Financial Inclusion—What's it Worth?

Preliminary and incomplete – please do not circulate further

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Abstract

The paper studies the determinants of being unbanked in the euro area and the United States as well as the effects on household wealth accumulation. Based on household-level data from the euro area Household Finance and Consumption Survey and the U.S. Survey of Consumer Finance, it first documents that there are, respectively, 3% and 7% of unbanked households in the two economies. Low-income households, unemployed households and those with a poor education are the most likely to be affected, and remarkably more so in the United States than in the euro area. At the same time, there is a role for government policies in fostering financial inclusion. Using a propensity score matching approach to estimate the effects of being unbanked, it is found that banked households report substantially higher net wealth than their unbanked counterparts, with a gap of around €70,000 for the euro area and $45,000 for the US. The main reason for this wealth difference is that banked households are considerably more likely to have taken on a mortgage, to have purchased their main residence, and to therefore have benefitted from the house price increases that have been observed in many of the countries prior to the survey.

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1. Introduction

The access of households to financial services has been a long-standing topic in policy debates in emerging markets (e.g., World Bank, 2008; World Bank, 2014). Data assembled by the World Bank (Demirgüç-Kunt and Klapper, 2013) for 148 countries shows that half of all adults globally did not have an account at a formal financial institution in 2011, with the majority of these living in developing countries. A more recent update (Demirgüç-Kunt et al., 2015) reports impressive progress, in the sense that the share of the unbanked stood at a considerably lower 38% in 2014, with substantial reductions in a number of developing countries. This is the result of conscious policy efforts to promote financial inclusion as a way of reducing poverty and spurring economic development.

At the same time, financial inclusion has also been identified as an important issue in advanced economies - the same data source reveals that 6% of adults in high-income economies remain unbanked in 2014 (down from 11% in 2011). Without access to saving and borrowing instruments via formal financial institutions, these households are prone to be at a disadvantage economically, as they cannot smooth consumption as easily, and face more difficulties in accumulating wealth.

This paper provides new evidence about the importance of financial inclusion in advanced economies, the determinants of being unbanked, and its effects. It uses data on household finances for 14 euro area countries, taken from the 2009/2010 Household Finance and Consumption Survey (HFCS), as well as comparable data from the 2010 U.S. Survey of Consumer Finance (SCF). While the share of unbanked households in the euro area is, at 3%, substantially below the number in the United States (7%), there is substantial variation across countries and over different household groups. Like in the United States, it is particularly the low-income and the poorly educated households that remain outside the financial system – however, the more disadvantaged households in the United States are substantially more likely to be unbanked than their counterparts in the euro area.

When studying the determinants of being unbanked, the cross-country dimension of the dataset allows further insights into the role of supply factors, and in addition enables us to investigate the effects of policies that are put in place to promote financial inclusion, with a focus on advanced economies. Our results are consistent with those of the large cross-country study by Demirgüç-Kunt and Klapper (2013): We show that the accessibility of financial institutions, i.e. the supply side matters, as the probability that a household is unbanked falls with the density of ATMs in a given country. As to the effect of government initiatives to promote financial inclusion, we find that encouraging recipients of transfer payments to open bank accounts increases the probability of owning a bank account by 6 percentage points (p.p.). This suggests that government policies can matter; however, in contrast to the earlier results, we do not find that the likelihood of being unbanked falls if the government requires its banks to offer a low-fee account to low-income clients.

The last part of the paper employs a propensity score matching approach to provide estimates of the effects of being unbanked. We find that banked households report substantially higher net wealth than their unbanked counterparts, with a gap of around €70,000 and $45,000 in the euro area and the United States, respectively. The main reason for this wealth difference is that banked households are considerably more likely to have taken on a mortgage, to have purchased their main residence, and to therefore have benefitted from the house price increases that have been observed in many of the countries prior to the survey.

These results provide support for the notion that financial inclusion is an important issue also in advanced economies. While it shows that being unbanked remains a reality for a non-trivial number of households in the euro area as well as the United States, and that this puts these households at a considerable economic disadvantage, our findings also show that public policies such as paying transfers through bank accounts can mitigate the issue to some extent.

The paper is organized as follows. The second section provides an overview of the related literature. Section 3 discusses the methodology and data used in the analysis. Subsequently, we report our results with regard to the determinants of being unbanked, before we move on to study the likely effects in Section 5. A discussion of the conclusions and implications follows in section 6.

2. Related Literature

As mentioned in the introduction, the World Bank has been conducting research on financial inclusion for several years. In particular, the collection of comparable cross-country data has helped understanding the importance of the issue, and allowed studying the determinants of being unbanked across countries, including the effects of public policies. Beck et al. (2007) stress the importance of the quality of the institutional environment as a positive factor, and the cost of enforcing contracts and the degree of government ownership of banks as a negative factor. Using a broader data coverage, Demirgüç-Kunt et al. (2015) identify the important role of governments in fostering financial inclusion, e.g. by shifting the payment of government transfers from cash into accounts, and Allen et al. (2012) report that the existence of low-cost accounts as well as a reduction in documentation requirements when opening bank accounts help enabling the access to financial services. Another important factor that they identify is greater proximity to financial intermediaries, which could also be in line with Honohan's (2008) result that mobile phone penetration matters. More generally, levels of economic development and financial inclusion are highly correlated (Sarma and Pais 2011), suggesting that for more developed economies, we should generally expect fewer unbanked households.

Beyond these cross-country studies, variations over time in individual countries have also been used to identify the determinants of being unbanked. For instance, Burgess and Pande (2005) identify a state-led expansion of the banking sector in India as having led to greater financial inclusion of the rural poor. Aportela (1999) shows that the exogenous expansion of a Mexican savings institute, targeted to low-income people, increased financial inclusion and raised the savings rate of affected households. An alternative identification scheme is employed by Osili and Paulson (2008), who find that immigrants in the United States from countries with more effective institutions are more likely than other immigrants to have a relationship with a bank. Based on the same identification approach, Rhine and Greene (2006) conclude that income, wealth and education are important determinants of being unbanked.

