Financial Resilience: A Way Forward Towards Economic Development in Developing Countries

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Abstract
Financial inclusion is a policy priority in both developed and developing countries. Yet almost one in four people remain financially excluded around the globe, with the vast majority living in the developing world. In this paper, we argue that financial resilience: an individual's ability to function effectively in adverse financial situations, can better help us assist people to cope with financial adversity, develop effective policy and, ultimately, improve economic development. This paper builds on an existing financial resilience meas-urement framework and adapts it to develop a measure appropriate to the context of devel-oping countries. Indonesia, where one in three people are financially excluded, is used as a case country from which to draw conclusions. We use the Indonesia Family Life Sur-vey and put forward the country's first snapshot of financial resilience. Implications for research and policy are presented.

Keywords Financial inclusion · Financial resilience · Economic development · Poverty · Indonesia

1 Introduction

Globally, about 1.7 billion adults remain financially excluded (Demirgüç-Kunt et al., 2018), and therefore, without access to appropriate and affordable financial products and services such as a transaction account, general insurance, and affordable credit (Leyshon & Thrift, 1995; Burkett & Sheehan, 2009; Salignac et al., 2016). The large majority of the

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financially excluded live in the developing world. China leads the way (225 million), fol-lowed by India (190 million), Pakistan (100 million), and Indonesia (95 million). Together with Nigeria, Mexico, and Bangladesh, these countries account for nearly half the world's unbanked population (Demirgüç-Kunt et al., 2018). This can lead to further disadvantage as access to appropriate and affordable financial products and services can drive economic development and 'help people escape poverty by facilitating investments in their health, education, and businesses' (Demirgüç-Kunt et al., 2018: 1; see also Uddin et al., 2014; Boukhatem, 2016; Majid et al., 2017; Gnangnon, 2019). Indeed, countries with high finan-cial exclusion often have higher rates of poverty, greater income inequality and slower eco-nomic growth (Amidjono et al., 2016; Dawood et al., 2019; Gitaharie et al., 2018; Karsidi et al., 2015; Rosengard & Prasetyantoko, 2011; Tambunan, 2015). Financial inclusion, thus, has become a policy priority for many.

The Global Findex database shows that bank account ownership has been increasing globally, for example, 69% of adults had an account in 2017, up from 62% in 2014 and 51% in 2011 (Demirgüç-Kunt et al., 2018). Inequalities, however, persist and the unbanked continue to be overly represented amongst the poor making them especially vulnerable to financial shocks and emergencies (e.g. unemployment, illness, crop loss, environmental hazards) (Gertler et al., 2009; Okten & Osili, 2004). In addressing poverty and economic development, thus, moving beyond financial inclusion (i.e. the delivery and practical aspects of financial products and services) and towards financial resilience (i.e. individuals' ability to function effectively in adverse financial situations), is important (Salignac et al., 2019). While concepts such as financial literacy (Lusardi & Mitchell, 2014; Lusardi et al., 2010) and financial capability (Serido et al., 2013; Von Stumm et al., 2013; Consumer Financial Protection Bureau, 2018) have been used by policy makers to address this gap, they do not explain people's capacity to cope with financial shocks.

Financial resilience has been defined as 'an individual's ability to access and draw on internal capabilities and appropriate, acceptable and accessible external resources and supports in times of financial adversity' (Salignac et al., 2019: 21). It is the ability of individuals to ''bounce back' after adverse events and experiences, to adapt to changing circumstances and to deal with environmental stress' (Abbott-Chapman et al., 2008: 612). While the concept of financial resilience is gaining popularity in developing countries (e.g. it has made its way into the 2017 Global Findex Database), it remains under conceptualised. To measure financial resilience, the 2017 Global Findex survey focused on the ability of respondents to 'come up with emergency funds' and what their main source of funding would be (Demirgüç-Kunt et al., 2018). We borrow from Salignac et al. (2019) and argue that this is not enough. Financial resilience is multidimensional. It takes into account that an individual's ability to cope can change over time and is dependent on context, structures and supports. As such, tools to measure, and interventions to enhance financial resilience must be multidimensional as well as understand and address context, which in developing countries, is likely to add complexity (Tadele & Manyena, 2009). Therefore, in this paper we are interested in better understanding financial resilience in a developing country context and how it can help further alleviate poverty and drive economic development. To do so, we draw from Salignac et al. (2019) financial resilience measurement framework and adapt it to develop a measure of financial resilience appropriate to developing countries.

We focus on Indonesia as our case country—a lower-middle-income country, the largest economy in Southeast Asia and 4th largest population in the world (World Bank, 2019). Indonesia is of specific interest as the country has undergone profound transformation towards 'inclusive' economic development since the Asian financial crisis of 1997–98. In this era of reform (or *Reformasi*), government policy shifted towards ensuring that marginalized and/or

excluded groups were included in the country's economic development process and adopted a 'pro-growth, pro-job, and pro-poor' strategy (Tambunan, 2015: 3). One important element of inclusive development for the Indonesian government and a tool towards poverty alleviation and financial stability has been financial inclusion. As such, in 2010, the central bank of Indonesia: Bank Indonesia, launched the National Strategy of Financial Inclusion, aimed at providing better access to financial products and services for all (Tambunan, 2015). In 2013, the Indonesia Financial Services Authority further launched the National Strategy on Financial Literacy and began focusing on awareness building, strengthening infrastructure for the delivery of education programs and further developing affordable financial products and services (Amidjono et al., 2016). In January 2020, Indonesia's President Joko Widodo commented on the importance of increasing national financial literacy and inclusion (Afifa, 2020). While account ownership in Indonesia rose from 20% in 2011 to 49% in 2017 (Demirgüç-Kunt et al., 2018), the country still faces significant poverty issues (Dawood et al., 2019; Tambunan, 2012, 2015). 'Although about half the population lives above the national poverty line, many are just beyond the threshold. These 'near poor' households are vulnerable to shocks such as food price increases, environmental hazards and ill health, which can easily drive them into poverty' (Amidjono et al., 2016: 280). Important disparities also remain with half the Indonesian population living in rural areas where poverty is prominent. For example, 16.6% of rural people are poor compared with 9.9% of urban populations (Amidjono et al., 2016), and access to financial products and services remains limited for the poor (Karsidi et al., 2015). Furthermore, previous research found that one in three Indonesians are financially excluded (Demirgüç-Kunt et al., 2018).

Our contribution is twofold. First, this paper builds on the financial resilience measurement framework developed by Salignac et al. (2019) in the context of a developed country, Australia. We adapt this framework to develop a measure appropriate to the context of developing countries, specifically Indonesia, where financial behaviours and vulnerabilities take different shapes. For example, poor households in developing countries often save through the accumulation of tangible assets such as livestock, vehicles and household appliances (Banerjee et al., 2011; Gertler et al., 2009; Vial & Hanoteau, 2015). Unlike in developed countries, housing characteristics such as sanitation and access to safe drinking water are used by policy makers in developing countries to identify and target the poor (Bah et al., 2019; Karlan & Thuysbaert, 2019). Many developing countries are also prone to natural disasters, which may push people into cycles of poverty, especially as national financial markets and governments may not provide suitable supports (Gignoux & Menéndez, 2016). Second, this paper uses Indonesia as a case country from which to draw conclusions using the Indonesia Family Life Survey (IFLS). Specifically, we use IFLS' fifth wave administered in 2014–2015, which includes interviews of 50,000 individuals from 16,204 households as well as the local leaders of 321 communities (rural and urban). It presents the country's first snapshot of financial resilience and enables us to identify pockets of disadvantage for targeted policy decisions. Implications for research and policy are then presented.

2 Financial Resilience in Indonesia

Resilience comprises 'multiple interrelated dimensions, which fluctuate over time' (Buikstra et al., 2010: 976). It is a *dynamic process* best characterised by *adaptability* (Adger, 2000) rather than *stability* (Bonanno, 2005), i.e. 'the process of 'bouncing back' from harm rather than immunity from harm' (Norris, 2010: 3). In this dynamic process, access to appropriate resources is critical, these can be internal or external. Internal resources are the 'relatively stable personal characteristics that protect individuals from stress' (Norris,

2010: 22). They are, for example, cognitive skills, positive views of self, hope, and optimism (Donnellan et al., 2009; Ensel & Lin, 1991; Masten, 2001; Norris, 2010). External resources, such as money and relationships, can also help an individual adapt better and minimize the unwanted impact of an adverse event (Cummins, 2010). 'Vulnerability', i.e. 'unequal exposure to risk is coupled with unequal access to resources' (Morrow, 2008: 4), however, means that individuals do not have access to these resources on an equal basis due to socio-economic disparities often outside their control (e.g. economic status, minority status, age and disability). In the context of developing countries, vulnerability is an important component to consider as it is widely acknowledged that the poor are generally more vulnerable. For example, more of their assets are tangible and of lower quality (e.g. small possessions such as jewellery, crops and livestock rather than financial investments), making it more difficult to provide collateral when applying for a loan (Hallegatte, 2014).

