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Jayasinghe, Maneka; Selvanathan, Eliyathamby A.; Selvanathan, Saroja

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The financial resilience and life satisfaction nexus of Indigenous Australians

Maneka Jayasinghe¹, Eliyathamby A Selvanathan², Saroja Selvanathan³

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¹ Charles Darwin University, Asia Pacific College of Business and Law, Waterfront Campus, Darwin, NT 0800, Australia

maneka.jayasinghe@cdu.edu.au

² Corresponding author

Griffith University,

Griffith Business School,

Nathan Campus,

Nathan,

QLD 4111, Australia

e.selvanathan@griffith.edu.au

Telephone: +61737355151

³ Griffith University, Griffith Business School, Nathan Campus, Nathan, QLD 4111, Australia

s.selvanathan@griffith.edu.au

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Abstract

Financial resilience is characterised by four sets of variables, namely, economic resources, financial inclusion, financial capability, and social capital. The purpose of this study is to examine the association between financial resilience, and life satisfaction of Indigenous Australians using the (2014/2015) National Aboriginal and Torres Strait Islander Social Survey data. The results reveal that running out of money for living and problems in accessing financial services have significant negative implications on the life satisfaction of Indigenous Australians. The ability to raise money in an emergency, social connections, and community support in times of crisis contributes to greater life satisfaction.

Key words: financial resilience; life satisfaction; Indigenous Australians

JEL classification: G50; I31; J15

1. Introduction

There is an increasing interest in analysing subjective well-being (often used interchangeably with the term happiness) among economists, policymakers, and individuals, using a single item, known as the self-perceived life satisfaction measure (Diener et al., 2013; Veenhoven, 2012). The ‘bottom-up’ theory of life satisfaction considers that an individual’s overall life satisfaction depends on his or her satisfaction in broad life domains, such as health, finance, family, and leisure (Pavot & Diener, 2008; Veenhoven, 1996). Some studies show that life satisfaction can also be influenced by satisfaction in one’s central life domains, such as finance, work, family (Bowling & Windsor, 2001; Xiao et al., 2014) and resilience (Abolghasemi & Varaniyab, 2010).

The existing literature on the money-happiness relationship indicates mixed findings. Using a life satisfaction approach, some previous literature shows that money does help in bringing happiness to people (Clark et al., 2008; Diener and Biswas-Diener, 2002; Diener and Oishi, 2000; Richards, 2016; Rijken & Groenewegen, 2007). On the other hand, previous studies have also found that income is negatively associated with overall life satisfaction (see, for example Lora and Chaparro (2008); Manning et al. (2016)).

This inconsistent relationship between objective measures of wealth, such as income and life satisfaction is not particularly surprising. This is because using income as the sole measure of financial wealth provides an incomplete portrait of the money-happiness relationship. In addition to objective measures, such as income, it is important to consider subjective measures when analysing the dynamics of the money-happiness relationship. These include: the ability to manage money and cope with unexpected financial shocks (e.g. experiencing a pay-cut, investment losses); positive adaptation in times of financial adversities, such as consumption smoothing over income contingencies (Kinnan & Townsend, 2012);

avoiding excessive debts (Mashigo, 2006); having security buffers against emergencies (Rutherford & Arora, 2009); and securing basic needs (Sahn & Stifel, 2003).

The capacity to adapt positively and achieve good outcomes despite exposure to severe adversities can be considered as ‘resilience’ (Rutter, 1987). While Masten and Wright (2010) view resilience as a “process”, Luthar et al. (2000) regard resilience as a “dynamic process encompassing positive adaptation within the context of significant adversity”. Fergus and Zimmerman (2005) state that resilience theory focuses on resources and positive adaptation applied to achieve healthy development of individuals despite risk. Resilience against the plethora of life events has been identified as a contributor to human well-being particularly in psychology, health, and environmental studies (see for example Abolghasemi and Varaniyab, 2010; Patterson, 2002; Ungar, 2012). Accordingly, one can argue that one’s financial resilience plays a significant role in enhancing life satisfaction. Muir et al. (2016) define financial resilience as “the ability to access and draw on internal capabilities and appropriate, acceptable and accessible external resources and support in times of financial adversity”. Salignac et al. (2019) following Muir et al. (2016) have developed a framework with four components that contribute to financial resilience; (1) economic resources; (2) financial products and services (financial inclusion); (3) financial knowledge and behaviour (financial capability); and (4) social capital.

There is a growing body of literature that explores the link between economic resources and life satisfaction (see, for example Brown et al., 2005; Diener and Biswas-Diener, 2002; Diener and Oishi, 2000); Headey et al., 2008), financial capability and financial satisfaction (see, for example, Xiao et al. (2014); Ali et al. (2015)), social capital and life satisfaction (see, for example, Ambrey et al., (2017); Richards (2016)). Unlike previous research, this study examines the link between financial resilience and overall life satisfaction. In other words, this study explores the link between all four components of financial resilience; economic resources,

financial inclusion, financial capabilities, and social capital collectively and overall life satisfaction of Indigenous Australians. In doing so, this study sheds some new light on the existing literature by investigating the importance of objective well-being measures or material resources and social attributes in subjective well-being. This study also examines the dynamics in the relationship between financial resilience and life satisfaction among various groups within Indigenous Australians, such as men and women, people in various age groups, and income groups. As Richards (2016) suggests, a resilience approach could facilitate the understanding of the role of resilience resources in people's lives as a way of maintaining or buffering subjective well-being in the presence of financial stressors.