Beyond contributions that try to identify the determinants of financial inclusion, others have studied its effects. Even though there are work-arounds for financially excluded households, like using friends and family as a source of borrowing (Banerjee and Duflo, 2007), having access to financial instruments opens more ample possibilities for a smoothing of consumption and investment in physical and human capital, thereby

improving economic welfare, reducing income inequality and fostering economic growth (World Bank, 2008).[1]

Such positive effects have been shown in several studies that exploit randomized controlled experiments (Ashraf et al. 2006; Dupas and Robinson 2011, 2013). Honohan and King (2012) also identified a positive effect on income using micro data for sub-saharan African households.

With most of the evidence relating to emerging markets, there are a few studies related to advanced economies. Bank deregulation in the United States, for instance, has been used to identify the effects of greater financial inclusion: Beck et al. (2010) find that this has led to more inclusive growth, boosting in particular the relatively low incomes, thereby narrowing the income distribution. Célerier and Matray (2014) also document a substantial effect of the banking deregulation on the share of unbanked households, along with an increase in savings rates. These studies, as well as Washington (2006) point to supply-side factors as important determinants of being unbanked, whereas other contributions like Bertrand et al. (2004) have highlighted the relevance of the demand side. In that regard, OECD (2013) stresses the importance of financial literacy – higher levels of financial knowledge are correlated with larger awareness of financial products, which is argued to be an important step in removing demand-side barriers to financial inclusion.

The dynamics of becoming unbanked in the United States has been analyzed by Rhine and Greene (2013), who find that families are significantly more likely to become unbanked when there is a decline in family income, loss of employment, or loss of health insurance coverage.

3. Data and Empirical Methodology

In this section, we outline our estimation methodology and the data we use for our empirical analysis.

3.1 Data

In order to conduct our analysis we use data from the HFCS and its U.S. equivalent, the SCF. The HFCS provides ex-ante comparable data for 15 euro area countries.[2] We discard the data for Finland, where households were not asked about their ownership of financial accounts, but a 100% participation rate was assumed when the amounts held in deposits were estimated with a statistical matching methodology, using the Finnish 2004 wealth survey as a donor data. Effectively, our data cover therefore more than 50,000 households in 14 euro area countries, namely Austria, Belgium, Cyprus, France, Germany, Greece, Italy, Luxembourg, Malta, the Netherlands, Slovakia, Slovenia, Spain and Portugal.

The HFCS contains information regarding socio-demographic variables, assets, liabilities, income and consumption for a sample of households that is representative both at the

[1] Mehrotra and Yetman (2014) consider the effects of financial inclusion on monetary policy. They argue that with greater financial inclusion, households can more easily smooth their consumption, which in turn makes output volatility less costly, and enables central banks to focus more on maintaining price stability.

[2] For more details on the survey, see http://www.ecb.europa.eu/home/html/researcher_hfcn.en.html. The results from the first wave are described in detail in Household Finance and Consumption Network (2013a), and the most relevant methodological features of the survey are discussed in Household Finance and Consumption Network (2013b).

national and the euro area level. A set of population weights is provided in order to ensure the representativeness of the sample. Our calculations use these population weights.

Another important feature of the HFCS is that missing observations for all the variables that are necessary to construct wealth and income aggregates (i.e. questions that were not answered by the respondent households) are imputed five times – an issue that we will take into account when assessing the statistical significance of our estimates. The HFCS data refer to the year 2008 in Spain, to 2009 in Finland, Greece and the Netherlands, and to 2010 in all remaining countries.

For our estimates for the United States, we rely on the U.S. SCF.[3] We use the 2010 wave to be as close as possible to the time of the HFCS. The SCF also provides population weights and five imputations, such that we can treat both surveys in the same way. For the United States, our sample contains nearly 6,500 households.

Table 1 here

While there are many different notions of financial inclusion, covering for instance the range of financial products that individuals can access, we will look at whether or not households are unbanked. We consider them to be unbanked if they neither hold checking or savings accounts with financial institutions, nor have a credit card. Note that this definition does not specify why the households are unbanked – they could have decided so themselves (because they do not require financial services, or because they somehow have an indirect access), or alternatively could lack access to the financial system, i.e. are excluded involuntarily.

Table 1 shows the share of unbanked households according to this definition. There are considerably fewer such households in the euro area than in the United States, with 3% versus 7%. However, these numbers mask a substantial heterogeneity in the euro area, where we find countries with less than 1% unbanked households (Austria, France and Germany), but also some with around 10% (Cyprus, Italy and Slovakia). The extreme case is the one of Greece, with more than 20% of households reporting not to have any financial accounts.

That number might seem implausible, and it cannot be excluded that there is some underreporting of account ownership. At the same time, there is anecdotal evidence that households in more distant areas in Greece tend to keep cash at home, rather than having bank deposits, as it is apparently perceived to be more convenient and there is little fear about theft. Still, it is useful to cross-check these data with the World Bank data underlying Demirgüç-Kunt and Klapper (2013). The World Bank data generally show larger shares of unbanked than the HFCS data, which could come from the fact that the HFCS measures access per household, whereas the World Bank data look at individual adults (and while an individual might not have access to an account herself, she might do so via the household). The figures for Greece are surprisingly close across the two datasets, with a share of 22% unbanked adults resulting in the 2011 World Bank data. Accordingly, we trust that the data for Greece are not completely off. Also, we are comforted by the fact that excluding Greece from the analysis does not alter our results qualitatively (see section 5.3 on robustness checks).

[3] This dataset has been used in Hogarth et al. (2004) to identify the determinants of being unbanked.

Looking at the distribution of unbanked households across different types of household characteristics, Table 1 shows that income is an important factor. This is the case in particular in the United States, where only 0.2% of households in the highest income quintile are unbanked, as opposed to 20% in the lowest quintile. But also in the euro area, and in nearly all individual countries (the Netherlands being the only exception) we find that high-income households are substantially more likely to be banked than those with a low income.