To better understand and measure the state of financial resilience in Indonesia, this paper builds on Salignac et al. (2019) four-component financial resilience framework. The framework enables us to determine and situate an individual's level of financial resilience from experiencing severe financial vulnerability to being financially resilient. It helps us capture both internal and external resources and includes indicators of vulnerability that relate to individual characteristics and circumstances. It comprises four components: 1) economic resources; 2) financial products and services; 3) financial knowledge and behaviour; and 4) social capital. We review each, in turn, in the context of Indonesia.

2.1 Economic Resources

The first component, economic resources, captures money-related factors that can influence an individual's ability to cope with financial shocks. Income, for example, is an important part of that. According to the Global Findex Survey, while 46% of the population in high-income economies reports having received at least one wage payment from a private sector employer in the past year, only 24% do so in developing countries and in Indonesia, most are paid in cash (Demirgüç-Kunt et al., 2018). In developing countries, 'cash transfers' or 'government payments' are prominent as a means of providing financial support to poorer households (Cameron & Shah, 2014; Dwiputri, 2017). About 20% of the population in Indonesia reported having received such payments in 2017, and were equally likely to receive these into an account or in cash. (Demirgüç-Kunt et al., 2018). The Bantuan Langsung Tunai (BLT) program, for example, was implemented in 2005. It is one of the largest cash transfer programs in the developing world and is aimed at compensating poor households for the removal of fuel subsidies leading to an important increase in fuel costs (Kwon and Kim, 2015). The BLT has been especially contentious as accurate targeting in developing countries is very difficult due to under-developed information, tax and welfare systems (Hastuti and Usman 2006). Implementation of the BLT resulted in 'undercoverage of eligible recipients (errors of exclusion) and leakage of funds to ineligible households (errors of inclusion)' (Cameron & Shah, 2014: 381). Half of the 1 billion US dollar program was misallocated to ineligible households resulting in social unrest, antisocial behaviour and erosion of trust (Coady et al., 2004; Elbers et al., 2007; Tambunan, 2015).

The ability to meet cost of living expenses (i.e. 'goods and services that are necessary to maintain a certain standard of living' (Jacobs et al., 2014: 33)) can also influence an individual's financial resilience. On the other hand, the inability to meet these costs often indicates economic insecurity and can cause emotional stress, thus, eroding resilience (Conger & Conger, 2002; Orthner et al., 2004). Pro-poor programs have been put in place

by government to address this issue and work towards providing the poor with access to income. For example, the Family Hope Program (*Program Keluarga Harapan*) was implemented to provide access to basic needs for households that are unable to provide for themselves (Tambunan, 2015). Being able to deal with unexpected expenses, and therefore, an individual's capacity to raise money in an emergency, is also an indicator of resilience (Demiguc-Kunt et al., 2015). In Indonesia, money from working (e.g. seeking additional hours or a salary advance) was most commonly cited as the main source of emergency funds, followed by family and friends (Demirgüç-Kunt et al., 2018). This differs from developed countries where most report relying on savings. Indeed, access to savings plays an important role in managing cash flow, managing risk and enabling consumption smoothing (Cull et al., 2014). While the Global Findex Survey finds that 40.5% of Indonesians saved in the past year, only 15.3% of Indonesian respondents indicated that they had saved at formal institutions (Amidjono et al., 2016). For most of the others, saving semi-formally through a savings club or a person outside the family is the most common method (Demirgüç-Kunt et al., 2018).

2.2 Financial Products and Services

The second component, financial products and services, builds on the current financial exclusion literature and, thus, focuses on access to financial products and services (Connolly et al., 2011). In Indonesia, around 40 million people remain without access to financial products and services (Gitaharie et al., 2018). Less than 20% of adults and only 12.8% of young adults own a bank account (Amidjono et al., 2016), with wealthier adults being twice as likely to do so (Demirgüç-Kunt et al., 2018). Out of the 60% of Indonesians households that did borrow, 17% borrowed from mainstream banks and 43% from non-bank sources (Rosengard & Prasetyantoko, 2011; Tambunan, 2015). Access to insurance also remains low (Demirgüç-Kunt et al., 2018).

Extant literature points to various forms of financial exclusion people may suffer from: self-exclusion (psychological, cultural and educational factors), physical exclusion (no available local branches), access exclusion (do not fit selection criteria), condition exclusion (unsuitable products), price exclusion (unaffordable), and marketing exclusion (excluded from marketing strategies) (Cnaan et al., 2012; Gomez-Barroso & Marban-Flores, 2013; Marron, 2013; Salignac et al., 2016). In Indonesia, physical exclusion remains the main barrier for owning a bank account, with about 33% of Indonesians citing distance as a reason for not owning one (Demirgüç-Kunt et al., 2018). Other factors such as not having enough money and not having a job (i.e. price exclusion), not knowing how a bank operates (i.e. self-exclusion) (Amidjono et al., 2016; Cole et al., 2011; Bank Indonesia, 2012), products and services that do not match people's needs as well as wage payments being made in cash (i.e. condition exclusion), and not owning a citizen identity card (i.e. access exclusion) (Gitaharie et al., 2018) are also prevalent. Only about 6% cited religious concerns as a reason (Demirgüç-Kunt et al., 2018). In terms of borrowing, not being creditworthy was cited as the main impediment (i.e. access exclusion), followed by not wishing to borrow and having no collateral (Amidjono et al., 2016; Demirgüç-Kunt et al., 2018; Gitaharie et al., 2018; Tambunan, 2015). This is in contrast to Johnston and Morduch (2008) who showed that while 40% of poor households are creditworthy, they remain excluded from the credit market as mainstream banks provide unsuitable products (i.e. condition exclusion). This is because the poor tend to want to borrow smaller amounts than provided through the mainstream market (Tsukada et al., 2010). Gitaharie et al. (2018)

also show that demographic characteristics may impact on households' likelihood to access credit from the formal banking sector. For example, they find that households with tertiary education are more likely to be granted a loan from formal financial institutions, while those with lower levels of education are more likely to need to seek alternative arrangements from the informal sector (Gitaharie et al., 2018).

Access to formal financial institutions in Indonesia, thus, is low. Statistics Indonesia showed that while Indonesian households' access to formal banks increased by 1.2% per year between 2008 and 2012, access to non-bank institutions increased by 12.5% (Gitaharie et al., 2018). Alternative forms of borrowing are, therefore, widespread. For the 43% of Indonesians who borrow from non-bank sources (Rosengard & Prasetyantoko, 2011; Tambunan, 2015) many borrowed from relatives, friends and neighbours, which is considered quicker and easier as no legal documents or collateral are required (Cole et al., 2011; Gitaharie et al., 2018; Okten & Osili, 2004). Microfinance has also been a reliable alternative. First available in the early 1970s with the *Bank Rakyat Indonesia (*BRI) (i.e. the Indonesian People's Bank) microfinance has been running successfully and sustainably for a number of years and is now well established (Tambunan, 2015). In rural areas, it is customary for microfinance institutions to accept standing crops as collateral, or to provide in-kind loans of rice at prices higher than cash prices (Tambunan, 2015). While those forms of alternative borrowing have been beneficial to poorer households, Indonesians continue to borrow from predatory lenders 'despite oppressive interest charges' (Karsidi et al., 2015: 173). Karsidi et al. (2015) find that the main reason for this is the ease with which individuals are able to borrow as well as the personal relationship the borrower has developed with the lender.

2.3 Financial Knowledge and Behaviour

The third component, financial knowledge and behaviour, builds on the current financial literacy and financial capability literature (Consumer Financial Protection Bureau, 2018; Kempson & Poppe, 2018). It looks at an individual's knowledge of, and confidence using, financial products and services. Financial literacy has received increasing policy attention both in developed and developing countries as financial capability requires individuals to access acquired financial knowledge to make appropriate financial decisions (Taylor, 2011; Serido et al., 2013; Von Stumm et al., 2013). Research has shown that in areas of credit, saving, and retirement planning, financial knowledge and corresponding financial behaviours are positively connected (Lusardi & Mitchell, 2014). For example, Lusardi and Mitchell (2007) show that low levels of financial literacy are positively associated with low levels of retirement planning, and Stango and Zinman (2009) demonstrate the positive association with borrowing at higher interest rates. In Indonesia, financial education has been found to be positively correlated with the use of formal financial products and services such as bank accounts, credit and insurance, and is 'one of the strongest and most consistent predictors of demand for financial services' (Cole et al., 2011: 1964).