Although some studies reveal that Indigenous Australians have a much higher score of overall life satisfaction than non-Indigenous people (see, for example Biddle 2014; Shields et al., 2009), some studies have alerted the possibility of Indigenous Australians facing challenges with respect to various aspects of financial resilience at a much higher level than other Australians particularly with respect to economic resources, financial products and services, and financial knowledge and behaviour. In the context of economic resources, the Australian Bureau of Statistics (ABS) (2017) reported significant income disparities between Indigenous and non-Indigenous Australians. Only about 20% of Indigenous people reported earning an equivalised weekly household income of \$1,000 or more in 2016 compared to 41% of non-Indigenous people. The disparity between these groups is also observed in terms of employment. The ABS (2017) revealed that about 72% of non-Indigenous people aged 15 to 64 years were employed compared to only about 47% of Indigenous Australians. When considering access to financial products and services, Connolly et al. (2012) found that 17.9% of Indigenous Australians had difficulties opening a bank account due to their inability to provide identification documents, compared with 8.7% of non-Indigenous people. Gordon and

Boyle (2015) reported that a lower level of literacy observed among Indigenous people is undoubtedly linked with the high level of financial exclusion experienced by them.

Salignac et al. (2019) highlighted the need for further research to enhance the understanding of individuals' financial resilience as it could help determine the type of resources required to enable people to cope with financial adversity, assist the development of effective policy and, ultimately, improve well-being. In recent years, there has been increasing interest among researchers on the well-being of Indigenous Australians (Biddle, 2014; Jayasinghe et al., 2020; Manning et al., 2016; Selvanathan et al., 2020; Shields et al., 2009). Nevertheless, the financial resilience and life satisfaction nexus of Indigenous Australians remains unexplored. Considering the previously discussed distinctive disparities faced by Indigenous Australians with respect to financial resilience, Weier et al. (2019) particularly highlight the need for research that explains the effects of financial resilience on Indigenous Australians to better understand the type of resilience resources which matter most to Indigenous Australians in enhancing financial resilience and well-being. To the best of our knowledge, this study represents the first investigative research into the link between financial resilience and overall life satisfaction in the Australian context using data from a survey conducted exclusively on Indigenous people in Australia. To this end, this current research makes a unique contribution to the emerging body of literature on Indigenous Australian's financial resilience and well-being in Australia.

This paper is organised as follows. Section 2 provides a review of the literature. Section 3 presents the financial resilience framework. Section 4 describes the data used in this study and presents the econometric model. Section 5 presents the estimation results. Section 6 discusses the limitations of the study and Section 7 presents concluding comments.

2. Review of Literature

Following the pioneering work of Kahneman et al. (1999), there has been a renewed and growing interest in well-being research. Over the past decade, the literature focused on well-being has evolved significantly, and has widened in scope (Bellani & D'Ambrosio, 2011; Bohnke & Kohler, 2008; D'Acci, 2011; Western & Tomaszewski, 2016). There are two prominent conceptual approaches used in studies of well-being: the objective approach that defines well-being in terms of objective measures, such as material resources (e.g. income, food) and social attributes (education, social networks), and; the subjective approach that focuses on people's perception towards their own lives, happiness, and satisfaction (Bohnke & Kohler, 2008; Western & Tomaszewski, 2016). The way in which the two approaches consider subjective well-being, however, is different. While in objective approaches, Bohnke and Kohler (2008) explain that subjective well-being evaluations serve as one component of overall well-being among other objective measures, the subjective approach regards objective well-being influences on individual's perception of subjective well-being. Most of the subjective well-being research focuses on how objective indicators affect life satisfaction or happiness, where the money-happiness relationship has been the most commonly researched objective well-being indicator.

Many studies have found that there is a positive relationship between income and life satisfaction within a country as well as across countries (Diener et al., 1993; Veenhoven et al., 1993). There are a number of explanations behind this positive correlation. For example, Lucas and Schimmack (2009) note that money enables individuals to spend and consume in ways that enhance their well-being, such as the acquisition of material goods, pleasurable experiences, better health. Adler and Snibbe (2003) suggest that a lack of financial resources to manage needs create psychological stress and thereby can have a significant (negative) impact on an individual's perception of life satisfaction. Kahneman et al. (2006) and Layard (1981) suggest

that the higher rank in society brought about by money is another way to explain the money-happiness relationship. However, there are some studies that find the money-happiness relationship can be weak (see, for example Clark et al. (2008); Diener and Biswas-Diener (2002); Diener and Oishi (2000)) and can be even negative (see, for example Lora and Chaparro (2008); Manning et al. (2016)).

The ‘economic resources’ component in Muir et al.’s (2019) financial resilience framework enables broader consideration of material resources, such as income, savings, debt management, and the ability to meet the cost of living expenses and raise funds in an emergency. Access to these other materials resources, in addition to income, has been identified as crucial for economic security. For example, Cull et al. (2014) wrote about the importance of savings on consumption smoothing; Schicks (2010) researched the importance of debt management; Conger & Conger, 2002 and Orthner et al., 2004 studied the importance of meeting the cost of living expenses, and; Demiguc-Kunt et al., (2015) explored the importance of access to emergency funds. These factors also contribute towards explaining the dynamics of the money-happiness relationship.

Some studies examine relationships between subjective well-being and social networks or social capital, another objective indicator (Ambrey et al., 2017; Powdthavee, 2008). Looking from a different viewpoint, Richards (2016) adopts the concept of ‘resilience’ from developmental psychology and investigates the buffering effect of social connectedness, a resilience resource, on subjective well-being. In doing so, Richards (2016) provides further insights into the traditional money-happiness relationship. The study reveals that an individual’s network of relationships has the potential to narrow the well-being gap that exists at times of financial adversity. Muir et al. (2016) further reinstate the role of social capital as a resilience resource in their financial resilience framework.