Also the working status of the household head matters – unemployed households and those categorized as "other not working" (i.e. students, permanently disabled, doing compulsory military service or equivalent social service, those fulfilling domestic tasks and other not working for pay) are more often unbanked. Finally, education also plays a role, with households with a less educated household head having a much higher likelihood of being unbanked.

Of course, all of these statistics are unconditional, and the various characteristics we have looked at are bound to be correlated. We therefore explain the determinants of being unbanked in a more formal setting that conditions simultaneously on a number of factors.

3.2 Estimating the Determinants of Being Unbanked

To estimate the determinants of being unbanked, we define a variable that is equal to 1 if a household does neither have a financial account nor a credit card, and equal to 0 otherwise. This binary variable is analyzed using a probit model, which we formulate for the euro area data as

$$\Pr\left(\mathbf{U}_i = 1 \mid x\right) = \Pr\left(\mathbf{U}_i^* > 0 \mid x\right) = \Phi\left(x\right) \tag{1}$$

$$\mathbf{U}_i^* = \beta_0^{EA} + \beta_1^{EA}{}_1 x_i + \beta_2^{EA} x_c + \varepsilon_i \tag{2a}$$

This model implies that the probability that household *i* is banked is a function of various determinants *x*, which affect a latent variable $\mathbf{U}_i^*$. The determinants include the following household characteristics x_i: Age, age^2, the position of the household in the national income distribution (as measured by income quintile dummies, with the lowest group serving as benchmark group), working status (self-employed, unemployed, retired, other inactive, with the employed constituting the benchmark), education (completed secondary education, completed tertiary education, or primary education as benchmark group), marital status (married, divorced, or single as benchmark group), the number of household members, and gender (with females being the benchmark).

In addition, we include in the pooled euro area data several country-specific determinants x_c: whether or not the government requires its banks to offer a low-fee account to low-income clients, whether or not the government encourages recipients of transfer payments to open bank accounts and the density of ATMs in a given country (measured as the number of ATMs per 1000km^2). These three variables test for the effect of government policies to foster financial inclusion and the supply side of financial services. The data are sourced from CGAP (2009) and the IMF's Financial Access Survey (IMF, 2012).

As an alternative specification, we drop the country-specific determinants and instead include a set of country fixed effects. These control for factors that affect all households in a given country alike, but might differ across countries. Accordingly, they allow us to test

to what extent our previous specification has accurately captured country effects. In this specification, the latent variable is modelled as

$$\mathbf{U}_i^* = \beta_0^{EA} + \beta_1^{EA} x_i + \mu_c + \varepsilon_i . \quad (2b)$$

Finally, since we do not pool the data of the HFCS and the U.S. SCF (both surveys have their own sample design and population weights), we run a separate estimation for the U.S. data with the latent variable described as

$$\mathbf{U}_i^* = \beta_0^{US} + \beta_1^{US} x_i + \varepsilon_i . \quad (2c)$$

When estimating the model, we use weights to account for the fact that an individual household does not always represent the same fraction of the overall population. Our weights readjust each observation to reflect its relative importance for the euro area (or the United States) as a whole. In so doing, we follow Faiella (2010) and Magee et al. (1998), which recommend the use of weights for two similar surveys, namely the Italian SHIW and the Canadian Survey of Consumer Finances. They argue that, in surveys with complex survey design, the use of weights protects against the omission of relevant information, which otherwise would have to be modelled explicitly by incorporating all available geographic and operational variables that determine sampling rates.

For the estimations with the euro area data, we cluster the standard errors by country.

3.3 Estimating the Effects of Being Unbanked

In the second part of our analysis, we are interested in estimating the effects of being unbanked, e.g. on the wealth accumulation of households. Doing so is subject to a number of complications. In particular, the number of unbanked households is quite small compared to those with bank accounts, and both groups are very different along many characteristics. Therefore, it is important to control for all possible characteristics that might have an effect on both being unbaked and the wealth accumulated. In order to do so, we make use of propensity score matching.

This methodology is often applied to estimate the effect of a "treatment" (like for instance a medical treatment, or being exposed to a certain policy measure; in our case, the treatment is being unbanked) on particular outcomes (like health, the desired effect of a policy initiative, or, in our case, wealth accumulation) if it is impossible to run randomized experiments. In the absence of a random allocation of households to the treatment group, as would be done in a randomized experiment, the methodology tries to compare households that are as similar as possible along a large number of dimensions (like for instance income or education), such that it is reasonable to argue that they effectively only differ with regard to their treatment status, i.e. in our case whether they are unbanked or not. That way, differences in the relevant outcome between the matched households and the treated households can be attributed to the effect of being unbanked. As shown by Dehejia and Wahba (2002), in a setup like ours, this method succeeds in alleviating the bias due to systematic differences between the treated and comparison units.

Propensity score matching has been used in related applications that study wealth accumulation of households, or household finances more generally. Loibl et al. (2010) look at the effects of participation in savings programs on household savings, Morse (2011) test whether access to payday loans affects the likelihood of financial stress, and Seligman and

Bose (2012) analyze whether employer-sponsored retirement savings plans change household wealth accumulation.

We use matching in the spirit of Rubin (1973, 1979), that is, we first generate a control group that is similar to the treatment group along a number of observable characteristics, and then proceed in a second step with a regression analysis of all the observations in the treatment and the control group. This is somewhat different from the alternative approach for which the second step consists in a direct comparison of the "treatment effect", i.e. in our case of the differences in wealth of the matched households.

The reason for using this specific approach is twofold. First, it allows us to incorporate population weights into our analysis. As shown by Dugoff et al. (2014), this can have substantial effects on the results when dealing with complex surveys like ours (in particular, the oversampling of the wealthy in both the HFCS and the SCF makes the use of population weight necessary to obtain representative results). Second, this two-step procedure is "doubly robust" in the sense that causal estimates will be consistent under relatively weak conditions even if either the matching or the parametric model is incorrectly specified (see Ho et al., 2007, and Robins and Rotnitzky, 2001).