As such, the Indonesian government declared 2008 'the year of financial education' and has since devoted important resources into developing a national strategy to build the population's financial knowledge (Tambunan, 2015; Wibowo, 2013). For example, the Central Bank of Indonesia launched the 'Let's go to the Bank' national campaign in 2008, followed by the government 'My Savings' program in 2009, and the delivery of financial education on a national scale between 2011 and 2015 targeted to different population groups (Tambunan, 2015). Indeed, while financial knowledge, skills and behaviours play an important role in supporting an individual's financial security (Lusardi & Mitchell, 2014), ensuring financial information

is accessible is also important (e.g. language accessibility). Cole et al. (2011) were the first to provide a national picture of financial literacy in Indonesia. They found that while financial education positively impacted the likelihood of Indonesian households to open a bank account, it did not impact on other financial products and services. The first national survey in financial literacy was conducted in 2013 by the Indonesia Financial Services Authority. Results showed that financial literacy levels were low and unevenly distributed, with only about 22% of the population classified as 'well literate' (Amidjono et al., 2016).

2.4 Social Capital

The last component, social capital, takes into account the 'network' people draw on for financial help in times of emergency as well as to gain financial knowledge (Demiguc-Kunt et al., 2015; Seccombe, 2002). Social capital refers to 'connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them' (Putnam, 2000: 19). Individuals typically draw on friends, family and community connections, this being especially true in developing countries where individuals may rely on formal (e.g. community meetings or activities) and informal interactions with their community, neighbours and family members to get and exchange information on financial institutions as well as financial products and services (Okten & Osili, 2004). Okten and Osili (2004) find that community and family networks are especially important in becoming informed about credit sources as well as obtaining credit and benefit especially women and the poor. Networks also participate in creating bonds of trust and patterns of expected behaviours between lenders and borrowers leading to reduced screening time and need for contract enforcement, and therefore, cost of lending (Okten & Osili, 2004). Social capital can also act as a safety net in countries where government support tends to be limited. In developing countries, households rely heavily on private transfers. Evidence shows that 20% to 90% of households in developing countries receive private transfers, representing up to 20% of household income (Deb et al., 2010; Park, 2003). While extant literature suggests various motivations for private transfers: e.g. altruism, self-interest, exchange for service, no particular motivation appears predominant (Park, 2003).

3 Methods

This study adapts the financial resilience framework developed by Salignac et al. (2019) to develop a measure appropriate to the context of developing countries, specifically Indonesia. We use the Indonesia Family Life Survey (IFLS) to collect data. The IFLS is a socio-economic longitudinal survey that collects information at the household- and community-level. It uses a sample of 7224 households, living in 321 communities from 13 of the 27 Indonesian provinces, representative of about 83% of the Indonesian population. The IFLS comprises five waves implemented between 1993 and 2015, each tracking the original sample, adding households that have split-up and removing those that have disappeared along the way. We use data from the fifth wave administered in 2014–2015 (i.e. IFLS-5), which includes responses from 50,000 individuals across 16,204 households as well as the local leaders of 321 communities, with both villages and urban townships being represented (Strauss et al., 2016). The final sample used in this analysis comprises 7779 households. The attrition is mainly due to our use of questions from the IFLS-5 community-level survey for one of the items (i.e. *bank_access*), which excluded households that had split-up

and households that had moved outside the 321 villages and urban townships covered in the community-level survey. We verify whether our analysis suffers from a potential attrition bias later in our paper.

3.1 Framework Compatibility

The four components of Salignac et al. (2019) financial resilience framework (i.e. (1) Economic resources; (2) Financial products and services; (3) Financial knowledge and behaviour; and (4) Social capital) were analysed for compatibility with data from the IFLS. Using the theoretical grounds for inclusion discussed in the previous section, and based on the data available from the IFLS, we identified corresponding items enabling us to develop a financial resilience measurement framework adapted to Indonesia, and more broadly, to developing countries.

Equivalent survey questions were identified in IFLS for each of the components and items of the framework (see Appendix 1). Due to a lack of data in the IFLS to measure financial knowledge and behaviour we were not able to include this component. We discuss this limitation in the final section of the paper. Based on the answers to the survey questions, a score was computed for each item (the scoring methodology is detailed in Table 1). Except for *Debt management*, *Unmet credit demand*, and *Unmet insurance demand,* all items were allocated a score ranging from 1 to 4, with 1 indicating the lowest score, and 4 the highest. The items *Debt management* and *Unmet credit demand*, were initially allocated a score ranging from 1 to 5, and *Unmet insurance demand* from 1 to 6. These items were rescaled using linear transformation so as to enable a score from 1 to 4 to be allocated and facilitate the analysis. The scores obtained for each item within a component were then averaged to determine the overall component score for each of the three financial resilience components we were able to include: (1) Economic resources, (2) Financial products and services, and (3) Social capital. Individual respondent's financial resilience score was determined by averaging the mean scores from each of the three components. The same process was followed to determine a score for each of the three components and an overall financial resilience score at population level (i.e. the scores across all respondents were averaged). By doing so, we assumed each component was of equal weight and, therefore, that each contributes equally to a person's financial resilience. We acknowledge that is not necessarily the case and discuss this limitation in the final section of the paper. The resulting financial resilience score, ranging from 1 to 4, was used to determine people's level of financial resilience, with 1 indicating severe financial vulnerability, 2 high financial vulnerability, 3 low financial vulnerability and 4 financial resilience.

3.2 Analysis

Based on household socio-demographic characteristics we further analysed the financial resilience of Indonesian households and identified variations within population groups. This enabled us to identify vulnerable groups within the Indonesian population. To do so, we examined the relationship between financial resilience and demographic characteristics including income per capita, geographical area, urban localization, housing status and quality, access to Information and Communication Technologies (ICT), and exposure to natural disasters.

Income per capita was assessed using the World Bank's (2020) classification of daily income for the Indonesian population: (1) the poor—individuals who are below the

Table 1 Scoring methodology

	1	2	3	4	5	6
Economic resources						
Savings	No or negligible savings (less than a month's income)	Limited savings (1–3 months' income)	Moderate savings (3–6 months' income)	Significant savings (more than 6 months' income)		
Debt management[a]	No debt and zero or negative income	Over-indebted (unable to meet repayments)	Just managing to pay off debts	Comfortably paying off debts	Very comfortably paying off debts or no debts	
Ability to raise Rp. 2.15 million in an emergency	Unable to raise Rp. 2.15 M in emergency	Unsure if able to raise Rp. 2.15 M in emergency	Likely to raise Rp. 2.15 M through VSL[c] and selling assets	Able to raise RP. 2.15 M from own savings		
Ability to meet cost of living standards	Great difficulty meeting living standards	Some difficulty meeting living standards	living standard is just adequate	Very easy to meet living standards		
Household income quartile[b]	First income quartile (lowest)	Second income quartile	Third income quartile	Fourth income quartile (highest)		
Financial products and services						
Access to basic banking services	Saving or checking account services not offered in the area	Saving or checking account services available but more than 10 km away	Saving or checking account services available in a 2 km–10 km radius	Saving or checking account services available in a 2 km radius		
Access to credit	Do not know a place where to access money	Know other informal lenders	Know associations, arisan or non-profit	Know a bank		
Unmet credit demand[a]	Have not tried to borrow and would probably need it	Strong unmet	moderate unmet	Insignificant unmet	No unmet	
Access to insurance	No access to any form of insurance cover	Under insured	Basic insurance cover	Significant insurance cover		
Unmet insurance demand[a]	No coverage, loss of insurance coverage	Partial coverage, some losses	No coverage, no loss	Partial coverage, no loss	All members covered, some losses	All members covered, no loss

Table 1 (continued)

	1	2	3	4	5	6
Social capital						
Social networks	Socially isolated	Minimal social network relationships	Well connected	Well established connections		
Support from social networks—Trust	Very unlikely	Fairly unlikely	Fairly likely	Very likely		
Community and government support—cash transfers	Unable to access community or government support	Receive specialized community or government support	Not heavily reliant on community or Government support	No need for community or Government support		

[a]The items 'debt management', 'unmet credit demand' and 'unmet insurance demand' are rescaled on a [1; 4] using a linear transformation

[b]The household income is per capita and computed using the square root equivalent scale (Vial & Hanoteau, 2015)

[c]VSL stands for Village Saving and Loan system

poverty line with less than $2.2 per person a day (representing an household's total annual income per capita of less than 4 million Rupiah); (2) the vulnerable—individuals who have between $2.2 and $3.3 per person per day (between 4 and 6 million Rupiah); (3) the aspiring middle class having between $3.3 and $7.75 (household annual income between 6 and 14 million Rupiah); (4) the middle class with $7.75 to $38 per person per day (household annual income between 14 and 70 million Rupiah); (5) the upper class with more than $38 per person per day[1] (household income between 70 and 120 million Rupiah), to which we added a sixth category: (6) the very rich (household annual income above 120 million Rupiah).