Borrowing from Muir et al. (2016) and Salignac et al. (2019) financial resilience framework, it appears possible that financial inclusion and financial capabilities have a buffering effect on subjective well-being. Bowman et al., (2016) presents a detailed description of how the well-being related to finance has shifted from financial exclusion through inclusion, literacy, and capability to resilience and well-being over the years. The financial products and services component of the financial resilience framework relates to the literature on financial exclusion/inclusion. Research suggests that financial exclusion may result in various problems, such as homelessness (Louth & Burns, 2018), lack of life insurance, and savings (Commonwealth of Australia, 2018) which may in turn have detrimental effects on well-being. Therefore, increased access to financial products and services is expected to enhance life satisfaction. The financial knowledge and behaviour component in the financial resilience framework coincides with the literature on financial capability (Consumer Financial Protection Bureau, 2018; Kempson & Poppe, 2018). It covers aspects, such as financial knowledge, confidence, and willingness to use financial products and services. De Neve & Cooper, 1999; Peterson, 1999; Robeyns, 2005, and Sen, 1993 have revealed that individuals with high financial capability enjoy a higher level of overall well-being. This is not surprising as a high level of financial capability implies that an individual has sufficient knowledge to identify appropriate financial products and services and effectively manage their finances and avoid debt spirals (Mashigo, 2006; Serido et al., 2013; Stumm et al. 2013).

3. Financial resilience: Theoretical framework

In this study, financial resilience is defined based on the financial resilience framework proposed by Muir et al. (2016). It is a multi-dimensional framework that has been built around four types of crucial resources that contribute to financial resilience; economic resources, financial products and services, financial knowledge and behaviour and social capital. Figure 1

presents the components of the financial resilience framework and indicators of each component. As can be seen, indicators of ‘economic resources’ are people’s level of savings; their ability to repay debt; whether they would be able to raise \$2,000 in an emergency; their capacity to meet the cost of living expenses; and the income level. Jacobs et al. (2014) defines the cost of living expenses as the ‘expenses related to goods and services that are necessary to maintain a certain standard of living’. The ‘financial products and services component’ considers an individual’s access to financial products and services, such as a bank account, credit and insurance, and the demand for these products. This component can be broadly considered to measure the level of financial inclusion. The ‘financial knowledge and behaviour’ component investigates an individual’s financial literacy and financial capability; that is an individual’s knowledge and understanding about money, financial products and services and their ability, and willingness to apply that knowledge. The ‘social capital’ component focuses on people’s social connectedness; their level of social support in times of crisis; and their need for and access to community and/or government supports.

[Figure 1 about here]

4. Data and Methodology

4.1. Data Description

The data used in this study is based on the latest National Aboriginal and Torres Strait Islander Social Survey (NATSISS) (2014/2015) conducted by the ABS from September 2014 to June 2015 (ABS 2015). The NATSISS is a six-yearly multidimensional social survey, which provides broad, self-reported information across key areas of social interest for Indigenous Australians, such as geography, cultural attachment, family and community experience, health, housing, education, income, and financial stress and life satisfaction. Geographically, the NATSISS covered remote and non-remote areas in all states and territories of Australia,

including discrete Indigenous Australians communities. However, the survey excludes the following jurisdictions: Statistical Area level 1 (SA1) that have a population between 200 to 800 people with no Aboriginal and Torres Strait Islander households; some SA1s in remote and very remote areas with a small number of Aboriginal and Torres Strait Islander households, and; some discrete communities with a small number of Aboriginal and Torres Strait Islander households. These exclusions have resulted in an estimated under-coverage of approximately 6.3% of Aboriginal and Torres Strait Islander persons in Australia. Nevertheless, the final sample has been weighted to population benchmarks to account for these exclusions. The estimates in this study have been derived using person weight to ensure that individual-level estimates conform to an independently estimated distribution of the population.

The survey design of NATSISS has incorporated 'community' and 'non-community' samples and these samples have been designed separately. The community sample has been derived from a random selection of discrete Aboriginal and Torres Strait Islander communities. The non-community dwellings have been selected using a stratified multistage area sampling method. The response rate in non-community areas was, approximately 78%, while that of discrete Aboriginal and Torres Strait Islander communities, was about 89%. The full NATSISS sample consists of 11,178 individuals. However, data on economic resources, financial services, financial knowledge and behaviour, and social capital aspects are available only for persons aged 15 years and above. The removal of the respondents less than 15 years provided a sample of 7018, which we have used for further analysis in this study.

The NATSISS has two advantages in relation to the objectives of this paper; a) it has the advantage of a much larger sample size of Indigenous people compared to any other survey (Chikritzhs & Brady, 2006) and b) provides data on life satisfaction scores and on most of the indicators in each component of the financial resilience framework.

The selection of the variables for the empirical analysis of this study is based on the individual indicators specified under each component of the financial resilience framework; economic resources, financial products and services, financial knowledge, and social capital and the availability of data. A detailed description of NATSISS variables corresponding to each indicator is presented in Table 1. To measure overall life satisfaction, we use the responses to the question ‘overall life satisfaction’. The responses range from 0 (for the least satisfied) to 10 (for highly satisfied).

[Table 1 about here]

Table 2 presents the summary statistics of the selected sample. Table 3 Parts A, B, and C show the life satisfaction scores of respondents who did and did not experience problems that affect the financial resilience by age group, income group, and gender, respectively. As can be seen, among the respondents who were reported as having low-level (0 – 5) overall life satisfaction, the percentage is always higher for the group ‘faced financial challenges’ than the group ‘did not face financial challenges’.