More formally, our identification strategy consists of two steps. First, for each observation in our sample we estimate a propensity score, which is the probability of being unbanked given a particular value for the observed characteristics x_i: $\Pr(\mathbf{U}_i = 1 \mid x_i) = \Phi(x_i)$. Then, for each unbanked household, we calculate the difference between its own propensity score and the propensity score of every banked household. We match each unbanked household with the five closest banked households, provided that the distance between their propensity scores is smaller than a particular threshold, which we set to be 0.01, or 1%, in our benchmark model. This matching method is usually called nearest neighbors matching with replacement and with a maximum distance (the caliper). This particular method is chosen because it provides a sample that is balanced across all covariates. All our results are robust to increasing and decreasing the number of neighbors matched and the size of the caliper (see section 5.3).

Once the matching is done, we construct a sample containing all the observations in the treatment group within the common support (i.e. all the unbanked households whose propensity score lies within the range of the propensity score distribution for the banked) and all the matched counterparts. We then use this sample to model the variable that measures the economic outcome of interest (e.g. net wealth), using the set of covariates from the matching stage as well as the dummy variable that measures whether a household is unbanked or not. We estimate this regression using OLS:

$$\mathrm{O}_i = \gamma_0^{EA} + \gamma_1^{EA}\, x_i + \gamma_2^{EA}\mathrm{U}_i + \mu_c + \varepsilon_i \tag{3a}$$

$$\mathrm{O}_i = \gamma_0^{US} + \gamma_1^{US} x_i + \gamma_2^{US}\mathrm{U}_i + \varepsilon_i \tag{3b}$$

where $\mathbf{O}_i$ denotes the outcome of interest, x_i refers to the covariates that are used in the matching stage, and $\mathbf{U}_i$, as before, is the identifier for the unbanked households. Equation (3a) is estimated with country fixed effects μ_c for the euro area, and equation (3b) for the United States.

We study a number of outcomes $\mathbf{O}_i$, namely a household's net wealth (and a decomposition of net wealth), whether the household is able to save, whether it is credit constrained, whether it has mortgage debt and whether it owns its main residence. A clear

concern regarding these outcomes, and most prominently for net wealth, is a possible endogeneity of the household's decision to be unbanked. This will occur if having a bank account is related to some attitude or behavior of the household (such as thriftiness or willingness to save) which is in turn also related to its net wealth. If we cannot control for these characteristics when constructing our matching samples and in our regression, our estimates will be biased. As mentioned in the literature survey, the earlier related studies have used in particular two identification strategies to mitigate these concerns – either exogenous events that allow comparing the situation before and after the event (such as Ashraf et al. 2006; Dupas and Robinson 2011, 2013), or exogenous variation across households like the background of immigrants in the United States (Osili and Paulson 2008; Rhine and Greene 2006).

Due to the non-experimental cross-sectional nature of our data, the available approach to tackle this issue is trying to control for as many households characteristics as possible. For the case of the United States, apart from using socio-demographic and economic variables, we can control for a series of attitudinal/behavioral variables which can proxy for characteristics of the type mentioned before. In particular, we control for the extent to which households shop around when looking for financial investments, whether they make use of specialized software to help them with their financial decisions, whether the household is saving (or has saved) for a future major expense, the ability of the household to get money from friends and relatives in case of an emergency, the household's saving habits and the reasons for saving. The inclusion of these variables should assuage concerns about endogeneity. As no comparable variables are available for the European data, we cannot include them there. However, we find that the results for the United States are qualitatively unchanged whether we include these variables or not, and thus if we assume the effects of these variables are similar in the euro area our results should hold there, too.

4. Determinants of Being Unbanked

Let us now look into the determinants of being unbanked. A large literature has already studied this question, so we see our results as a cross-check of the earlier findings using new data. Table 2 provides three sets of results, according to equations (2a) to (2c). All coefficients are average marginal effects, for an easier interpretation of the findings.

Table 2 here

In line with the earlier results, we confirm that income is a particularly important factor for being unbanked. In the euro area, households in the top income quintile are around 7 p.p. more likely to have financial accounts than those in the lowest income group. For the United States, the gradient is substantially steeper – here, the income-rich are 16 p.p. more likely to be banked than the income-poor. This is consistent with the discussion of the summary statistics in Table 1, but it is important to note that the current results condition on other determinants.

Also the findings regarding working status in Table 1 are confirmed in Table 2: if the household head is unemployed, a euro area household is 2.5 p.p. more likely to be unbanked than their employed counterparts. In the United States, this effect is stronger, at 4.5 p.p.. For the "other inactive" households (i.e. students, permanently disabled, doing compulsory military service or equivalent social service, those fulfilling domestic tasks and

other not working for pay), we find a 2.4 p.p. difference in the euro area, and a drastic 16 p.p. difference in the United States.

A third important factor is education. Having finished high school or even college is associated with a higher prevalence of having an account – once more, with a much larger effect in the United States. The other household characteristics are either not significant in both the euro area and the United States, or they appear to be important in only one of the two cases.

Moving on to the country-specific variables, our results are consistent with those of the large cross-country panel study by Demirgüç-Kunt and Klapper (2013).[4] The likelihood that a household is unbanked falls with the density of ATMs in a given country, suggesting that the supply of bank services matters. Government policies also seem to matter - in countries where the government encourages recipients of transfer payments to open bank accounts, 6 p.p. more households report to be banked. In contrast, and differently than earlier studies, we do not find that the likelihood of being unbanked falls if the government requires its banks to offer a low-fee account to low-income clients.

The inclusion of country-specific variables is important. If we were to exclude them entirely, i.e. base the estimates only on household characteristics, we would obtain a substantially smaller pseudo-R^2 of 0.13. Comparing the results of a model with the country-specific variables with those of a model with country fixed effects, we see that the pseudo-R^2 increases only somewhat, suggesting that our variables have captured a large part of the country-specific variation.[5]

These results are broadly in line with those of the earlier literature. Household characteristics like income, working status and education are relevant determinants, with the more disadvantaged households being more likely to be unbanked. In addition, supply factors are important, and there is a role for government policies in fostering financial inclusion.

