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The sustainable practices of multinational banks as drivers of financial inclusion in developing countries

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ABSTRACT

Lack of access to banking generates inequality in the developing world; therefore, financial inclusion is a crucial objective of the Sustainable Development Goals. We investigate the impact of sustainable practices of multinational banks (MNBs) on financial inclusion. A sample of 275 MNBs, 16 developing countries, and 16,618 individuals yield robust evidence confirming the positive effect of such practices on financial inclusion. Specifically, we find that as MNBs become sustainable, the use of mobile banking intensifies. This finding is consequential because mobile banking is one of the most powerful means to achieve financial inclusion in the developing world.

1. Introduction

Financial inclusion, or the use of financial services by the poor (Allen et al., 2016; Kendall et al., 2010), has emerged as a policy issue as its importance to sustainable development has become better known (Beck and De La Torre, 2007). Families and small businesses need inclusion in financial services to make long-term plans and surmount life's most pressing necessities. Bank account holders are likelier to seek credit and insurance; start up new enterprises; get an education; or see the doctor, all of which contribute to greater well-being. For this reason, financial inclusion is a crucial objective of the Sustainable Development Goals (SDGs) set by the United Nations (UN) in 2015. Specifically, SDG 8.10 exhorts us to enhance the capacity of financial institutions to promote and expand financial inclusion. At present, 31% of adults around the world do not have access to banking (World Bank, 2021). Financial exclusion is particularly acute in developing countries, where 37% still do not have a bank account, compared to 9% in the developed world (Demirgüç-Kunt et al., 2018).

The emergence of fintech is beginning to turn the tide, however. The proliferation of mobile phone users globally, especially in developing countries, has allowed access to financial services by previously excluded people (Tram et al., 2021). Mobile banking has

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become an important transaction platform in developing countries.¹ Even when mobile money apps are not directly connected to a formal bank account, they provide financial transaction services *like* classical accounts. Mobile banking, therefore, generate financial inclusion (Donovan, 2012; Tram et al., 2021; Xu, 2020).

In this paper, we analyse if sustainable practices of multinational banks (MNBs) promote financial inclusion in developing countries using a sample of 275 MNBs, 16 developing countries, and 16,618 individuals. Specifically, we find that the MNBs' social practices promote mobile banking in developing countries. Our study fills important gaps in research, as follows. First, it contributes to the limited literature addressing SDG 8.10. Second, it adds to the literature exploring how the presence of MNBs affects financial inclusion in the developing world (Grittersova, 2014). Third, it strengthens the literature identifying mobile banking as one of the most important tools to augment financial inclusion in developing countries (Donovan, 2012).

2. Multinational banks, sustainable practices and financial inclusion

MNBs are considered more efficient and competitive than domestic banks (Bonin et al., 2005). They may be able to promote financial inclusion in the developing world (Lu, 2007): their multi-nationality, size, and world market scope give them more clout, normative reach, autonomy, and motive to act than domestic banks (Rugman and Doh, 2008). Moreover, unlike local competitors, they are flush with capital and outfitted to meet developing countries' vast need for finance (De Haas and Van Lelyveld, 2010) and to invest in technological innovations that facilitate financial inclusion (Gopalan and Rajan, 2018).

Despite this upbeat outlook, evidence shows considerable shortcomings in the impact of MNBs on financial inclusion in the developing world; in particular, outreach to the neediest classes of prospective clients has been substandard ever since MNBs arrived in these countries in the 1990s (Beck and Martinez Peria, 2010). MNBs can even undermine financial inclusion: their competition squeezes smaller local banks that had previously afforded some services for the needy. Competition forces them to harden their business model to cater for affluent clients (Gormley, 2010). Even if MNBs supply innovation and scarce capital, critics of their supposed constructive role assert that the effect on financial inclusion is inconsequential; their overriding drive is business self-interest (Gormley, 2010). MNBs are likelier than local banks to be short-termist profiteers and to "cherry-pick" markets and clientele to maximise immediate return on investment (Buch and DeLong, 2004; De Jong, 2021). In developing countries, MNBs generally serve large, established customers who are seen as creditworthy and easy to deal with (Focarelli and Pozzolo, 2005), which discriminates against those who need financial inclusion the most.