[Table 2 about here]

[Table 3 about here]

4.2 Methodology

To examine the link between financial resilience and life satisfaction, we estimate an ordered logit model (*Model A*) taking ‘overall life satisfaction’ as the dependent variable and the variables discussed in Table 1 that characterise financial resilience as the independent variables. The choice of the ordered logit model is based on the nature of the data. When there is a choice between more than two alternatives and these choices are inherently ordered with respect to the dependent variable, ordered logit models can be used (Cameron and Trivedi 2010).

Model A

$$\begin{aligned}
OLIFESAT^* = & \beta_0 + \beta_1 LIVING\ EXPENSES\ PROBLEMS + \beta_2 EMERGENCY\ FUNDS + \beta_3 \ln\ INCOME \\
& + \beta_4 FINANCIAL\ SERVICE\ PROBLEMS + \beta_5 + EDUCATION \\
& + \beta_6 SOCIAL\ CONNECTION + \beta_7 COMMUNITY\ SUPPORT + \varepsilon
\end{aligned}$$

where *OLIFESAT**: self-assessed life satisfaction - 0 (least satisfied) to 10 (highly satisfied), *LIVING EXPENSES PROBLEMS*: whether an individual ran out of money for living expenses within the last 12 months (yes=1, no=0), *EMERGENCY FUNDS*: whether household members were able to draw \$2000 in an emergency (yes=1, no=0), *ln INCOME*: log equivalised weekly household income, *FINANCIAL SERVICE PROBLEMS*: whether an individual faced problems in accessing financial services, such as banks, credit unions and other financial services (yes=1, no=0), *EDUCATION*: the highest level of education of the respondent (no education/did not respond=0, year 9 and below=1, certificate I/II=2, year 10=3, year 11=4, year 12=5, Certificates III/IV=6, Advanced Diploma=7, Bachelor degree=8, Postgraduate qualification=9), *SOCIAL CONNECTION*: frequency of communication with family and friends within the last 12 months (no contact=0, once in three months=1, Once a month=2, once a week=3, every day=4), and *COMMUNITY SUPPORT*: whether an individual was able to get support in time of crisis from outside the household (yes=1, no=0).

In *Model A*, we assumed that there is no heterogeneity (that is the same disturbance variance) across the age groups, income groups, and gender. Such an assumption is too strong indeed, as one would expect heterogeneity across groups. For example, women may face more heterogenous financial challenges than men. In addition, if we assume that the error variances are the same for all cases, then the parameter estimates will be biased, and their standard errors would be incorrect. In order to overcome these issues, we follow the model proposed in Allison (1999).

Under the assumption that all coefficients are the same across gender and allowing heterogeneity, Allison (1999) proposed a single equation model for person *i* of the form

$$(1) \quad y_i = \alpha_0 + \alpha_1 G_i + \sum_{j>1} \alpha_j x_{ij} + \sigma_i \varepsilon_i$$

where x is a vector of explanatory variables, G_i is a variable with a value of 1 for women and 0 for men, $\sigma_i = \frac{1}{1+\delta G_i}$ and ε_i has a standard logistic distribution and is independent of x . As can be seen, Equation (1) allows different intercepts between men and women while having the same slope coefficients. For women, $\sigma_i = \frac{1}{1+\delta}$ and for men $\sigma_i=1$. Since $\sigma_i > 0$, we need $\delta > -1$. Furthermore, if $\delta > 0$, then the disturbance variance is (100 δ %) smaller for women than men and when $-1 < \delta < 0$, the disturbance variance is (100 δ %) larger for women than men. This means that, we can interpret 100 δ as the percentage by which the disturbance standard deviation for men is greater or less than the standard deviation for women. A point worth noting is that the traditional logistic regression model is a special case of (1), where $\delta = 0$.

To Equation (1), which involves δ , Allison (1999, in equation 13) adds an interaction term for each x variable (gender * x), to give an ordered logit model across gender specified as

$$(2) \quad \log \left[\frac{p_i}{1-p_i} \right] = \alpha_0^* + (\alpha_1 + \alpha_0^* \delta + \alpha_1 \delta G_i) G_i + \sum_{j>1} \alpha_j x_{ij} + \sum_{j>1} \lambda_j (G_i * x_{ij})$$

where $p_i = \Pr(y_i = j)$ and $\lambda_j = \alpha_j \delta$. The estimated coefficient α_j associated with variable x_{ij} is the estimated effect of x_{ij} for men and $\alpha_j(1 + \delta)$ is the estimated effect of x_{ij} variable for women. Equation (2) is a standard logit equation that takes care of all the main effects of the x variables as well as their interaction with the group dummy G . One important feature of equation (2) is that each interaction coefficient is a constant (δ) multiple of the corresponding main effect α_j . To implement the estimation of Equation (2), we use the heterogeneous choice models presented in Williams' (2010). Williams (2010) shows that Allison's (1999) model for group comparisons is a special case of alternative parameterisation of his heterogenous choice model. The other advantage of heterogeneous choice models is that they explicitly specify the determinants of heteroskedasticity and correct for it.

We use the ordinal variable on life satisfaction as the dependent variable and variables discussed in Column 2 of Table 1 that characterise financial resilience as exogenous variables to set up a heterogenous choice model in the form of Model *B* below. Model *B* is estimated using Stata OGLM (Ordinal Generalised Linear Models) command described in Williams (2010). OGLM is recommended to be used to fit heterogenous choice and related models.