What is remarkable, though, is the difference across the two economies, with relatively more disadvantaged households in the United States being dramatically more likely to be unbanked than their counterparts in the euro area. After having studied the determinants, we will now turn to analyzing the effects of being unbanked.

5. Effects of Being Unbanked

As described in Section 3, in order to study the effects of being unbanked, we first need to match the unbanked with a set of banked households. Table 3 reports the main summary statistics of our matching exercise.[6]

[4] We also included other variables, like GDP per capita, and additional variables from CGAP (2009), namely a variable that captures disclosure requirements when opening an account, an index that captures how the practices of financial institutions get monitored, an index how issues arising from the monitoring get enforced, the existence of savings schemes and the existence of tax incentives to participate in savings schemes. None of these turned out to be important.

[5] The number of observations is different in the two cases, because the country-specific variables in the first specification are not available for Cyprus and Malta.

[6] Results are shown for the sample of households for which we observe the main dependent variable, net wealth. For some other dependent variables, there are some missing observations, leading to slightly different results of the matching procedure. While these are not shown for brevity, it is important to note that in all cases, the matching procedures successfully eliminate differences between the matched households along the covariates.

Table 3 here

For the euro area, our sample consists of 2189 unbanked households and all of them remain in the matched sample. These households are matched with 6210 banked households. For the United States, the starting sample of unbanked households is smaller, reflecting the overall smaller sample size of the U.S. data. Of the 419 unbanked households, 403 remain in the matched sample, together with 1078 banked households. The third column provides the matching results for the U.S. sample that has an extended set of covariates. As matching along more dimensions makes it harder to find comparable households, the resulting sample of matched households is somewhat smaller, leaving us with 397 unbanked, and 1014 banked households.

Table 3 also contains information on the quality of the matching. First, it shows the pseudo R^2 that results from a probit estimation of the propensity score on all covariates, along with a p-value for the likelihood ratio tests that all covariates are jointly insignificant. These statistics are given for the full sample before matching, and for the sample of matched (banked and unbanked) households.

For the full samples, we obtain pseudo R^2s in the order of 0.3, and the joint insignificance of the covariates is clearly rejected. This suggests that the covariates are important determinants of households' propensity to be unbanked. If the matching has been successful, however, this should no longer be the case for the matched sample (as here, the households should be very similar along all the covariates, and only differ with regard to their banking status). This does indeed seem to be the case – the pseudo R^2s are very close to zero, and the joint insignificance of the regressors cannot be rejected.

Another test for the validity of the matching procedure is given by the median and mean standardized bias statistics in Table 3. To obtain these, we calculate the "bias" for each covariate, i.e. the difference in the mean of each covariate between the unbanked and the banked households (expressed as a percentage of the square root of the average of the sample variances in the treated and non-treated groups (formulae from Rosenbaum and Rubin (1985)). To get a single summary statistic, we subsequently calculate the median/mean of the biases. It is apparent that the difference between the banked and the unbanked is substantial in the unmatched sample (mean bias around 25% in the euro area, and 40-45% in the United States), whereas it is very small (in the order of 1%-2%) in the matched sample.

Based on these statistics, we are confident that the matched sample allows estimating the effect of being unbanked on a set of economic outcomes. We will turn to this next.

5.1 Wealth accumulation

Following the matching of treated and untreated (i.e., unbanked and banked households), we can now move on to the second step. We first study the effects of being unbanked on wealth accumulation. Table 4 shows the results of the second-step regression using the sample of matched households, according to equations (3a) for the euro area and (3b) for the United States. For brevity, we only show the coefficients for the treatment effect

(whereas the actual regression contains all the covariates that were used in the matching stage).[7]

Table 4 here

In the euro area, households without a bank account have, on average, €71,000 lower net wealth than similar households who do have a bank account. For the United States, when controlling for the same household characteristics, the difference in net wealth between the two groups is around $47,000. As we discussed in section 3, there might be concerns about a bias in these estimates due to omitted variables. When adding a set of control variables to address this issue (see section 3.3), the difference in net wealth between the two groups is reduced to $32,000, suggesting that some bias might indeed be present. However, if we assume the same magnitude of bias in the results for the euro area, these would clearly still be economically significant.

The differences in net wealth between the banked and the unbanked are non-trivial and we therefore want to understand the reasons for this gap. A first step in this direction is to look at the breakdown of net wealth into its different components, namely real assets, financial assets, mortgage debt and non-mortgage debt. As table 4 shows, the difference in net wealth between banked and unbanked households in the euro area comes mainly from the asset side and in particular from the difference in real asset holdings between the two groups. In particular, of the €71,000 wealth gap between banked and unbanked households in the euro area, €60,000 are attributed to the difference between the real assets. The rest comes mainly from the difference in financial assets. Although unbanked households hold a little less debt, the difference is not significant.

Looking at the specification for the United States that is directly comparable to the one for the euro area, we find that also there, the wealth gap is mainly explained by differences in real assets, with comparable magnitudes ($55,000 in the United States, and €60,000 in the euro area). Also the order of magnitude of differences in financial wealth is similar in both economies, with $13,000 and €14,000, respectively. The reason why the wealth gap in the United States is smaller than the one in the euro area is due to the liability side of households' balance sheets – whereas there is no substantial gap in debt holdings in the euro area, banked households in the United States are considerably more indebted than the unbanked: they have almost $19,000 more in mortgage debt and more than $2,000 in non-mortgage debt. These results are qualitatively robust to using the extended set of covariates, even if as before, the magnitudes of the treatment effect are found to be somewhat smaller.

5.2 Other effects

To investigate further differences in wealth accumulation that seem to result from being unbanked, we also look at a few other factors that could be affected by whether or not a

[7] The reason for not showing all coefficients is that their interpretation is not straightforward. Let us take the example of income as a determinant of wealth. This effect is estimated for the matched sample, so it is not clear whether the results would hold for the entire household population. Discussing the effect of income on wealth for this sample might therefore be misleading. This problem does not arise for the estimated treatment effect, though, as this precisely identifies the effect of being unbanked on wealth accumulation for the *relevant* sample, namely households that are unbanked and a set of comparator households with similar characteristics. The entire set of results is available from the authors upon request.

household has a bank account. One way to accumulate wealth is via savings. Accordingly, we test whether households are in a position to save or not, and find there to be substantial differences: Unbanked households in the euro area report a 11.9 p.p. lower probability of being able to save than their banked counterparts, with the gap in the United States being of similar size, at 10.1 p.p. (whereas this difference becomes somewhat smaller at 5.3 p.p., but still significant at the 10% level, for the model that includes the extended set of covariates available for the U.S. households).