Incorporating ESG criteria into banks' operations boosts sustainability (Aracil et al., 2021; Murè et al., 2021; Ubeda et al., 2022). Sustainable practices empower MNBs to promote financial inclusion (Ubeda et al., 2021). Capital poverty is an opportunity to attract new, capital-hungry clients who normally lack access to financial services (Bihari and Pradhan, 2011). Sustainable banks are also likelier to have internal "financial inclusion policies" that seek out the under-served (Ahamed et al., 2021). Integrating ESG practices into their business model potentiates "sustainable win/win" possibilities (Pralhad, 2005) and "mutual prosperity" transactions (Forcadell and Aracil, 2017) that are known to expand inclusion without sacrificing profit (Porter et al., 2019). Practising the ESGs establishes client rapport, mitigates financial risk, and expands financial inclusion (Ramzan et al., 2021).

Expanding access points for digital financial services to more clients boosts financial inclusion (Vo et al., 2021). Its sheer accessibility of mobile banking to the underserved is game-changing (Tram et al., 2021). Fintech is reconfiguring financial inclusion in several ways. In addition to availability, now that at least half the developing populace owns mobile phones (World Bank, 2014), mobile banking also opportune users to switch from insecure, informal cash transactions to a more formal and secure format (Demirgüç-Kunt et al., 2022). Mobile fintech also renders a variety of products, services, and credit facilities convenient and affordable for all, individuals, small and medium-sized enterprises, and even large firms, which bids fair to increase aggregate expenditure and, with it, GDP (Ozili, 2019). Indeed, "financial inclusion is now digital" (Forcadell and Aracil, 2019: 96). The World Bank sees in mobile banking a potent inclusion tool which has already contributed substantially to extending banking deeper into the developing world. Its latest figures show that between 2014 and 2021, mobile banking increased account ownership by 8 percent in developing economies (Demirgüç-Kunt et al., 2022). This makes a sound case for mobile banking to be used as a proxy for financial inclusion (Chauvet and Jacolin, 2017; Tram et al., 2021).

As a result of these arguments, we hypothesize that the presence of MNBs incorporating sustainable practices promotes financial inclusion, in particular mobile banking, in developing countries.

3. Data & methods

3.1. Variables

3.1.1. Dependent variable

We measure mobile banking through the Global Findex survey² of 2017 (see: Demirgüç-Kunt et al., 2018). The variable *Mobile_Banking_{ij}* takes the value one if individual *i* of country *j* has used a mobile phone to make payments, to buy things, or to send or receive money, and zero if not (Xu, 2020).

¹ The use of mobile technology in banking depends largely on consumers' trust in banks and on the technological infrastructure (Gefen et al., 2003; Xu, 2020).

² Additional information about the Global Findex, including the complete database, can be found at: <http://www.worldbank.org/globalfindex>. See also: <http://www.gallup.com/strategicconsulting/en-us/worldpoll.aspx>.

3.1.2. Independent variables

Our independent variable is the social pillar of sustainable practices of MNBs ($Social_j$). We estimate the variable $Social$ from Thomson Reuters³ (Cheng et al., 2014; Dahlsrud, 2008; Forcadell et al., 2020). For calculating this variable, we abstract from the sustainable practices of MNB i in country j ($Social_{ij}$). So, we develop a country-level index of the social pillar of sustainable practices of MNBs: $Social_j = \sum_{i=1}^{k_j} \frac{A_{ij}^f}{A_j} Social_{ij}$, where k_j is the number of subsidiaries in country j , A_{ij}^f is the volume of assets controlled by MNB i in country j , and A_j is the total assets of banks in country j . We use the BankScope database provided by Bureau van Dijk and Fitch Ratings (Ahamed et al., 2021) to update the database of bank ownership compiled by Claessens and van Horen (2015). They consider a bank a subsidiary if its headquarters holds more than 50% of its shares. This criterion allows us to identify both domestic and foreign subsidiaries of MNBs. To avoid double counts, we use the consolidated counts of headquarters of domestic banks and the subsidiaries of MNBs. Accordingly, A_{ijt}^d is the volume of assets controlled by domestic banks, and A_{ijt}^f is that by MNBs. We identify 1418 commercial banks in 109 developing countries, of which 564 are subsidiaries of MNBs. Therefore, $A_j = \sum_{i=1}^{n_j} A_{ij}^d + A_{ij}^f$ is the total bank assets in country j , where n_j is the number of banks located in country j . The description of the control variables is detailed in Table 1.