Model B

$$\begin{aligned}
 OLIFESAT^* = & \beta_0 + \beta_1 LIVING\ EXPENSES\ PROBLEMS + \beta_2 EMERGENCY\ FUNDS + \beta_3 \ln\ INCOME \\
 & + \beta_4 FINANCIAL\ SERVICE\ PROBLEMS + \beta_5 EDUCATION + \beta_6 SOCIAL\ CONNECTION \\
 & + \beta_7 COMMUNITY\ SUPPORT + \beta_8 GENDER + \beta_9 LIVING\ EXPENSES\ PROBLEMS * GENDER \\
 & + \beta_{10} EMERGENCY\ FUNDS * GENDER + \beta_{11} \ln\ INCOME * GENDER \\
 & + \beta_{12} FINANCIAL\ SERVICE\ PROBLEMS * GENDER + \beta_{13} EDUCATION * GENDER \\
 & + \beta_{14} SOCIAL\ CONNECTION * GENDER + \beta_{15} COMMUNITY\ SUPPORT * GENDER + \varepsilon
 \end{aligned}$$

where *GENDER*: women (=1) and men (=0). The variables associated with β_9 to β_{15} coefficients are the interaction terms between gender and the seven (X) variables associated with β_1 to β_7 coefficients, respectively. To illustrate, the estimated coefficient, β_1 associated with variable *LIVING EXPENSES PROBLEMS* is the effect of running out of money for living on life satisfaction of men and $\beta_1 + \beta_9$ is that of women. The statistically significant interaction terms (β_9 to β_{15}) indicate that those aspects of financial resilience make a significantly different impact on the life satisfaction of the two groups, male and female, that are being compared.

Using a similar approach, we also examine the variation of the effects of these seven (X) variables on life satisfaction across different age and income groups. For this purpose, firstly, taking age group 15-24 (=0) as the base age group, five dummy variables were created for six different age groups; 15-24, 25-34, 35-44, 45-54, 55-64, and 65 and above. Similarly, three dummy variables were created for four income groups (income quartile groups 1 to 4),

taking the 1st income quartile group (=0) as the base. Secondly, we estimated a model similar to Model *B*, separately, for age and income groups.

5. Estimation Results

Table 4 presents the estimation results for the full sample for Model *A*. As can be seen, the coefficients of living expenses problems and financial service problems variables are negative and statistically significant. This indicates that running out of money for living expenses and facing problems in accessing financial services increase the probability of being in the lowest category and decreases the probability of being in the highest category of overall life satisfaction variable. On the other hand, emergency funds, social connection, and community support variables are positive and statistically significant. This implies that ability to gather \$2000 in an emergency, frequent communication with family and friends, and having access to support in times of crisis increase the probability of being in the highest category of the latent overall life satisfaction variable and decreases the probability of being in the lowest category of the overall life satisfaction variable.

[Table 4 about here]

The (equivalised household) income variable has a negative sign but is statistically insignificant. This observation is a notable contrast to the existing literature on the (positive) relationship between income and life satisfaction (see, for example, Frijters et al., 2004). However, very similar results (negative and statistically insignificant income coefficient) have been found in Manning et al. (2016) with respect to Indigenous Australians. Results also indicate that the education variable has a statistically significant negative coefficient, which suggests that the higher the level of education, the lower the probability of being in the highest category of overall life satisfaction. Similar results have been found in Ambrey and Fleming (2012) in Australia. As shown in Table 4, among the selected independent variables, running

out of money for living expenses generates the highest (negative) impact on life satisfaction, followed by the ability to get support in times of crisis (positive) and ability to gather \$2000 in an emergency (positive).¹

The results of the heteroscedasticity corrected model (Model B) that allow comparisons across gender, age, and income are presented in Tables 5, 6, and 7, respectively.

[Table 5 about here]

[Table 6 about here]

[Table 7 about here]

As given in Column (2) of Table 5, the estimated effect of running out of money for living on life satisfaction for men is $\beta_1 = -0.707$ and that of women is $\beta_1 + \beta_9 = -0.707 + (-0.049) = -0.756$. All the interaction terms in Table 5 are statistically insignificant. This implies that there is no gender difference in the impact of any indicator of financial resilience on life satisfaction. However, the estimated values of σ as well as δ are both statistically significant indicating that there is heterogeneity (differing disturbance variance) between men and women. Further, the estimated value of $\delta = 0.071 > 0$, indicating that the disturbance variance is 7.1% smaller for women than men.

As can be seen, the results for most of the interaction terms presented in Tables 6 and 7, are statistically insignificant. In Table 6, statistically significant different impacts on life satisfaction were observed in the variables ‘income’ among the age group 55-64, ‘financial service problems’ among the age groups 35-44, and ≥ 65 , and ‘social connection’ among the age group 55-64, relative to the base age group 15-24. In Table 7, ‘income’, among the 4th income quartile group and ‘financial service problems’, among the 2nd income quartile groups

¹ In the interest of brevity, we do not present marginal effects of Table 4 estimates. These results are available on request.

show statistically significant interaction terms and hence a significant difference in the impact of those aspects on life satisfaction between these two population groups.

6. Limitations of the study

The discussion presented in this study is subject to two data-related limitations. Firstly, the survey excludes the homeless and those who are in hospitals and prisons at the time the survey was conducted. These groups may face unique challenges with respect to financial resilience, which we are unable to incorporate in this study due to data unavailability. Secondly, NATSISS does not provide data related to some aspects of financial resilience, such as data on savings and debts and individuals' financial knowledge, and hence our analysis excludes those aspects of financial resilience.