Another way to accumulate wealth is to invest in assets and to benefit from valuation gains in these assets. The large differences in the value of real assets between banked and unbanked households suggests that this channel might be at play here. In order to buy real estate, it is typically required to take up a mortgage. Accordingly, we test whether there are differences in the prevalence of mortgage debt and of home ownership. Once more, we find there to be substantial differences: Unbanked euro area households have a 5.2 p.p. lower probability of having a mortgage and a 10.7 p.p. lower probability of being homeowners than their banked peers. The gap is even larger in the United States, where the unbanked have a 17.0 p.p. lower probability of having a mortgage, and a 19.8 p.p. lower probability of being homeowners than the households with bank accounts.

To summarize, there appear to be two different avenues that lead to a wealth gap between the banked and the unbanked households. The former find it easier to save, and they are more likely to take up a mortgage, own their main residence, and accordingly have benefitted from the house price increases that have been observed in many of the countries prior to the survey.

5.3 Robustness

All our results are robust to changes in the parameters of the matching method selected, i.e., the number of neighbors matched and the caliper within which matches are allowed. Table 6 shows results if we match to 1 or 10 neighbors (as opposed to 5), and if we modify the caliper to 0.1 and 0.001 (as opposed to 0.01). For brevity, only results regarding the main outcome, i.e. net wealth, are presented. Results are also robust to doing a simple nearest neighbor matching without specifying any caliper and to perform the matching without replacement.

Table 6 here

The next to last row in Table 6 shows results when the estimation does not use population weights. There is not much change for the euro area, but the treatment effect for the United States increases threefold and becomes insignificant. This arises because the U.S. survey has a strong oversampling of wealthy households; in this case, if we have such wealthy households in the matched sample, but do not use population weights, these households have an overly large influence on the estimation, thereby distorting the results.

Finally, the last row of the table reports the results when excluding Greece from the euro area sample. As we discussed in section 3.1, the number of unbanked households in Greece is extremely high compared to the euro area (22.6% vs 3.3%), such that this country could be driving the results. Apparently, this is not the case – our results go through even when we exclude all Greek households. In addition, we also explored whether our results go

through when we take logarithms of net wealth. In line with our results with nominal amounts, we find statistically significant effects of being unbanked; given that the regression coefficients are harder to interpret, we do not include them in Table 6.

6. Conclusions

Financial inclusion has become an important topic in the current policy debate. Especially following the global financial crisis, the issue has also gained prominence in advanced economies. Using data for 14 euro area countries and for the United States, this paper has shown that there are important parts of the population in advanced economies that remain unbanked, such as the low-income and the poorly educated households, and households in countries that have less access to financial institutions (as proxied by the density of ATMs in a given country).

Without access to saving and borrowing instruments via formal financial institutions, these households are prone to be at a disadvantage economically, as they cannot smooth consumption as easily, and face more difficulties in accumulating wealth. In line with this hypothesis, we find that banked households report substantially higher net wealth than their unbanked counterparts, with a gap of around €70,000 and $45,000 in the euro area and the United States, respectively. The main reason for this wealth difference is that banked households are considerably more likely to have taken on a mortgage, to have purchased their main residence, and to therefore have benefitted from the house price increases that have been observed in many of the countries prior to the survey.

These results provide support for the notion that financial inclusion is an important issue also in advanced economies. While it shows that being unbanked remains a reality for a non-trivial number of households in the euro area as well as the United States, and that this puts these households at a considerable economic disadvantage, our findings also show that public policies such as paying transfers through bank accounts can mitigate the issue to some extent.

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Table 1: The share of unbanked households

	All	Income quintile					Work status of reference person					Education of reference person			Observations
		1	2	3	4	5	Employee	Self-Employed	Unemployed	Retired	Other Not Working	Primary or None	Secondary	Tertiary	
Euro Area	3.24%	8.99%	3.56%	1.86%	1.13%	0.64%	1.65%	2.68%	6.16%	4.11%	6.39%	7.55%	2.83%	0.91%	51,532
Austria	0.63%	2.01%	0.53%	0.35%	0.09%	0.18%	0.21%	1.65%	0.00%	1.08%	0.00%	0.00%	0.75%	0.00%	2,380
Belgium	1.78%	4.86%	3.27%	0.47%	0.00%	0.27%	0.71%	0.20%	6.68%	1.41%	5.31%	3.26%	2.03%	1.21%	2,327
Cyprus	11.97%	24.78%	16.24%	9.21%	7.14%	2.35%	7.28%	8.13%	12.87%	21.39%	16.67%	31.58%	10.86%	6.81%	1,237
France	0.43%	1.11%	0.52%	0.31%	0.12%	0.09%	0.21%	0.05%	1.08%	0.38%	1.86%	0.91%	0.28%	0.08%	15,006
Germany	0.96%	3.17%	1.31%	0.27%	0.00%	0.00%	0.10%	1.06%	3.56%	1.60%	2.48%	0.00%	1.30%	0.33%	3,565
Greece	22.63%	39.45%	27.63%	19.21%	15.02%	11.54%	19.81%	16.72%	28.86%	24.58%	27.93%	31.20%	21.06%	12.27%	2,971
Italy	8.22%	27.65%	8.46%	3.03%	1.47%	0.44%	5.09%	4.66%	23.12%	8.60%	19.95%	17.07%	6.04%	1.77%	7,951
Luxembourg	1.29%	3.27%	1.65%	1.50%	0.00%	0.00%	1.68%	1.11%	4.52%	0.00%	2.07%	3.21%	0.80%	0.40%	950
Malta	2.67%	9.62%	3.07%	0.64%	0.00%	0.00%	1.33%	0.00%	16.16%	2.84%	4.90%	3.54%	2.86%	0.83%	843
Netherlands	2.20%	1.73%	1.16%	3.98%	1.86%	2.31%	2.39%	0.63%	0.00%	1.93%	1.43%	4.04%	2.33%	1.60%	1,301
Portugal	5.52%	15.81%	6.83%	2.62%	1.56%	0.74%	2.72%	2.90%	7.35%	8.55%	8.34%	8.12%	1.68%	0.87%	4,404
Slovakia	8.66%	23.82%	11.34%	5.54%	1.46%	0.55%	1.85%	0.32%	10.50%	25.13%	10.20%	38.02%	9.84%	4.38%	2,057
Slovenia	6.01%	16.11%	7.82%	0.88%	4.44%	0.66%	0.41%	3.88%	4.41%	13.02%	2.62%	26.75%	6.84%	0.63%	343
Spain	1.58%	4.06%	0.75%	1.48%	1.44%	0.14%	0.57%	1.21%	3.06%	1.62%	3.03%	3.06%	1.27%	0.23%	6,197
United States	6.80%	20.30%	8.90%	3.80%	0.80%	0.20%	5.60%	4.80%	19.50%	3.30%	18.50%	21.20%	7.50%	1.20%	6,482