The Indonesian provinces covered in the IFLS survey were grouped into ten geographical areas: Jakarta, West Java (excluding Jakarta), Central Java, East Java, Bali, Nusatenggara, North Sumatra, South Sumatra, Kalimantan, and Sulawesi. A dummy variable equal to one was allocated to households living in an urban neighbourhood, and zero to those living in a rural neighbourhood.

Following Salignac et al. (2019), we further considered home ownership according to whether the house was owned by the household, rented, or occupied for free. Furthermore, indicators of housing quality are suggested as a marker for poor households in developing countries (Karlan & Thuysbaert, 2019). As such, we considered whether households in our sample had access to safe drinking water, had their own toilet connected to a sceptic tank or a sewage system, and whether they were equipped with a fridge. Dummy variables were included in the analysis to control for these measures of housing quality. We further considered household's access to ICT, with a dummy equal to one if the household had access to the Internet. Another dummy equal to one was allocated if at least one member of the household had a mobile phone.

Natural disasters are recognised as a source of vulnerability (Gignoux & Menéndez, 2016) and are especially prominent in Indonesia. This led us to build an indicator of households' past exposure to and impact from natural disasters. A dummy equal to one was allocated if during the last 5 years, a natural disaster (e.g. tsunami, earthquake, volcanic eruption, drought, etc.) occurred in the living area and severely impacted the household, causing the death of or major injuries to a household member, or direct financial loss, or caused the household to relocate. As an alternative, we built an indicator (dummy) considering only the deadly impact of natural disasters: a dummy equal to one was allocated if a natural disaster caused the death of a household member.

We also considered socio-demographic characteristics of the household head, with dummies accounting for gender and marital status. A dummy equal to one was also allocated if he or she could read an Indonesian-language (Bahasa) newspaper. Age was measured according to the following age groups: 15 to 24 years, 25 to 34 years, 35 to 49 years, 50 to 64 years, 65 years and more. Education was measured using the following characteristics: the household head has no education, elementary education only, high-school education only, a university college or bachelor degree, a master or a PhD, or other education (e.g. adult education). We further built an indicator of the labour force status of the household head, using 6 categories: full-time employment (works more than 35 h a week on the main job), part-time (work less than 35 h a week and is satisfied with it) or casual employment,

[1] Figures in US dollars per day are converted into annual values in Rupiah using the private consumption purchasing power parity-adjusted conversion factor, equal to 4,721 Rp. per USD in 2015 (source: https://data.worldbank.org/indicator/).

underemployed (work less than 35 h a week and is unsatisfied), unemployed, unpaid worker, not in the labour force.

As physical and mental health conditions are potential sources of vulnerability, we built two indicators to account for them. First, we considered the household head's level of disability, defined as physical functioning limitations (Mani et al., 2018). This was assessed in the IFLS survey through a series of 7 questions on Activities of Daily Living (ADLs). Adults who are at least 15 years old were asked whether they could: carry a heavy load (such as a bucket of water) for 20 m, draw water from a well, walk for 5 kms, sweep the house floor yard, bow, squat, kneel, stand up from sitting on the floor without help, stand up from sitting position in a chair without help. Answers ranged on a 3-point scale, from 'easily', 'with difficulty', to 'unable to do it'. Following Mani et al. (2018), we split household heads in two groups: 1) individuals with severe disabilities (those who reported difficulties on at least one ADL) and 2) other household heads. The IFLS survey further contains 10 items that enabled us to measure mental health based on the Center for Epidemiologic Studies' Depression Scale (CSE-D) (Sujarwoto et al., 2019). The interviewee was asked whether he/she felt bothered, depressed, hopeful about the future, fearful, happy, lonely, cannot get going, that everything is an effort, that his/her sleep is restless, and has trouble concentrating. The 10 items were recorded on a scale from 0 to 3, with the higher value signalling a lower level of mental health. The values for the 10 items were then summed up to obtain the CES-D score, with a total score equal or greater than 10 indicating probable serious mental illness.

The data was analysed using Stata 14. Differences in terms of outcomes over the three components of financial resilience were first investigated. The association between demographic characteristics and financial resilience scores was then explored in a linear regression model. As in Salignac et al. (2019), we developed four scenario analyses to predict the level of financial vulnerability or resilience based on risk and protective factors. Thus, enabling us to identify vulnerable groups most likely to need support through policy and program interventions.

4 Findings

4.1 Descriptive Analysis

Most respondents experienced some level of financial vulnerability (see Fig. 1). Almost a third of the Indonesian population experienced severe (6.2%) or high (24.8%) financial vulnerability,[2] over half (57.7%) experienced low financial vulnerability and only 11.2% showed financial resilience.

The overall level of financial resilience was 2.71 (low vulnerability), comprising moderate levels of economic resources (2.51), financial products and services (2.77) and social capital (2.94) (see Fig. 2).

As discussed in the previous section, each of the three components of financial resilience shows the population average across three to five items (see Table 2). The moderate

[2] We use 2, instead of 1.75, as the threshold that characterizes the lower end category of severe financial vulnerability. Using 1.75, only 1.9% of the sample would fall in that vulnerability category. Using 2, 6.2% of the sample falls in that category, which is more consistent with other studies explaining that 7% of the Indonesian population are extremely poor (World Bank, 2020), although we do not pretend that there should be an exact match between extreme poverty and severe financial vulnerability.

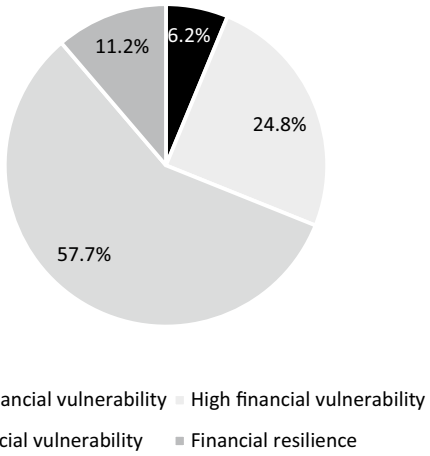

Fig. 1 Financial resilience score—population segments

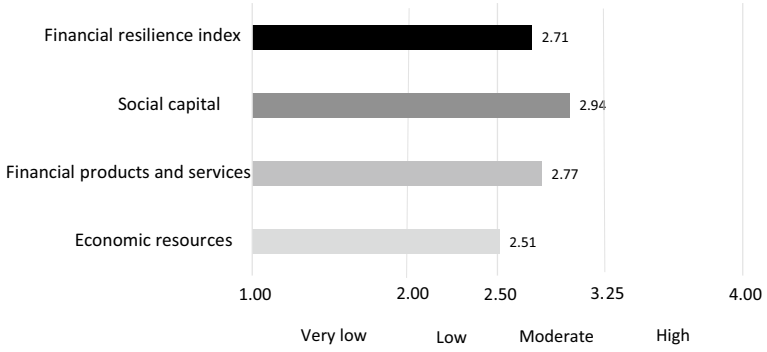

Fig. 2 Financial resilience components

level of economic resources comprised a low level of savings (1.59), high level of debt management (3.49), low ability to raise 2.15 million Rupiah in case of emergency (2.22), moderate living standards (2.83) and low income (2.43). In addition, we found that more than two thirds of the population (69.8%) had a very low level of savings, 40.9% had very low ability to raise 2.15 million Rupiah in case of an emergency, but 71.9% indicated high levels of debt management. The moderate level of financial products and services also revealed different levels of needs across items—high level of options for access to a bank's services (3.61), moderate levels of access to credit (3.21) and met insurance demand (2.72), but low levels of access to insurance (2.13) and met credit demand (2.17). As such, access to credit and banking services were not a problem for over two thirds of the population (68.3% and 68.4% respectively), yet 59.2% had unmet credit demand and more than half of the population lacked access to insurance (37.9% had very low and 28.6% had low access). The moderate level of social capital (2.94) comprised a high level of support from social networks (3.32) and a moderate level of community and government support (3.30) but a low level of social networks (2.30). Despite being a popular option for support in Indonesia, 45.8% of the Indonesian population had very low levels of access to Arisan (social networks).