7. Concluding Comments

Policymakers and civil society in Australia have already recognised the need for proactive measures to enhance Indigenous well-being (Australian Government, 2008). Complementing various government initiatives, there has been a growing body of research on Indigenous disadvantage and well-being, such as disproportionate health, employment, and education outcomes and financial exclusion of Indigenous Australians (ABS, 2017; 2014 ANZ Survey, 2015). In facilitating the understanding of Indigenous well-being, research has also highlighted that Indigenous well-being is multifaceted and money plays little or no impact on their overall life satisfaction (Manning et al., 2016). Recognising the role of Indigenous cultural norms in every domain of subjective well-being, culture has been emphasised as a key aspect that should be considered in enhancing Indigenous well-being (Wagland & Taylor, 2015).

This study, applying quantitative data analysis techniques for NATSISS data, extends the existing literature on Indigenous well-being by investigating how financial resilience, such

as the ability to meet living expenses, ability to raise funds in an emergency, access to financial products and services, financial knowledge and behaviour and social capital, which could be directly or indirectly linked with their socio-economic disadvantage and culture that other research has highlighted, affect subjective well-being of Indigenous Australians. To this end, this study makes a significant contribution to the knowledge of Indigenous well-being by uncovering the relative importance of aspects of financial resilience for the subjective well-being of Indigenous Australians that has not been investigated in the previous literature.

While having a secure source of income may enhance greater life satisfaction, our results show that income itself does not seem to have a significant impact on life satisfaction. Rather than the amount of income received, in this study, we found that running out of money to meet living expenses has a bigger (negative) impact on Indigenous Australians' life satisfaction. Our results further support the findings of Rutherford and Arora (2009) and Conger and Conger (2002) that having security buffers against emergencies and the ability to meet the cost of living expenses are important factors when exploring the money-happiness relationship. Furthermore, we also found that the ability to raise funds in an emergency is associated with enhanced life satisfaction. In our study, similar to Richards (2016), we find that social capital, more specifically, the ability to get support in times of crisis from outside the household appears to have a buffering effect on the subjective well-being of Indigenous Australians. While the existing studies show that Indigenous Australians are mostly excluded from accessing financial services and products, our results find that difficulties in accessing financial services, such as banking, insurance, and credit cards make Indigenous Australians unsatisfied about life.

By increasing the understanding of Indigenous well-being, this study also contributes to the on-going conversation of policy and action towards enhancing Indigenous well-being. As suggested by Gordon and Boyle (2015) and Commonwealth of Australia (2018), lower literacy levels and cultural features, such as 'inconsistent names and dates of birth on documentation'

make accessing financial services difficult. Although we find that the education level does not necessarily increase the life satisfaction of Indigenous Australians, we find that the improved financial literacy to plan, manage and use their money wisely and the ability to access financial services indeed increase their life satisfaction.

In the last decade, the Australian government together with the financial services sector has started working closely with the Indigenous community to explore more multi-cultural and multi-dimensional approaches to enhance financial access and inclusion, and financial literacy. Despite numerous initiatives to increase financial literacy and financial inclusion, ANZ (2014) noted that Indigenous Australians continue to demonstrate the poorest levels of financial literacy, with little to no identifiable improvement in measured skills over the period 2003-2014. Wagland and Taylor (2015) noted that among the financial literacy programs that are specifically designed to address the low financial literacy levels observed among Indigenous Australians, only two programs; My Moola program introduced by First Nations Foundation and MPower program introduced by Cape York Partnerships incorporate Indigenous culture in the design of their program. Program evaluation results of these two initiatives reveal that they were assessed as very successful programs. In general, these two programs aim to improve the abilities of individuals and households to manage income and household budgets so that basic material needs, such as food, clothing, and shelter can be sustained. By doing so, the individuals are expected to gradually move from passive welfare to responsible and self-reliance individuals. This study which uncovers the relationship between various aspects of financial resilience and subjective well-being emphasises the increasing need for designing more programs, such as My Moola and Mpower that facilitate disadvantaged Indigenous Australians to overcome financial barriers and thereby increase their overall well-being.

Therefore, this study highlights the need for acknowledging and directing policy and action towards the financial resilience aspects that Indigenous Australians consider important

for enhanced life satisfaction. Our findings further necessitate the attention of policymakers and financial service providers towards increased support services and flexibilities for Indigenous Australians in accessing financial services, and support services and resources to encourage proactive financial behaviour, such as saving money for emergencies rather than utilising high-cost credit. This study recommends that further support should also be extended to help Indigenous individuals manage money and build capabilities through financial literacy and behaviour change.

Finally, while we acknowledge that Indigenous Australians are not a homogenous group, in this study, other than a few exceptions, no significant gender, age, or income gender differences were found in the link between the components of financial resilience and life satisfaction. This suggests that the aspects relating to financial resilience we investigated in this paper are common factors that affect the life satisfaction of all Indigenous Australians, irrespective of their gender, age, and income group.

Authors contribution

Dr. Maneka Jayasinghe contributed by conceptualising the study, undertaking the empirical analysis, and compiling the first draft of the paper. Dr. Jayasinghe also led the first round revision of the paper.

Professor Eliyathamby A. Selvanathan contributed by conceptualising the methodological framework of the paper. Professor Selvanathan is also the corresponding author.

Professor Saroja Selvanathan provided overall critical comments on the completed drafts numerous times and led the second round revision process.