Table 1

Description of control and instrumental variables.

Control variables	
Trust in Banks ($BTrust_j$)	The average of trust in banks in country j $BTrust_j = \sum_{i=1}^{n_j} \frac{BTrust_{ij}}{n_j}$, where n_j is the number of responses in country j , $BTrust_{ij}$ trust in banks of individual i , the scoring is: None at all (1), Not very much confidence (2), Quite a lot of confidence (3), or A great deal of confidence (4) (Xu, 2020). Source: World Value Survey. Given that the trust level is stable over time (Bjørnskov, 2007), we have selected the year closest to 2017 from the surveys conducted in 2010–2014 and 2017–2021.
Gender ($Gender_{ij}$)	Dummy variable equal to 1 if the respondent is female and 0 otherwise (Allen et al., 2016; Xu, 2020). Source: Global Findex 2017.
Age (Age_{ij})	Age in years (Allen et al., 2016; Xu, 2020). Source: Global Findex 2017
Personal Income ($Inc(d)_{ij}$)	Ordinal variable from 1 to 5 of the self-reported level of income. One indicates the lowest income group, and five the highest income group in one's country. Source: Global Findex 2017 (Allen et al., 2016; Neaime and Gaysset, 2018; Xu, 2020).
Education ($Educ(d)_{ij}$)	Ordinal variable from 1 to 3 of the self-reported level of education. 1 = completed primary or less, 2 = secondary, and 3 = completed tertiary or more (Allen et al., 2016; Xu, 2020). Source: Global Findex.
Employed ($Employed_{ij}$)	This variable takes the value 1 if the respondent is employed by an employer, either full- or part-time (Allen et al., 2016). Source: Global Findex 2017.
Rule of Law (RL_j)	This variable ranges from -2.5 (weak) to 2.5 (strong) (Buriak et al., 2019; Fungáčová et al., 2019). Source: The World Governance Indicators.
Bank Concentration ($BConc_j$)	Assets of the five largest banks as a share of total commercial banking assets. Mean of three years before the survey year in each country (Fungáčová et al., 2019). Source: Global Financial Development Database (OI.06)
Branch of banks ($Branch_j$)	Number of commercial bank branches per 100,000 adults. Source: Global Financial Development Database (AI.02)
Non-interest income of banks ($NoInt_j$)	Bank income generated by non-interest-related activities as a percentage of total income (net-interest income plus non-interest income). Non-interest-related income includes net gains on trading and derivatives, net gains on other securities, net fees, commissions, and other operating income. Source: Global Financial Development Database (EI.03)
Instrumental variables	
Protestant people ($Protestant_j$)	$Protestant_j = \sum_{i=1}^{n_j} \frac{Protestant_{ij}}{n_j}$, where n_j is the number of responses in country j ; $Protestant_{ij}$ takes the value 0 if the respondent is Protestant (Bjørnskov, 2007). Source: World Values Survey (F025_01).
GDP per capita ($GDP.pc_j$)	Data are in constant 2015 U.S. dollars (Fungáčová et al., 2019). Source: World Development Indicators.
Population ($Population_j$)	Logarithm of adult population (Bjørnskov, 2007; Xu, 2020). Source: Global Findex 2017.
Political preferences ($Politic_j$)	$Politic_j = \sum_{i=1}^{n_j} \frac{Politic_{ij}}{n_j}$, where n_j is the number of responses in country j ; $Politic_{ij}$ is the individual political preferences of the individual i in country j . The values are between one and ten; the higher the value, the greater the predisposition towards right-wing positions. Source: World Values Survey (E033).
Human Freedom ($Free_j$)	Quartile of the human freedom index: 1 = high freedom to 4 = low freedom (Bjørnskov, 2007). Source: Freedom House.
Country Legal System. ($Common_j$)	Variable that takes the value one if the country's legal system is of British Common Law origin. Source: (La Porta et al., 1998).