Table 2 Score and distribution of population across financial resilience components

	Financial resilience items	Mean	% population in each score range				
			[1–2] Very low (%)	[2–2.5] Low (%)	[2.5–3.25] Moderate (%)	[3.25–4] High (%)	Total (%)
Economic resources	Savings	1.59	69.8	12.7	6.7	10.9	100
	Debt management [a]	3.49	14.4	6.9	6.8	71.9	100
	Ability to raise Rp. 2.15 million in an emergency	2.22	40.9	8.5	38.1	12.5	100
	Ability to meet cost of living standards	2.83	9.4	20.5	47.4	22.7	100
	Household income quartile	2.43	25.5	27.7	25.2	21.6	100
Financial products and services	Options for access to a bank's services	3.61	0.5	6.1	25.1	68.3	100
	Access to credit	3.21	18.6	10.1	2.8	68.4	100
	Unmet credit demand [a]	2.17	59.2	1.1	5.8	34.0	100
	Access to insurance	2.13	37.9	28.6	16.2	17.3	100
	Unmet insurance demand [a]	2.72	17.0	31.1	18.5	33.5	100
Social capital	Social networks (Arisan)	2.30	45.8	1.3	30.1	22.8	100
	Support from social networks (trust)	3.32	0.1	0.5	66.9	32.6	100
	Communityand government support (cash transfers)	3.20	14.8	9.2	17.1	58.9	100

[a] Those items were rescaled. All scores range from 1 to 4, 4 meaning the highest contribution in terms of financial resilience

Differences in terms of financial resilience were also identified across demographic groups (see Table 3). Households headed by a woman had a lower level of financial resilience than those headed by a man (2.48 compared to 2.76). In addition, about half of the households headed by a woman had very low or low financial resilience (14.1% and 36.4% respectively) compared to just over a third for households headed by a man. Respondents who had never been married were also over represented in the low and very low financial resilience categories. When looking at the life-course, financial resilience seemed to follow an inverted U-shape, with households headed by 15- to 24-year-olds and 65 years or older having the lowest levels of financial resilience. Respondents living in these two categories of households were more likely to have low or very low levels of financial resilience.

Respondents in rural areas had lower levels of financial resilience than those in urban areas, and a higher proportion was likely to have very low or low financial resilience (9.6% and 30.9% respectively compared to 3.4% and 19.5%). Characteristics that were likely to identify rural versus urban households further supported these findings, with those without internet access, cell phone, access to safe drinking water, toilet connected to a sceptic tank, or access to a fridge having lower levels of financial resilience than those with access to all these facilities. Regional discrepancies were also observed, with financial resilience scores ranging from a minimum of 2.55 in South Sumatra, well below the country average, to a maximum of 2.89 in Bali, well above the country average. Households were much less likely to have very low or low financial resilience in Bali (2.4% and 11.1%), Jakarta (1.8% and 20%), and Central Java (2.8% and 19.8%) compared to regions like South Sumatra (10.9% and 36.2%), North Sumatra (8.4% and 27.8%), Sulawesi (9.3% and 28%), and Nusatenggara (7.4% and 30.6%).

As expected, higher levels of household income per capita were associated with moderate and high levels of financial resilience. For example, over 40% of households on annual incomes higher than 70 million Rupiah experienced high levels of financial resilience compared to 18.6% of households on annual incomes of 6 to 14 million Rupiah and as little as 1.6% and 1.1% of households in the lowest income groups. At the other extreme, two thirds of households on annual incomes lower than 4 million Rupiah had very low or low financial resilience.

Employment was a key protective factor for financial resilience, with higher proportions of the full time, and part time or casually employed experiencing moderate or very high levels of financial resilience.). The representation in the very low levels of financial resilience increased with the level of disengagement from work. While only 3.1% of the employed had very low levels of financial resilience, this figure almost doubled (5.7%) for those employed part time and casually, and further increased to 8.8% for the underemployed, 10.7% for the unemployed, 15.3% for those in unpaid work, and 17.9% for people not in the labour force. Similarly, the level of education was a protective factor, those with no or elementary education being more likely to have very low or low levels of financial resilience.

The family head having a severe physical disability was more likely to place households in very low (11.5%) and low (32.9%) levels of financial resilience compared to households headed by healthy counterparts (5.4% and 23.5% respectively). A similar observation was drawn when comparing responses from households with heads having a probable serious mental illness or not, although the difference between their mean financial resilience scores was moderate (respectively 2.64 and 2.73). Although expected differently, households impacted by natural disasters (death or major injuries to a member, or economic loss) had similar levels of financial resilience compared to those not impacted (respectively 2.68 and 2.72). Both categories of households were similarly represented in the very low

Table 3 Mean financial resilience score by demographic characteristics

	Group	Mean	Sample size	Sample distribution				
				[1, 2] Very low (%)	[2, 2.5] Low (%)	[2.5, 3.25] Moderate (%)	[3.25, 4] High (%)	Total (%)
	Sample	2.71	7779	6.2	24.8	57.7	11.2	100
Gender	Male [a]	2.76	6300	4.4	22.0	60.1	13.4	100
	Female [a]	2.49	1479	14.1	36.4	46.0	3.6	100
Marital status	Never married [a]	2.49	1493	13.3	36.7	46.1	3.9	100
	Married [a]	2.76	6286	4.6	21.9	60.1	13.4	100
Age group	15 to 24 years [a]	2.49	213	18.8	31.5	45.1	4.7	100
	25 to 34 years	2.74	1368	5.1	22.3	60.2	12.4	100
	35 to 49 years	2.78	2840	3.3	21.6	61.7	13.4	100
	50 to 64 years	2.71	2268	5.8	25.3	57.5	11.5	100
	65 + years	2.53	1090	13.8	33.8	45.2	7.2	100
Geographical area	Jakarta	2.82	506	1.8	20.0	63.8	14.4	100
	West Java[b]	2.64	1205	7.9	28.4	54.9	8.8	100
	Central Java	2.83	1584	2.8	19.8	61.5	15.9	100
	East Java	2.74	1127	7.0	19.9	61.2	11.9	100
	Bali	2.89	415	2.4	11.1	68.2	18.3	100
	Nusatenggara	2.62	664	7.4	30.6	54.2	7.8	100
	North Sumatra	2.65	853	8.4	27.8	54.9	8.9	100
	South Sumatra	2.55	696	10.9	36.2	45.0	7.9	100
	Kalimantan	2.69	343	4.4	29.2	57.4	9.0	100
	Sulawesi	2.64	386	9.3	28.0	51.0	11.7	100
	Rural	2.61	3567	9.6	30.9	51.2	8.2	100
	Urban	2.80	4212	3.4	19.5	62.7	14.4	100

Table 3 (continued)

	Group	Mean	Sample size	Sample distribution				
				[1, 2] Very low (%)	[2, 2.5] Low (%)	[2.5, 3.25] Moderate (%)	[3.25, 4] High (%)	Total (%)
Income per capita	Under Rp. 4 M	2.31	1807	23.0	44.9	31.0	1.1	100
	Rp. 4 M to 6 M	2.48	616	8.6	45.3	44.5	1.6	100
	Rp. 6 M to 14 M	2.72	1829	0.8	26.8	65.6	6.8	100
	Rp. 14 M to 70 M	2.92	3168	0.1	10.8	70.5	18.6	100
	Rp. 70 M to 120 M	3.18	253	0.0	0.8	56.5	42.7	100
	Rp. 120 M +	3.22	106	0.0	1.9	52.8	45.3	100
Labour force status	Employed[a]	2.79	3849	3.1	20.4	62.5	13.9	100
	Part time & casual[a]	2.70	2277	5.7	25.9	58.0	10.4	100
	Underemployed[a]	2.55	464	8.8	39.2	46.4	5.5	100
	Unemployed[a]	2.53	28	10.7	35.7	53.6	0.0	100
	Unpaid [a]	2.49	602	15.3	33.9	45.2	5.6	100
	Not in the labor force[a]	2.56	559	17.9	27.4	42.9	11.8	100
Education	No education[a]	2.36	518	20.8	40.2	36.9	2.1	100
	Elementary education[a]	2.61	3357	7.2	60.9	55.9	5.7	100
	High school [a]	2.80	3132	3.5	19.3	62.7	14.5	100
	College bachelor[a]	3.03	623	2.7	7.9	56.3	33.1	100
	Master PhD[a]	3.26	42	0.0	0.0	52.4	47.6	100
	Other education[a]	2.80	107	7.5	16.8	57.9	17.8	100
	Cannot read Indonesian[a]	2.45	984	16.3	36.4	44.7	2.6	100
	Read Indonesian[a]	2.75	6795	4.8	23.1	59.3	12.9	100
Home ownership	Home owned	2.71	6186	6.3	24.8	57.2	11.7	100
	Home rented	2.71	1206	5.7	25.1	57.5	11.7	100
	Home occupied	2.71	387	7.0	23.0	60.5	9.6	100