Notes: The table shows the share of unbanked households in the HFCS and the SCF, along with the number of observations in each dataset. The breakdown by income quintile is based on total gross household income excluding income from financial assets, where the quintiles are calculated over the distribution in each country separately. All numbers are calculated using population weights.

Table 2: Determinants of being unbanked

	Euro Area		Euro Area		USA	
	AME	*Std. error*	AME	*Std. error*	AME	*Std. error*
Age	0.000 *	*0.000*	0.000	*0.000*	-0.001 ***	*0.000*
Income quintile 2	-0.027 ***	*0.009*	-0.027 ***	*0.006*	-0.049 ***	*0.007*
Income quintile 3	-0.043 ***	*0.015*	-0.042 ***	*0.011*	-0.084 ***	*0.009*
Income quintile 4	-0.058 ***	*0.016*	-0.057 ***	*0.011*	-0.138 ***	*0.014*
Income quintile 5	-0.068 ***	*0.020*	-0.068 ***	*0.014*	-0.162 ***	*0.021*
Self-employed	0.007	*0.006*	0.004	*0.006*	0.007	*0.011*
Unemployed	0.016 ***	*0.004*	0.018 ***	*0.004*	0.045 ***	*0.010*
Retired	-0.002	*0.008*	0.000	*0.008*	-0.019	*0.014*
Other not working	0.017 ***	*0.004*	0.015 ***	*0.005*	0.160 ***	*0.023*
College	-0.028 ***	*0.006*	-0.022 ***	*0.004*	-0.102 ***	*0.011*
Highschool	-0.028 ***	*0.008*	-0.018 ***	*0.007*	-0.050 ***	*0.007*
Married	-0.008 **	*0.003*	-0.009 ***	*0.003*	-0.029 ***	*0.010*
Divorced	0.001	*0.005*	0.002	*0.005*	-0.010	*0.009*
Number of hh members	0.007 ***	*0.002*	0.005 ***	*0.001*	0.002	*0.002*
Gender	0.004	*0.005*	0.004	*0.005*	-0.015 *	*0.008*
Low-fee account	-0.011	*0.009*	--	--	--	--
Government transfers	-0.056 ***	*0.016*	--	--	--	--
ATMs per 1000km2	0.000 *	*0.000*	--	--	--	--
GDP per capita	-0.001	*0.001*	--	--	--	--
Austria	--	--	-0.009 ***	*0.001*	--	--
Belgium	--	--	0.010 ***	*0.001*	--	--
Cyprus	--	--	0.068 ***	*0.002*	--	--
France	--	--	-0.023 ***	*0.002*	--	--
Greece	--	--	0.091 ***	*0.002*	--	--
Italy	--	--	0.048 ***	*0.002*	--	--
Luxembourg	--	--	0.000	*0.003*	--	--
Malta	--	--	0.009 ***	*0.003*	--	--
Netherlands	--	--	0.020 ***	*0.002*	--	--
Portugal	--	--	0.031 ***	*0.003*	--	--
Slovakia	--	--	0.060 ***	*0.003*	--	--
Slovenia	--	--	0.045 ***	*0.003*	--	--
Spain	--	--	-0.002	*0.004*	--	--
Pseudo R-squared	0.234		0.273		0.282	
Observations	49,452		51,532		6,482	

Notes: The table reports results from probit regressions that model whether a household is unbanked, following equations (1) and (2). AME denotes average marginal effects; standard errors are reported in italics. Columns (1) and (2) are based on data for the euro area, with standard errors clustered by country. Column (1) is based on equation (2a), i.e. includes country-specific variables. Column (2) is based on equation (2b), i.e. includes country-fixed effects. Column (3) shows results for the United States and is based on equation (2c). ***/**/* denotes statistical significance at the 1%/5%/10% levels.