³ Thomson Reuters is the world's largest financial statistics database and provider of systematic ESG information to professional investors who manage portfolios by integrating ESG (non-financial) data.

Table 2
Presence and sustainability of MNBs.

Country	MNB_j	$MNB(ESG)_j$	$Social_j$	SB_j
Argentina	0.277	1.000	85.484	76.865
Bolivia	0.152	0.751	29.379	27.050
Brazil	0.151	0.954	77.728	73.165
Chile	0.389	1.000	93.245	85.273
Colombia	0.179	1.000	85.881	83.049
Ecuador	0.016	1.000	89.362	81.140
Indonesia	0.279	0.847	68.634	57.104
Jordan	0.199	0.622	43.485	45.638
Malaysia	0.168	1.000	67.211	57.173
Mexico	0.727	1.000	87.166	80.15
Pakistan	0.056	1.000	93.386	73.837
Peru	0.431	0.995	89.886	79.039
Philippines	0.085	0.780	67.347	59.317
Thailand	0.191	0.996	64.338	64.437
Turkey	0.296	0.956	75.500	71.524
Vietnam	0.034	1.000	72.523	77.951

*** Calculations for the 2017 year.

We select 16 developing countries where the assets of MNBs with ESG ratings exceeded 50% of the banking assets controlled by all MNBs (See [Table 2](#)).

3.2. Sample

We merge different data sources (BankScope, EIKON-Thomson Reuters, Global Vindex, World Bank) to configure a sample of 16 developing countries, 275 banks (BankScope), and 16,618 individual respondents surveyed in 2017 (Global Vindex). [Table 3](#) presents the summary statistics. [Table 4](#) presents the correlation matrix.

Table 3
Summary statistics.

	Mean	Std. Dev.	Min	Max
$Mobile_Banking_{ij}$	0.061	0.239	0.000	1.000
$Social_j$	75.114	17.438	29.379	93.386
SB_j	73.764	16.413	21.451	87.605
MNB_j	0.213	0.163	0.016	0.669
SB_j	2.510	0.408	2.032	3.169
$BTrust_j$	0.061	0.239	0.000	1.000
$Gender_{ij}$	0.573	0.245	0.000	1.000
Age_{ij}	40.568	17.260	15.000	99.000
$Inc(2)_{ij}$	0.176	0.381	0.000	1.000
$Inc(3)_{ij}$	0.192	0.394	0.000	1.000
$Inc(4)_{ij}$	0.207	0.405	0.000	1.000
$Inc(5)_{ij}$	0.242	0.428	0.000	1.000
$Educ(2)_{ij}$	0.5401	0.498	0.000	1.000
$Educ(3)_{ij}$	0.109	0.312	0.000	1.000
$Employed_{ij}$	0.632	0.482	0.000	1.000
RL_j	-0.254	0.504	-1.488	1.012
$BConc_j$	75.104	16.664	32.208	98.420
$Branch_j$	14.140	7.758	3.449	40.688
$NoInt_j$	30.351	9.543	14.748	49.966