Table 3 (continued)

	Group	Mean	Sample size	Sample distribution				
				[1, 2] Very low (%)	[2, 2.5] Low (%)	[2.5, 3.25] Moderate (%)	[3.25, 4] High (%)	Total (%)
Housing quality	No internet access	2.67	6399	7.0	27.3	56.8	8.9	100
	Has internet access	2.92	1380	2.9	13.2	60.1	23.8	100
	No cell phone	2.56	2795	10.2	33.5	51.1	5.3	100
	Has a cell phone	2.80	4984	4.0	19.9	61.0	15.1	100
	No access to safe drinking water	2.70	6315	6.5	25.2	57.2	11.1	100
	Access to safe drinking water	2.75	1464	5.2	23.0	58.2	13.6	100
	No toilet connected to a sceptic tank	2.57	2251	10.0	33.7	50.6	5.7	100
	Own toilet connected to a sceptic tank	2.77	5528	4.7	21.1	60.2	13.9	100
	No fridge	2.62	4874	8.3	29.7	55.1	6.9	100
	Has a Fridge	2.87	2905	2.8	16.4	61.3	19.4	100
Physical & mental health	No probable serious mental illness[a]	2.73	6078	6.0	23.7	57.7	12.6	100
	Probable serious mental illness[a]	2.64	1701	7.1	28.5	56.6	7.8	100
	Severe disability[a]	2.56	1039	11.5	32.9	48.9	6.7	100
	No severe disability[a]	2.73	6740	5.4	23.5	58.7	12.3	100
Natural disasters	Not impacted by natural disaster	2.72	6227	6.4	24.2	57.0	12.3	100
	Impacted by natural disaster	2.68	1552	5.6	26.9	59.0	8.5	100
	Not deadly impacted by natural disaster	2.71	7582	6.2	24.6	57.5	11.7	100
	Deadly impacted by natural disaster	2.60	197	7.6	30.5	54.3	7.6	100

[a]The demographic characteristics apply to the household head

[b]West Java does not include Jakarta

financial resilience category (respectively 5.6% and 6.4%). Solely focusing on households deadly impacted by natural disasters revealed a slightly larger difference in terms of financial resilience (mean financial resilience scores of 2.6 and 2.71 respectively) and a slightly higher representation in the very low and low financial resilience categories for households impacted by a natural disaster.

4.2 Regression Results

We used a linear regression of the dependent variable (financial resilience score) on all socio-demographic characteristics listed in Fig. 3 to predict the average financial resilience score for each characteristic. Figure 3 exhibits the beta parameters estimated from the multivariate regression with their level of significance ($p < 0.01$, or $p < 0.05$) (column 3), and standard errors (column 4). The coefficient of determination R-squared is 0.47, meaning that the model has a quite good explanatory power, whereas the F-test ($F[42, 7736] = 162.66$) confirms the overall significance of the estimated parameters and the model. A base category was identified for each group of variables (e.g. male for gender, 35–49 years for age) and the average predicted financial resilience score for each category was compared to the base category using a t-test of the difference in the sub-samples means (sub-samples refer to categories in each socio-demographic characteristic). The score (column 1) for the base category is indicated in black and categories significantly different from the base category ($p < 0.005$) are marked with an asterisk. Figure 3 also shows the statistics of the t-tests of the difference in mean predicted scores (column 2).

Most categories investigated were significantly different from the base category, indicating they are, on their own, strong predictors of financial resilience. Home ownership was the only characteristic that did not affect financial resilience. The level of access to basic and more than basic commodities, however, appeared a strong predictor of financial resilience. Higher financial resilience scores were reported by respondents who owned a fridge (2.87 compared to 2.62 if they did not), had access to a toilet connected to a sceptic tank (2.77), and had access to safe drinking water (2.75). Owning a mobile phone and having internet access were also protective factors for financial resilience. The financial resilience of respondents with internet access was 2.92, significantly higher than that of respondents without internet access (2.67).

Women had significantly lower levels of financial resilience than men (2.49 compared to 2.76). All age categories reported significantly lower levels of financial resilience than the base category (35–49 years old, 2.78). Respondents living in Bali reported significantly higher levels of financial resilience (2.89) than those living in Central Java, the base category (2.83). Lower levels of financial resilience were reported in all other regions, with lowest levels reported in South Sumatra (2.55), Nusatenggara (2.62), Sulawesi and West Java (2.64). Respondents from Jakarta reported similar levels of financial resilience as those in Central Java. Furthermore, everything else being equal, living in urban areas was associated with significantly higher levels of financial resilience (2.80 compared to 2.61).

Household income per capita and household head's education were strong predictors of financial resilience. Financial resilience ranged between 2.31 for respondents inhouseholds earning under 4 million Rupiah per year to 3.22 for respondents in households earning over 120 million Rupiah per year. The financial resilience of respondents with no education was 2.36, increasing to 2.61 for those with elementary education, 2.80 for high school graduates, and reaching 3.03 and 3.26 for undergraduates and postgraduates respectively.

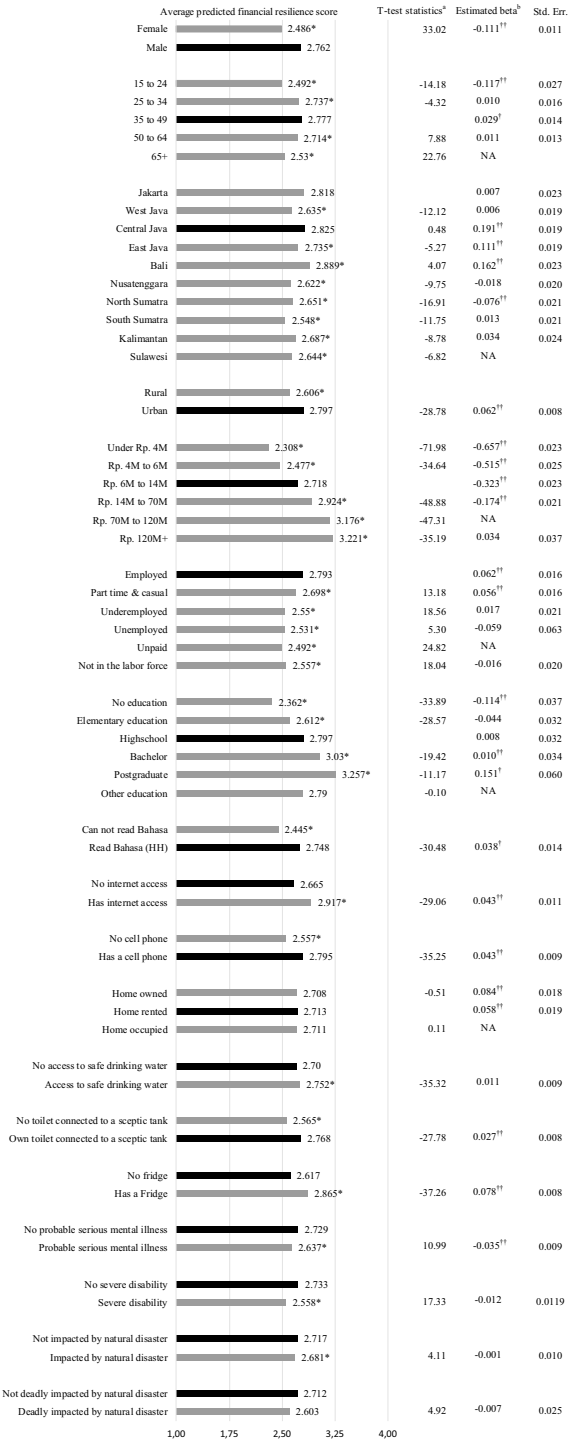

Fig. 3 Average predicted financial resilience score. *Indicates statistically significant differences from the base case ($p < 0.05$). [a]t statistics of t-test of the difference in average predicted financial resilience scores between each category and the corresponding base category (in bold). [b]These are the estimated parameters from the multivariate regression of financial resilience scores on all categories (dummy variables). $R^2 = 0.47$. $F(42; 7736) = 162{,}66$, and number of obs. is 7779. NA indicates that the estimated parameter is not available as the corresponding dummy variable has been omitted due to collinearity. †, ††Indicate statistically significant at 5

Similarly, as expected, employment had a strong effect on financial resilience, with the employed reporting the highest level (2.79), followed closely by those employed part time and casually (2.70). Those doing unpaid work had significantly lower levels of financial resilience compared to the base group (2.49).