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Table 1: NATSISS data based on the financial resilience framework

Indicator ¹ (1)	Variable selected from NATSISS ² (2)
Economic resources	
Savings	Data not available
Debt management	Data not available
Ability to meet living expenses	Whether household members ran out of money for basic living expenses in last 12 months (yes=1 no=0) <i>(LIVING EXPENSES PROBLEMS)</i>
Ability to raise funds in an emergency	Whether household could raise \$2000 in an emergency (yes=1 no=0) <i>(EMERGENCY FUNDS)</i>
Income level	Equivalent weekly household income <i>(ln INCOME)</i>
Financial products and services	
Access to Bank account	Whether has problems accessing financial services, such as banking, credit union and other financial institutions (yes=1 no=0) <i>(FINANCIAL SERVICE PROBLEMS)</i>
Access to credit and needs met	
Access to insurance and needs met	
Financial knowledge and behaviour	
Knowledge of financial products and services	Highest level of education <i>(EDUCATION)</i>
Confidence using financial products and services	Data not available
Willingness to seek financial advice	Data not available
Proactive financial actions	Data not available
Social capital	
Social connections	Frequency of contact with family and friends outside household No contact, at least once in 3 month, at least once a month, at least once a week, every day) <i>(SOCIAL CONNECTION)</i>
Access to financial support in times of crisis	Whether able to get support in time of crisis from outside household (yes=1 no=0) <i>(COMMUNITY SUPPORT)</i>
Access to community and government when needed	Data not available

Note: ¹ based on the financial resilience framework in Muir et al. (2019); ²As given in NATSISS questionnaire accessed through ABS (2015).

Table 2: Summary statistics

Characteristics of respondents	Percentage
Gender	
Men	47.9
Women	52.1
Age group	
15-24	31.0
25-34	21.7
35-44	17.1
45-54	14.8
55-64	9.5
65 and above	5.8
Level of education	
Year 9 and below	23.5
Certificate I/II	1.6
Year 10	19.2
Year 11	10.1
Year 12	12.2
Certificates III/IV	22.5
Advanced diploma	5.2
Bachelor degree	3.4
Postgraduate qualification	1.5
Able to get support in time of crisis from outside household	91.6
Faced problems in accessing financial services	4.9
Ran out of money for living expenses within the last 12 months	27.6
Able to gather 2000\$ in an emergency	49.5
Frequency of communication with family and friends within the last 12 months	
No contact	1.2
Once in three months	1.0
Once a month	3.5
Once a week	28.7
Every day	65.9
Overall life satisfaction	
0-2	2.8
3-5	18.7
6-8	49.4
9-10	29.1

Table 3: Life satisfaction score by age, income and gender

A: Percentage of respondents by age group												
Overall life satisfaction	15-24		25-34		35-44		45-54		55-64		65 and above	
	Faced financial challenges*	Did not face financial challenges	Faced financial challenges	Did not face financial challenges	Faced financial challenges	Did not face financial challenges	Faced financial challenges	Did not face financial challenges	Faced financial challenges	Did not face financial challenges	Faced financial challenges	Did not face financial challenges
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
0-2	1.4	1.2	3.4	0.8	4.5	0.5	4.9	1.8	6.5	4.5	2.2	2.4
3-5	18.7	6.3	24.3	10.9	31.0	12.5	29.4	8.9	22.8	9.6	15.6	11.3
6-8	53.2	53.8	49.5	54.9	40.1	60.4	44.7	52.9	42.0	46.2	40.9	44.1
9-10	26.7	38.7	22.9	33.1	24.3	26.5	21.1	36.2	28.6	39.6	41.0	42.0
B: Percentage of respondents by income group												
Overall life satisfaction	1 st income quartile group (lowest)		2 nd income quartile group		3 rd income quartile group		4 th income quartile group (highest)					
	Faced financial challenges	Did not face financial challenges**	Faced financial challenges	Did not face financial challenges	Faced financial challenges	Did not face financial challenges	Faced financial challenges	Did not face financial challenges				
0-2	3.4	-	3.1	2.0	2.6	1.2	3.9	2.0				
3-5	25.4	-	23.3	19.6	18.9	7.7	25.5	10.5				
6-8	45.1	-	46.3	58.1	56.3	56.8	45.2	51.0				
9-10	25.8	-	27.6	20.3	22.0	33.8	25.2	36.4				
C: Percentage of respondents by gender												
Overall life satisfaction	Male		Female									
	Faced financial challenges	Did not face financial challenges	Faced financial challenges	Did not face financial challenges								
0-2	3.7	1.0	3.1	2.2								
3-5	22.4	8.1	25.0	10.5								
6-8	48.7	56.0	46.0	51.0								
9-10	25.2	34.7	25.9	36.3								

Note: * faced financial challenges implies the respondents who experienced one or more problems that affect their financial resilience; faced problems in accessing financial services, ran out of money for living expenses within the last 12 months, unable to gather 2000\$ in an emergency, unable to get support in time of crisis from outside household, did not communicate with family and friends within last 12 months, and equalised household income less than 433\$ a week, which is the poverty line in Australia (Australian Council of Social Service, 2018). ** The cut-off equalised household income of the 1st income quartile is less than \$433. Therefore, all the respondents in the 1st income quartile fall into the category of ‘faced financial challenges’. Level of education has not been considered as a factor that affect the financial resilience here.

Table 4: Financial resilience and life satisfaction

Variable (1)	Coefficient (2)
<i>LIVING EXPENSES PROBLEMS</i> (yes=1) (β_1)	-0.648* (0.000)
<i>EMERGENCY FUNDS</i> (yes=1) (β_2)	0.427* (0.000)
ln <i>INCOME</i> (β_3)	-0.001 (0.878)
<i>FINANCIAL SERVICE PROBLEMS</i> (yes=1) (β_4)	-0.028** (0.062)
<i>EDUCATION</i> (β_5)	-0.030* (0.034)
<i>SOCIAL CONNECTION</i> (β_6)	0.119* (0.000)
<i>COMMUNITY SUPPORT</i> (yes=1) (β_7)	0.561* (0.000)
Number of observations	7018

Note: Dependent variable is overall life satisfaction. p-values are in parentheses. * and ** refer to significance at the 5% and 10% level, respectively.