Table 4
Correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.- $Social_j$	1.000															
2.- MNB_j	0.177	1.000														
3.- $BTrust_j$	-0.159	-0.527	1.0000													
4.- $Gender_{ij}$	-0.005	0.033	-0.042	1.000												
5.- Age_{ij}	0.030	-0.029	-0.002	0.015	1.000											
6.- $Inc(2)_{ij}$	0.029	-0.007	0.003	0.041	-0.018	1.000										
7.- $Inc(3)_{ij}$	0.007	0.014	-0.017	0.027	0.006	-0.231	1.000									
8.- $Inc(4)_{ij}$	0.004	0.002	-0.012	-0.016	0.002	-0.240	-0.251	1.000								
9.- $Inc(5)_{ij}$	0.006	0.019	-0.020	-0.085	-0.009	-0.258	-0.269	-0.280	1.000							
10.- $Educ(2)_{ij}$	-0.012	0.146	-0.197	-0.036	-0.250	-0.002	0.029	0.042	0.017	1.000						
11.- $Educ(3)_{ij}$	-0.038	0.014	-0.103	0.000	-0.066	-0.082	-0.036	0.016	0.189	-0.398	1.000					
12.- $Employed_{ij}$	-0.066	0.003	0.032	-0.230	-0.152	-0.035	-0.010	0.021	0.079	0.045	0.101	1.000				
13.- RL_j	-0.044	0.184	0.149	-0.001	0.021	0.010	-0.005	-0.005	-0.023	-0.026	-0.021	0.012	1.000			
14.- $BConc_j$	0.100	0.177	-0.197	-0.038	-0.122	-0.012	-0.007	0.008	0.010	0.015	-0.056	0.001	0.158	1.000		
15.- $Branch_j$	0.398	-0.080	-0.325	0.032	-0.012	-0.007	0.002	0.003	0.019	0.078	0.023	0.019	-0.344	-0.210	1.000	
16.- $NoInt_j$	-0.604	0.191	-0.267	0.001	-0.006	-0.002	-0.001	0.011	0.001	0.040	0.106	-0.006	0.075	0.253	0.004	1.000

3.3. Analytical approach

We choose a set of countries where MNBs control 50% or more of the country's banking assets. This proceeding may generate a sample of the most attractive developing countries for banking, which could constitute selection bias. Non-random selection requires control of the unobserved heterogeneity when estimating the primary equation. We use the two-step method proposed by Heckman et al. (2006) to correct the potential biases caused by a non-random selection. In the first step, we use a probit regression (Eq. (1)) to estimate the probability of a country receiving direct investment from a sustainable MNB:

$$Pr(D_j=1|X) = \phi(Z\gamma) \quad (1)$$

where D_j is a dummy variable that takes value one when the MNBs control more of the 50% of the banking assets in country j , and zero for all other cases⁴; ϕ is the cumulative distribution function of the standard normal distribution; Z is the vector of explanatory variables⁵; and γ is the vector of coefficients.

In the second step, we analyse the effects of SB_{ij} , estimated at the country level (level 2), upon $Mobile_Banking_{ij}$, estimated at the individual level (level 1). This multilevel frame violates the assumption of independence of observations, leading to downwardly biased standard errors if ordinary regression is used (Krull and MacKinnon, 2001; Preacher et al., 2010). Therefore, we estimate a multilevel probit regression:⁶

$$P[Mobile_Banking_{ij}=1|X, D=1] = \beta_1 + \beta_2 Social_j + \beta_3 CV1_{ij} + \beta_4 CV2_j + \zeta_{1j} + \rho\sigma_u\lambda(Z\gamma) + \epsilon_{ij} \quad (2)$$

where $Mobile_Banking_{ij}$ is a dummy variable that takes value one if individual i from country j uses mobile banking, zero if not.

The coefficient β_2 captures the effect of $Social_j$ on the decision to use mobile banking. A positive and significant β_2 would confirm our hypothesis. $CV1_{ij}$ and $CV2_j$ are, respectively, the control variables to level 1 and to level 2. ζ_{1j} is the intercept, which varies over individuals, and $\zeta_{1j} \sim N(0, \psi_{11})$; σ_u is the standard deviation of u , which is the variance of unobserved characteristics of firms associated with the location advantages of countries for attracting sustainable MNBs; ρ is the correlation between unobserved country-specific characteristics associated with their location advantages and unobserved determinants of trust in banks; λ is the Inverse-Mills Ratio estimated in Eq. (1) which can be interpreted as the unobserved heterogeneity between selected and not-selected countries that are correlated with exposure. If $\rho\sigma_u$ is significant, it would indicate that selection bias is present but corrected; ϵ_{ij} are the errors and $\epsilon_{ij} \sim N(0, \theta)$.