Natural disasters often affect Indonesia and are likely to impact all areas of life. We differentiated between levels of impact that a natural disaster might have. We found that those impacted by a natural disaster resulting in the death of a household member had significantly lower levels of financial resilience (2.60 compared to 2.71 baseline category) and similarly, those impacted but not resulting in death still had significantly lower levels of financial resilience (2.68 compared to 2.71 baseline category) compared to the base category. Having a severe disability was also associated with significantly lower levels of financial resilience (2.56) compared to respondents who did not have a disability (2.73).

The cumulative effects of multiple 'risks' and 'protective' factors were considered in a linear regression model to illustrate how different combinations of characteristics affect financial resilience. In order to do this, we predicted the average financial resilience with the linear regression model, and for specified combinations of the socio-demographic categories. Four hypothetical scenarios (see Table 4) are described: (1) a benchmark, (2) cumulative mid-level risk factors, (3) cumulative high-level risk factors, and (4) cumulative protective factors. The benchmark scenario predicted a financial resilience score of 2.93 (low financial vulnerability, similar to the population average). The cumulative mid-level risk factor (2.27) identified high financial vulnerability, whereas the high-level risk factors (ranging between 1.89 and 1.94) identified severe financial vulnerability. The cumulative protective factors scenario led to financial resilience (3.32 or 3.33).

As a robustness check, we used the Principal Component Analysis (PCA) instead of a mean in order to build the financial resilience score and its three components. The PCA method can be used to analyse discrete data from socioeconomic surveys (Karlan & Thuysbaert, 2019). It enables to aggregate correlated variables, by creating uncorrelated components that explain the variance in the data, thus capturing the relevant information contained in the original data. The components were ordered so that the first component captured the largest amount of information that is common to all of the original variables (Filmer & Pritchett, 2001). We used the first component as a relative financial resilience score. The results ranged between −4.72 and 4.37, with a mean PCA-financial resilience score close to zero. For ease of comparing the PCA-score with the financial resilience score computed as a mean, the PCA-index was then linearly transformed so that it ranged on a 1 to 4 scale, with a mean of 2.7. Using the PCA-financial resilience score to reproduce the various stages of the previous analysis generated very similar results to those presented in the paper and are available from the authors upon request.

In order to verify for a potential attrition bias, we computed a 'restricted financial resilience score' solely based on questions from the IFLS household survey. To do so, we removed the *bank_access* item from the analysis, as it was based on questions from the IFLS community survey. As a result, the sample size increased from 7,779 to 12,935 households. We calculated the mean restricted financial resilience scores for both samples, which showed similar results (2.639 and 2.634 respectively). To further verify for a potential attrition bias, we repeated this process with the scenarios analysis, estimating the average predicted restricted financial resilience score across the 4 categories and for both samples—which again showed similar results. For the benchmark scenario, the predicted scores were 2.85 for the 12,935 households sample, and 2.87 for the 7,779 households sample. For the cumulative mid-level risk factors scenario, the predicted scores were 2.18 and 2.21 respectively. For the cumulative high-level risk factors scenario, the predicted scores were 1.85, 1.84, 1.78 and 1.77 for the 12,935 households sample, and 1.85, 1.84, 1.79, and

Table 4 Scenario analysis

Scenario	Characteristics	Predicted financial resilience score [1–4]	95% confidence interval	Predicted financial resilience result
Benchmark	Household head is a male	2.93	2.81–3.02	Low financial vulnerability
	35–49 years old			
	Lives in Central Java			
	No probable serious mental illness			
	Employed full time			
	High school level of education			
	Rp. 6 M–14 M yearly household income per capita			
Cumulative mid-level risk factors	Household head is a female	2.27	2.18–2.37	High financial vulnerability
	Underemployed			
	Elementary level of education			
	Rp. 4 m–6 M yearly household income per capita			
Cumulative high-level risk factors	Household head is a female,			Severe financial vulnerability
	Lives in rural area			
	no fridge, toilet connected to a sceptic tank, access to pipe water			
	Has no education			
	Cannot read Indonesian			
	Less than Rp. 4 M yearly household income per capita			
and	Deadly impacted by natural disaster	1.94	1.70–2.17	

Table 4 (continued)

Scenario	Characteristics	Predicted financial resilience score [1–4]	95% confidence interval	Predicted financial resilience result
or	Lives in Sumatra, Sulawesi or Nusatenggara			
and	Does not have a cell phone	1.94	1.91–1.98	
or	Unemployed, or unpaid worker, or not in the labor force	1.90	1.87–1.94	
or	is 65 + years old and has a severe disability	1.89	1.82–1.96	
Cumulative protective factors	Household head is a male	3.33	3.23–3.43	Financially resilient
	Household head has no probable serious mental illness			
	Has a fridge, own toilet connected to a sceptic tank, and access to pipe safe water			
	More than Rp. 120 M yearly household income per capita			
or	Lives in Bali, Central Java or Jakarta	3.32	3.01–3.63	
	Higher education (master or PhD)			

Average predicted financial resilience scores. Number of obs. = 7779. F(42, 7736) = 184.49. Prob > F = 0.000. R-squared = 0.469

1.78 for the 7,779 households sample. For the cumulative protective factors scenarios, the predicted scores were 3.26 and 3.35 for the 12,935 households sample, 3.29 and 3.24 for the 7,779 households sample. Due to the similarity of the results across the two samples, we exclude a potential attrition bias.

5 Discussion, Limitations and Further Research

This study has enabled us to move beyond practical aspects of financial products and services (i.e. financial inclusion) towards understanding people's capacity to cope with financial shocks (i.e. financial resilience) as a way to promote economic development. Building on the financial resilience measurement framework developed by Salignac et al. (2019), we have put forward an adapted framework suited to a developing country context. To the best of our knowledge, this is the first published detailed account of financial resilience in developing countries.

Using the Indonesia Family Life Survey (IFLS), we presented a snapshot of Indonesia's financial resilience thereby establishing a baseline of the level of financial resilience in the country in 2015. At that time, the Indonesian population was of 258 million people; including 65 million households. While our study showed low vulnerability on average across our sample, it estimated that 31% of Indonesian households experienced severe or high levels of financial vulnerability. Indonesian households fared differently across the financial resilience components and, on average, fared best in social capital and least well in economic resources. High levels of social capital were to be expected in a developing country context as it acts as a safety net in countries where government support tends to be limited (Okten & Osili, 2004). On the other hand, low levels of economic resources were the result of low levels of savings, low income and low ability to raise 2.15 million Rupiah in case of emergency. While these items are expected to be low in developing countries (Demirgüç-Kunt et al., 2018), together they enable us to identify pockets of vulnerability within the population.

This study provided a demographic profile of respondents who have lower levels of financial resilience and revealed lower levels of financial resilience for households headed by women as well as household heads that were never married. Our findings also showed associations between financial resilience and age, education, unemployment and underemployment as well as disability. We found that older people, people with lower levels of education, or those who are un- or under-employed or living with a disability had little capacity to bounce back after a shock. These results are consistent with recent studies demonstrating the effects of gender, age, education, employment and disability on poverty and exclusion in Indonesia and Asia–Pacific countries (ESCAP, 2019; Priebe, 2017; Tadjoeddin, 2019). Living in urban areas, on the other hand, was associated with significantly higher levels of financial resilience, consistent with earlier observations that poverty is higher in rural Indonesia (Priebe, 2017; Tadjoeddin, 2019). Home ownership (or housing type) was the only characteristic that did not affect financial resilience. This is likely to be due to widespread home ownership in Indonesia, with about 80% of households owning a home (Abidoye et al., 2020). On the other hand, household characteristics that have been identified as markers of poverty (e.g. no internet access and no access to safe drinking water, not owning a mobile phone, a fridge or a toilet connected to a sceptic tank Alkire & Seth, 2015; Demirgüç-Kunt et al., 2018; Karlan & Thuysbaert, 2019)) were strongly associated with lower levels of financial resilience. This is consistent with extant literature. Demirgüç-Kunt et al. (2018), for example, explain that mobile phone ownership and internet access have strong potential for poverty alleviation and reduction in financial exclusion. Natural disasters of various types also often affect Indonesia and are likely to impact all areas of life. Our results showed that households that

had been impacted severely (i.e. injury, death, or economic loss) within the past 5 years, exhibited lower financial resilience scores. This is consistent with Gignoux and Menéndez (2016) who showed that Indonesian people hit by earthquakes incur economic losses in the short run, and thus become more vulnerable.