Table 3: Outcome of the matching

	Euro Area	USA (1)	USA (2)
Number of unbanked hhs	2,189	419	419
Number of matched unbanked hhs	2,189	403	397
Number of matched banked hhs	6,210	1,078	1,014
Pseudo R-squared			
Before matching	0.29	0.32	0.36
After matching	0.00	0.00	0.01
p > chi squared			
Before matching	0.00	0.00	0.00
After matching	0.98	1.00	1.00
Median bias (%)			
Before matching	17.62	36.98	37.51
After matching	1.10	2.33	1.68
Mean bias (%)			
Before matching	24.41	44.48	39.49
After matching	1.77	2.32	2.16

Notes: This table shows the results of the propensity score matching we perform in the first stage of our estimation. Each unbanked household is matched with the five closest banked households, provided that the distance between their propensity scores is smaller than 0.01. The first column shows results for the euro area, the second column for the United States when the control variables are the same as for the euro area. The control variables are: Age, age^2, income quintile dummies, working status (self-employed, unemployed, retired, other inactive and employed as the excluded category), education (completed secondary education, completed tertiary education, or primary education as benchmark group), marital status (married, divorced, or single as benchmark group), the number of household members, and gender (male, or female as benchmark group). In the case of the EA country fixed affects are also included. For USA (2), we control in addition for the extent to which households shop around when looking for financial investments, whether they make use of specialized software to help them with their financial decisions, whether the household is saving (or has saved) for a future major expense, the ability of the household to get money from friends and relatives in case of an emergency, household's saving habits and the reasons for saving. Pseudo R-squared is the pseudo R-squared from a probit estimation of the conditional treatment probability (propensity score) on all the variables in the model. p stands for the corresponding P-value of the likelihood-ratio test of the joint insignificance of all the regressors. The standardized bias statistics are calculated as follows: we calculate the bias for each covariate, i.e. the % difference of the sample means in the treated and non-treated (full or matched) sub-samples as a percentage of the square root of the average of the sample variances in the treated and non-treated groups (formulae from Rosenbaum and Rubin (1985)). To get a single summary statistic, we subsequently calculate the median/mean of these biases.

Table 4: Effect of being unbanked on net wealth and its components

Outcome	Euro Area		USA (1)		USA (2)	
Net wealth	-71,372.4 ***	*9,723.24*	-46,791.2 ***	*13,104.5*	-31,552.6 ***	*9,706.3*
Real assets	-60,421.9 ***	*10,854.13*	-54,866.2 ***	*13,274.7*	-44,307.9 ***	*9,986.7*
Financial assets	-13,975.4 ***	*2,926.06*	-13,038.2 ***	*3,570.4*	-7,095.3 ***	*2,629.0*
Mortgage debt	-2,185.5	*2,118.76*	-18,787.5 ***	*3,318.0*	-18,069.1 ***	*2,657.3*
Non-mortgage debt	-839.4	*838.51*	-2,325.8 **	*1,177.9*	-1,781.4	*1,300.8*

Notes: This table shows the results of the second-step regression using the sample of matched households, according to equations (3a) for the euro area and (3b) for the United States. The table shows the coefficient and (in italics) the standard error of the treatment variable "being unbanked" from an OLS regression. The dependent variable is defined in the header of each row, the independent variables are "being unbanked" plus a set of control variables (see notes to Table 3). ***/**/* denotes statistical significance at the 1%/5%/10% levels.

Table 5: Effect of being unbanked on other outcomes

Outcome	Euro Area		USA (1)		USA (2)	
Able to save	-0.119 ***	*0.017*	-0.101 ***	*0.031*	-0.053 *	*0.028*
Have mortgage debt	-0.052 *	*0.030*	-0.170 ***	*0.024*	-0.156 ***	*0.023*
Homeownership	-0.107 ***	*0.020*	-0.198 ***	*0.028*	-0.179 ***	*0.028*

Notes: This table shows the results of the second-step regression using the sample of matched households. The dependent variables are whether the household is able to save (row 1), whether it has mortgage debt (row 2) and whether it owns its main residence (row 3). The table shows the average marginal effect and (in italics) the standard error of the treatment variable "being unbanked" from a probit model. The independent variables are "being unbanked" plus a set of control variables (see notes to Table 3). ***/**/* denotes statistical significance at the 1%/5%/10% levels.

Table 6: Robustness checks – effect of being unbanked on net wealth

	Euro Area		USA (1)		USA (2)	
Baseline specification (5 neighbours, caliper 0.01)	-71,372.4 ***	*9,723.2*	-46,791.2 ***	*13,104.5*	-31,552.6 ***	*9,706.3*
10 neighbours, caliper 0.01	-70,888.9 ***	*9,383.3*	-44,170.7 ***	*11,730.9*	-29,439.0 ***	*8,830.2*
1 neighbour, caliper 0.01	-66,591.1 ***	*14,160.1*	-48,083.3 ***	*25,956.3*	-26,680.7 *	*14,842.0*
10 neighbours, caliper 0.1	-71,369.8 ***	*9,724.8*	-46,413.3 ***	*12,747.7*	-31,409.1 ***	*9,674.7*
10 neighbours, caliper 0.001	-71,750.0 ***	*9,486.9*	-49,213.6 ***	*14,386.5*	-35,122.2 ***	*10,746.9*
1 neighbour, no caliper	-66,573.7 ***	*14,173.2*	-48,021.2 *	*25,187.0*	-26,755.3 *	*14,787.9*
1 neighbour, no caliper, without replacement	-63,505.2 ***	*12,564.9*	-46,715.8 *	*23,987.1*	-24,933.8 **	*11,053.4*
Unweighted	-67,612.6 ***	*14,949.9*	-155,971.7	*158,811.2*	-90,409.9	*76,043.8*
Excluding Greece	-80,840.6 ***	*5,771.5*	--	--	--	--

Notes: This table shows the results of the second-step regression using the sample of matched households, according to equations (3a) for the euro area and (3b) for the United States. The table shows the coefficient and (in italics) the standard error of the treatment variable "being unbanked" from an OLS regression. The dependent variable is net wealth, the independent variables are "being unbanked" plus a set of control variables (see notes to Table 3). Row (1) reports the results already shown in Table 4. Row (2) reports results for allowing matching with up to 10 neighbors (with matching still being with replacement and a caliper of 0.01). Row (3) reports results for restricting matching to only 1 neighbor (with matching still being with replacement and a caliper of 0.01). Row (4) reports results for extending the caliper to 0.1 (with matching still being with replacement and 5 nearest neighbors). Row (5) reports results for reducing caliper to 0.001 (with matching still being with replacement and 5 nearest neighbors). Row (6) shows results for simple nearest neighbor matching. Row (7) shows results for nearest neighbor matching without replacement. Row (8) shows results when no population weights are applied. Row (9) shows results excluding Greece from the euro area sample. ***/**/* denotes statistical significance at the 1%/5%/10% levels.