4. Results

In Model 1 (Table 5), the coefficient of $Social_j$ is positive and significant. This means that the socially sustainable practices of MNBs increase the use of mobile banking in developing countries. However, the VIF evidences a possible multicollinearity problem; therefore, in Model 2 (Table 5), we exclude the variables $BConc_j$ and $Branch_j$, which allows us to achieve an acceptable level of VIF. In this model, the coefficient of $Social_j$ remains positive and significant. This finding confirms our hypothesis.

Our estimations could be biased by omitting country-specific effects and simultaneity. The relation between financial inclusion and trust in banks, income distribution, education, and institutional development is not unidirectional and may include reverse causality (Beck et al., 2010; Neaime and Gaysset, 2018; Xu, 2020). Trust in banks is necessary for financial inclusion, but financial inclusion also improves trust in banks (Gefen et al., 2003; Xu, 2020). Poverty alleviation and education increase demand for banking services, but financial inclusion reduces inequalities (Neaime and Gaysset, 2018) and facilitates access to education. Institutional development creates a framework conducive to financial inclusion, but the improvement of the financial system stimulates development of the institutional framework. Using a function control within a standard two-stage method (Wooldridge, 2015) can alleviate, if not solve, endogeneity bias and doubts about the direction of causality. Thus, in the specification of the control function, we include some instrumental variables (Bjørnskov, 2007; Xu, 2020) (Table 1).

⁴ We select 31 developing countries, including 34,886 personal interviews.

⁵ Based in Focarelli and Pozzolo (2005) we select these variables: trust in banks, rule of law, free press, number of commercial bank branches per 100,000 adults, bank concentration, logarithm of adult population, personal income, education level.

⁶ We used the command `meprobit` of Stata 16.

Table 5
Multilevel probit regression.

	Model 1 <i>Mobile_Banking_{ij}</i>	Model 2 <i>Mobile_Banking_{ij}</i>
<i>Social_j</i>	0.011 ** (0.005)	0.009** (0.004)
<i>MNB_j</i>	1.226** (0.526)	1.031** (0.510)
<i>BTrust_j</i>	0.965**** (0.218)	0.536** (0.211)
<i>Gender_{ij}</i>	-0.170**** (0.036)	-0.171**** (0.036)
<i>Age_{ij}</i>	0.009 (0.007)	0.008 (0.007)
<i>Age_{ij}²</i>	-0.000**** (0.000)	-0.000**** (0.000)
<i>Inc(2)_{ij}</i>	0.069 (0.069)	0.038 (0.068)
<i>Inc(3)_{ij}</i>	0.147** (0.066)	0.116* (0.065)
<i>Inc(4)_{ij}</i>	0.322**** (0.062)	0.303**** (0.061)
<i>Inc(5)_{ij}</i>	0.445**** (0.060)	0.426**** (0.059)
<i>Educ(2)_{ij}</i>	0.301**** (0.054)	0.250**** (0.051)
<i>Educ(3)_{ij}</i>	0.720**** (0.081)	0.588**** (0.066)
<i>Employed_{ij}</i>	0.354**** (0.045)	0.352**** (0.045)
<i>RL_j</i>	0.221** (0.102)	0.209* (0.112)
<i>BConc_j</i>	0.017*** (0.005)	
<i>Branch_j</i>	0.052** (0.022)	
<i>NoInt_j</i>	-0.003 (0.006)	-0.000 (0.007)
λ_{Mills}	-0.258 (0.294)	0.470*** (0.151)
<i>Constant</i>	-7.286**** (1.115)	-4.451**** (0.821)
Wald – χ^2_1	642.490****	628.730****
VIF max†	14.594	1.960
LR-test	77.650****	208.910****
Observations	16,618	16,618
Number of Countries	16	16

In Model 3 (Table 6), the coefficients of *SB_j* and *MNB_j* are positive and significant. Thus, the presence of any MNBs has a positive effect on the total number of mobile accounts set up, but the sustainable practices of some MNBs increase this effect. This finding confirms our hypothesis.

