverty line by 1.6%, in the lower poverty line by 7.2%, and in the upper-income poverty line by 40.6%. The first-stage regression results also point to the significant impact of access to the nearest bank on all poverty levels alleviating poverty. By looking at the results, it is possible to conclude that the direct channel works actively in Turkey. Finally, the robustness of the results is first ensured by assigning alternative weights to the determinants of FI and then by adopting Oster's bound tests. The results point to the significance of FI to decrease poverty for all groups. The empirical results as well show that the probability of exposure to poverty is lower for those who are male, employed, unmarried, have higher education levels, and own a house.

The findings suggest that FI is an effective policy tool to decrease poverty and to fight poverty, even for developing countries. Policymakers should promote the access of households to financial institutions, thus allocating more resources to enable financial services to all populations is of crucial importance. Given the significance of access to the nearest bank to promote FI levels, governments must promote the financial institutions to open up branches to distant areas. The expansion of services to households may reduce the current and future risks of poverty. The direct channel of FI on poverty will also trigger the indirect channel through increased employment with the creation of jobs with the credits taken from financial institutions. Thus, governments should also promote the

granting and extension of loans to entrepreneurs with a limited level of funds. Considering the significant effect of access to the nearest bank on poverty alleviation, another policy application might be to promote the usage of internet banking services for households. Thus, governments should provide means of usage and a business environment that increases access to the financial system by all households.

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Appendix A.

Table A1. Empirical results from the logit model using FI original scores.

	ExtremePOV		LowerPOV		UpperPOV	
	Coeff.	Robust Std. Err.	Coeff.	Robust Std. Err.	Coeff.	Robust Std. Err.
Financial inclusion	-0.277	1.886	-5.49***	1.072	-6.31***	0.292
<i>Household characteristics</i>						
Female	0.148	0.717	0.723**	0.333	0.426*	0.227
Age	-0.047***	0.016	-0.053***	0.010	-0.048***	0.005
Edu	-0.771	0.504	-0.437	0.313	-0.628***	0.141
Married	0.651	1.062	0.649	0.414	0.520**	0.248
Hsize	0.475***	0.085	0.543***	0.043	0.652***	0.031
Job	-1.118*	0.601	-1.164***	0.283	-0.906***	0.142
Own	-1.163**	0.528	-0.851***	0.261	-0.351***	0.120
Constant	-4.007**	1.900	-2.908***	0.947	-1.375***	0.485
Obs#		11,595		11,595		11,595
Chi ²		179.73***		291.90***		788.39***
Prob. (Chi ²)		0.00		0.00		0.00
Pseudo_R ²		0.221		0.324		0.386

*, **, *** represent 10%, 5% and 1% level of significance.

Table A2. 2SLS estimations using FI original scores.

	ExtremePOV		LowerPOV		UpperPOV	
	Coeff.	Robust Std. Err.	Coeff.	Robust Std. Err.	Coeff.	Robust Std. Err.
Financial inclusion	-0.022**	0.0093	-0.101***	0.023	-0.569***	0.060
Household characteristics included?		YES		YES		YES
First-Stage						
Access to the nearest bank	-0.031***	0.002	-0.031***	0.002	-0.031***	0.002
<i>Diagnostics</i>						
Obs#		11,595		11,595		11,595
F-stat (first-stage)		397.44***		397.44***		397.44***
Chi ²		15.71**		15.71**		15.71**

*, **, *** represent 10%, 5% and 1% level of significance.