We further tested four scenarios by combining risk and protective factors. Our four scenarios demonstrated that in addition to their isolated effects, cumulated risks factors (e.g. living in a household headed by a woman, being underemployed, with lower levels of education, being impacted by natural disasters or being older) led to high or severe financial vulnerability. In these 'pockets of disadvantage' there is little room to bounce back from a shock. These are the people policy and development interventions need to primarily target. This is essential if we are to meet the Sustainable Development Goals and move closer to alleviating poverty, fighting exclusion, and ensuring that all people have a fair access to basic services and opportunities, irrespective of their background (ESCAP, 2019). DeLoach and Smith-Lin (2018) show, for instance, that Indonesian households affected by a shock such as the illness of an adult worker, use formal banking services (borrowing and saving) in order to smooth their consumption. Those who do not have access to formal banking services, however, often sell their productive assets as a coping strategy, thus further hampering they ability to bounce back in the future.

This study is limited by the data we were able to gather from the IFLS. Indeed, while Salignac et al. (2019) financial resilience measurement framework comprises four components (i.e. (1) Economic resources; (2) Financial products and services; (3) Financial knowledge and behaviour; and (4) Social capital), a lack of data in the IFLS to measure financial knowledge and behaviour meant that we were not able to include this component. While Cole et al. (2011) were the first to provide a national picture of financial literacy in Indonesia, followed by the first national survey in financial literacy conducted by the Indonesia Financial Services Authority in 2013 (Amidjono et al., 2016), we suggest financial literacy be explicitly integrated in a survey such as the IFLS. Furthermore, while tax literacy has emerged as an important component of financial literacy, it is not something our framework takes into account. We suggest that integrating a measure specific to tax literacy would enable future research to explore potential associations between tax literacy and financial resilience (Freudenberg et al., 2017; Kamaluddin & Madi, 2005; Nichita et al., 2019). As in Salignac et al. (2019), we assumed each component of the framework was of equal weight and, therefore, that each contributes equally to an individual's financial resilience. This is not necessarily the case and future research could explore the possibility of unequal weightings further contributing to the multidimensional nature of the framework and whether particular components of resilience are driving changes. In addition, this study is limited by a survey conducted at a single point in time, thus providing a limited account of the dynamic nature of financial resilience (Akter & Mallick, 2013). Measuring financial resilience on a regular basis in the future would enable more dynamic analysis as well as better understanding of the impact of policy change over time. Analyses will be able to discuss, for example, the duration and circumstances for recovery from financial adversity, changes in the population financial resilience scores over time, whether particular vulnerable groups are improving or worsening.

Appendix

See Table 5.

Table 5 Survey questions, financial resilience framework

	Survey questions	Justification
Economic resources		
Savings	"Next, we would like to know about assets owned by you or by members of the household but not used for a business"	We retain financial assets (savings, certificate of deposit, stocks and receivables) and non-financial assets (jewellery, livestock, poultry) as Indonesian families mainly save in cash, and through the accumulation of jewellery and livestock, as these assets are sold in times of need (Gertler et al., 2009)
Debt management	"What is the total amount of the loan now? (assume end of 12 month period)"	These questions enable us to compute the debt-to-income ratio (DIR) and the debt-service-to-income ratio (DSIR) that are used jointly to measure over-indebtedness and financial distress related to debt and capability to repay debt (Daud et al., 2019; Guérin et al., 2014). For DIR, we consider the categories [0; 0.1[, [0.1; 0.5[, and DIR $\geq$ 0.5. For DSIR, categories are [0; 0.1],]0.1; 0.2],]0.2; 0.5], and DSIR > 0.5
	"What is the total loan that has been paid in the last 12 months?"	
Ability to raise Rp. 2.15 million in an emergency	"Do you know whether, in the last 12 months, the village savings and loans activity has occurred in this village?"	In case of an emergency, people rely on their savings, and in developing countries they are likely to turn to friends and family (Demirgüç-Kunt et al., 2018). As we cannot measure the ability to raise money from family and friends in case of emergency, we replace this with the presence of village savings and loans (VSL) activities
		We define the amount of money that must be available in case of an emergency as 1/20 of the GNI per capita in local currency (Demirgüç-Kunt et al., 2018). Data for 2015 were retrieved from the World Bank WDI database
Ability to meet living expenses	"Concerning your current standard of living, which of the following is true: less than adequate for my needs = 1, just adequate = 2, more than adequate = 3?"	This question is asked to individual adults, and the answers are averaged at the household level. We then consider four categories: 1;]1; 2[, [2; 2.5[, and [2.5; 3]

Table 5 (continued)

	Survey questions	Justification
Household income quartile	It is the sum of all sources of revenues earned by the household's members (adults and children): labour income, farm and non-farm business benefits or losses, transfers received. The household income is per capita and computed using the square root equivalent scale	
Financial products and services		
Access to basic banking services	"Is there […] in or outside this village where people go to, to borrow and save money?"	Access to basic banking services is defined as the presence of either "Savings account" or "Checking account services".The ease of access to saving and checking accounts services is defined according to the distance to the service (Gertler et al., 2009)
	"How many kilometres is it from the community centre to this institution?"	Possible institutions are the BRI bank, people credit banks, village credit institutions, village unit cooperatives, other formal cooperatives, state/private banks, Baitul Maal Wat Tamwil, Syariah/ Islamic Banks, insurance companies, pawning companies
	"What types of services are available at this institution […]?"	
Access to credit	"Do you or any family member know of a place where you can access money?", and "What type of place is this?"	Possible places are private commercial banks (A), cooperatives (B), public/semi-public banks (C), agricultural banks (D), employers (E), landlord (F), store owners (G), non-governmental organizations (H), neighbourhood associations (I), arisan (J), small farmers groups (K), money lenders (L), offices (M), pawnshop (N), non-bank financial institutions (O), other (V). Banks (categories A, B, C and D) are assumed to offer a better access to credit than non-profit, arisan or associations (H, I, J), which in turn offer better conditions than other informal lenders E, F, G, L, M, N, O

Table 5 (continued)

	Survey questions	Justification
Unmet credit demand	"Did you or other member of the household try to borrow any money or goods from a source other than your family or friends over the past 12 months?"	
	"Were you or other member of the household turned down in your efforts to secure a loan over the past 12 months?"	
	"Where you or other member of the household successful in securing a loan in the past 12 months?"	
	"How many times did you or other member of the household borrow from a source other than your family or friends over the past 12 months?"	
Access to insurance	"Are you the policy holder/primary beneficiary of health benefits or health insurance scheme?"	We consider whether no, some or all household members are covered, and for public health services only, or both public and private services
	"Does this benefit cover outpatient visits to public and private health centres?"	
Unmet insurance demand	"Since 2007, have you lost any health insurance coverage such as health insurance, labour social insurance, employer provided insurance or clinic, private health insurance, etc."	
Social capital		
Social networks	"Have you participated in arisan in the last 12 months?"	Informal rotating savings and credit associations (arisan) are an important factor of community organizations, both in rural and urban Indonesia (Miguel et al., 2005). They exist at many different layers of the society, such as, for instance the workplace, family, friends, religion, farmers, wives of civil servants/military, etc. They meetannually, monthly, weekly, or daily
	"What is the interval between meetings of the arisan?"	

Table 5 (continued)

	Survey questions	Justification
Support from social networks—Village trust	"I am willing to help people in this village if they need it"	The answers range from strongly agree, agree, disagree, to strongly disagree, and they are recoded so that higher values mean higher level of trust. The answers are averaged at the household level
Community and government support—cash transfers	"Has this household ever received conditional/unconditional cash transfer from BLT 2008, Keluarga Harapan, or BLSM program?"	The poorest 10% of households are eligible to receive these cash transfers (Alatas et al., 2012). Due to data limitation, we use income per capita to assess eligibility, although we acknowledge this is an imperfect measure of poverty. To correct for a potential bias in that indicator, and better control the eligibility of households, we complement income per capita with a question on another governmental assistance program (RASKIN). We then specify household categories based on these two questions and income per capita
	"During the past year, has this household ever bought rice/received money from RASKIN program?"	

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Code availability Not applicable.

Declarations

Ethics approval This paper uses data that is publicly available. The analysis has been undertaken in full compliance with our institution's ethics protocols.

Consent to participate Consent to participate is integrated in the methods used by the Indonesia Family Life Survey.

Consent for publication This paper uses data from the Indonesia Family Life Survey. This data is publicly available and can be used for publications.

Conflict of interest No conflict of interest.

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