Table 6
Multilevel probit regression (Control function).

Model 3 <i>Mobile_Banking_{ij}</i>	
<i>Social_j</i>	0.006** (0.003)
<i>MNB_j</i>	0.770**** (0.255)
<i>Control Variables</i>	[...]
λ_{Mills}	-0.430*** (0.122)
λ_{BTrust}	1.853 (39.412)
λ_{Inc}	-13.275 (52.034)
λ_{Educ}	21.399 (47.577)
λ_{RL}	-0.345 (0.318)
<i>Instrumental variables (first stage regressions)</i>	
	<i>BTrust_j</i>
<i>Protestant_j</i>	2.880**** (0.001)

(continued on next page)

Table 6 (continued)

Model 3 <i>Mobile_Banking_{ij}</i>	
<i>Population_{ij}</i>	0.179**** (0.000)
	<i>Inc(d)_{ij}</i>
<i>GDP.pc_j</i>	-0.000**** (0.000)
<i>Politic_j</i>	-0.003 (0.016)
<i>Population_j</i>	-0.076**** (0.014)
	<i>Educ(d)_{ij}</i>
<i>GDP.pc_j</i>	0.000**** (0.000)
<i>Politic_j</i>	-0.298**** (0.020)
<i>Free_j</i>	0.387**** (0.016)
<i>Population_j</i>	-0.361**** (0.016)
	<i>RL_j</i>
<i>GDP.pc_j</i>	0.000**** (0.000)
<i>Free_j</i>	0.253**** (0.0002)
<i>Common_j</i>	0.438**** (0.038)
<i>Population_j</i>	-0.145**** (0.003)
Observations	16,618
Number of Countries	16

Bootstrapping: 1000 interactions.

As a robustness check, we complete the analysis of the Social pillar with an analysis of the Environmental, Social, and Governance (ESG) scores to assess the level of sustainability of MNBs at the country level (*ESG_j*). In this case, we use the ESG scores provided by Thomson Reuters (Cheng et al., 2014; Dahlsrud, 2008; Forcadell et al., 2020). We estimate the same models as before, replacing the variable *Social_j* by *ESG_j*. In Model 4 (Table 7), the coefficient of *ESG_j* is positive and significant; thus, the sustainable practices of MNBs increase the use of mobile banking in developing countries; however, the VIF evidences a possible multicollinearity problem; therefore, in Model 5 (Table 7), we exclude the variable *BConc_j*, which allows us to achieve an acceptable level of VIF. In this model, the coefficient of *ESG* remains positive and significant. In Model 6 (Table 8), by controlling the endogeneity, the coefficient of *ESG_j* remains positive and significant. These findings corroborate our hypothesis.

Table 7
Multilevel probit regression.

	Model 4 <i>Mobile_Banking_{ij}</i>	Model 5 <i>Mobile_Banking_{ij}</i>
<i>SB_j</i>	0.012* (0.006)	0.015** (0.007)
<i>MNB_j</i>	1.303** (0.542)	0.740 (0.611)
<i>BTrust_j</i>	0.927**** (0.226)	0.507** (0.209)
<i>Gender_{ij}</i>	-0.171** (0.036)	-0.171**** (0.036)
<i>Age_{ij}</i>	0.009**** (0.007)	0.008**** (0.007)
<i>Age_{ij}²</i>	-0.000**** (0.000)	-0.000**** (0.000)
<i>Inc(2)_{ij}</i>	0.065 (0.069)	0.045 (0.069)
<i>Inc(3)_{ij}</i>	0.144* (0.066)	0.123* (0.066)
<i>Inc(4)_{ij}</i>	0.319**** (0.062)	0.307**** (0.062)
<i>Inc(5)_{ij}</i>	0.443**** (0.060)	0.430**** (0.060)
<i>Educ(2)_{ij}</i>	0.294**** (0.054)	0.261**** (0.053)
<i>Educ(3)_{ij}</i>	0.704**** (0.081)	0.618**** (0.079)
<i>Employed_{ij}</i>	0.352**** (0.045)	0.351**** (0.045)
<i>RL_j</i>	0.196* (0.102)	0.200* (0.113)
<i>BConc_j</i>	0.017*** (0.006)	
<i>Branch_j</i>	0.050** (0.023)	0.024 (0.025)
<i>NoInt_j</i>	-0.004*** (0.006)	-0.001 (0.007)
λ_{Mills}	-0.175 (0.296)	0.302 (0.286)
Constant	-7.237**** (1.167)	-4.976**** (1.024)
Wald - χ^2_1	640.960****	629.070****
VIF max _†	7.190	3.560
LR-test	93.650****	193.640****
Observations	16,618	16,618
Number of Countries	16	16

Table 8
Multilevel probit regression (Control function).

Model 6 multilevel probit <i>Mobile_Banking_{ij}</i>	
<i>SB_j</i>	0.019**** (0.003)
<i>MNB_j</i>	-0.164 (0.602)
Control Variables	[...]
λ_{Mills}	-0.710**** (0.272)
λ_{BTrust}	1.397 (16.769)
λ_{Inc}	0.351 (0.296)
λ_{Educ}	-0.5799* (0.350)
λ_{RL}	-1.271* (0.719)
Instrumental variables (first stage regressions)	
	<i>BTrust_j</i>
<i>Protestant_j</i>	0.701**** (0.002)
<i>Population_j</i>	0.079 (0.000)
	<i>Inc(d)_{ij}</i>
<i>GDP.pc_j</i>	-0.000**** (0.000)
<i>Politic_j</i>	0.411**** (0.034)
<i>Population_j</i>	-0.113**** (0.030)
	<i>Educ(d)_{ij}</i>
<i>GDP.pc_j</i>	0.000 (0.000)
<i>Politic_j</i>	-0.011 0.020
<i>Free_j</i>	0.149**** (0.020)
<i>Population_j</i>	-0.169**** (0.030)
	<i>RL_j</i>
<i>GDP.pc_j</i>	0.000**** (0.000)
<i>Free_j</i>	0.000**** (0.000)
<i>Common_j</i>	2.353**** (0.119)
<i>Population_j</i>	0.055**** (0.001)
Observations	16,618
Number of Countries	16

Bootstrapping: 1000 interactions.

5. Conclusions

We find strong empirical evidence confirming our hypothesis that the sustainable practices of MNBs promote mobile banking in developing countries. These findings are consequential because mobile banking is one of the most powerful means of achieving financial inclusion in the developing world (Donovan, 2012). Several relevant policy implications follow, which may help practitioners, policy-makers, and researchers understand the pivotal role of sustainable banking in addressing the 2030 Agenda, particularly the financial inclusion challenges in SDG 8.10. Banking practitioners at MNBs should note that adopting the ESG criteria empowers host-market publics to approach them and demand financial services with confidence that they will be treated fairly. Policy-makers in developing countries could direct or nudge banks in their jurisdictions to adhere to these criteria in the knowledge that this would contribute to financial inclusion by bridging the persistent trust gap in banks that likely hold back their country's development. Researchers might investigate whether and how sustainable banks are related to financial inclusion. Although financial inclusion has improved in the last several years, almost one-third of adults in the world still lack access to banking services, a marginalisation afflicting the developing world almost exclusively.

CRedit authorship contribution statement

Fernando Úbeda: Methodology, Software, Data curation, Formal analysis. **Alvaro Mendez:** Investigation, Writing – original draft, Writing – review & editing, Investigation, Project administration. **Francisco Javier Forcadell:** Writing – original draft, Investigation, Supervision, Validation.

Declaration of Competing Interest

The authors whose names are listed above declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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