Table 5: Financial resilience and life satisfaction by gender

Variable (1)	Coefficient (2)
<i>LIVING EXPENSES PROBLEMS</i> (yes=1) (β_1)	-0.707* (0.000)
<i>EMERGENCY FUNDS</i> (yes=1) (β_2)	0.338* (0.000)
ln <i>INCOME</i> (β_3)	0.003 (0.683)
<i>FINANCIAL SERVICE PROBLEMS</i> (yes=1) (β_4)	-0.019 (0.177)
<i>EDUCATION</i> (β_5)	-0.037* (0.011)
<i>SOCIAL CONNECTION</i> (β_6)	0.168* (0.000)
<i>COMMUNITY SUPPORT</i> (yes=1) (β_7)	0.372* (0.001)
<i>GENDER</i> (β_8)	-0.207 (0.476)
Interaction terms	
<i>LIVING EXPENSES PROBLEMS</i> * <i>GENDER</i> (β_9)	-0.049 (0.643)
<i>EMERGENCY FUNDS</i> * <i>GENDER</i> (β_{10})	-0.098 (0.308)
ln <i>INCOME</i> * <i>GENDER</i> (β_{11})	0.000 (0.969)
<i>FINANCIAL SERVICE PROBLEMS</i> * <i>GENDER</i> (β_{12})	-0.011 (0.532)
<i>EDUCATION</i> * <i>GENDER</i> (β_{13})	-0.007 (0.717)
<i>SOCIAL CONNECTION</i> * <i>GENDER</i> (β_{14})	-0.082 (0.225)
<i>COMMUNITY SUPPORT</i> * <i>GENDER</i> (β_{15})	-0.044 (0.786)
Ln(sigma)	-0.069* (0.002)
Delta	0.071

Note: Dependent variable is overall life satisfaction. p-values are in parentheses. * significant at the 5% level.

Table 6: Financial resilience and life satisfaction by age group

Variable (1)	Age group 2 (2)	Age group 3 (3)	Age group 4 (4)	Age group 5 (5)	Age group 6 (6)
<i>LIVING EXPENSES PROBLEMS</i> (yes=1) (β_1)	-0.688* (0.000)	-0.681* (0.000)	-0.685* (0.000)	-0.714* (0.000)	-0.698* (0.000)
<i>EMERGENCY FUNDS</i> (yes=1) (β_2)	0.280* (0.000)	0.263* (0.000)	0.279* (0.000)	0.256* (0.000)	0.270* (0.000)
ln <i>INCOME</i> (β_3)	0.004 (0.416)	0.005 (0.289)	0.001 (0.936)	-0.001 (0.905)	0.002 (0.648)
<i>FINANCIAL SERVICE PROBLEMS</i> (yes=1) (β_4)	-0.027* (0.011)	-0.033* (0.001)	-0.024* (0.015)	-0.028* (0.005)	-0.020* (0.029)
<i>EDUCATION</i> (β_5)	-0.036* (0.001)	-0.028* (0.007)	-0.031* (0.003)	-0.030* (0.003)	-0.026* (0.012)
<i>SOCIAL CONNECTION</i> (β_6)	0.189* (0.000)	0.213* (0.000)	0.207* (0.000)	0.170* (0.000)	0.198* (0.000)
<i>COMMUNITY SUPPORT</i> (yes=1) (β_7)	0.313* (0.000)	0.377* (0.000)	0.342* (0.000)	0.389* (0.000)	0.322* (0.000)
<i>AGE GROUP</i> (β_8)	-0.214 (0.522)	-0.346 (0.284)	-0.001 (0.998)	-0.889* (0.006)	-0.226 (0.610)
Interaction terms					
ln <i>INCOME</i> * <i>AGE GROUP</i> (β_8)	-0.007 (0.476)	-0.016 (0.158)	0.014 (0.228)	0.025** (0.081)	0.010 (0.517)
<i>COMMUNITY SUPPORT</i> * <i>AGE GROUP</i> (β_9)	-0.027 (0.573)	-0.057 (0.252)	-0.001 (0.986)	0.070 (0.219)	0.191 (0.498)
<i>FINANCIAL SERVICE PROBLEMS</i> * <i>AGE GROUP</i> (β_{10})	0.010 (0.639)	0.041** (0.072)	-0.007 (0.783)	0.020 (0.491)	-0.054** (0.099)
<i>LIVING EXPENSES PROBLEMS</i> * <i>AGE GROUP</i> (β_{11})	-0.026 (0.815)	-0.137 (0.275)	-0.198 (0.164)	-0.042 (0.819)	0.239 (0.366)
<i>EMERGENCY FUNDS</i> * <i>AGE GROUP</i> (β_{12})	-0.079 (0.453)	-0.041 (0.721)	-0.050 (0.711)	0.162 (0.302)	-0.146 (0.402)
<i>SOCIAL CONNECTION</i> * <i>AGE GROUP</i> (β_{13})	-0.042 (0.583)	-0.084 (0.279)	-0.042 (0.633)	0.255* (0.016)	0.094 (0.355)
<i>EDUCATION</i> * <i>AGE GROUP</i> (β_{14})	-0.031 (0.181)	-0.016 (0.504)	-0.007 (0.779)	-0.013 (0.630)	0.035 (0.290)
Ln(sigma)	-0.067* (0.013)	-0.032 (0.261)	0.092* (0.002)	0.127* (0.000)	0.045 (0.291)
Delta	0.069	0.033	-0.088	-0.119	-0.044

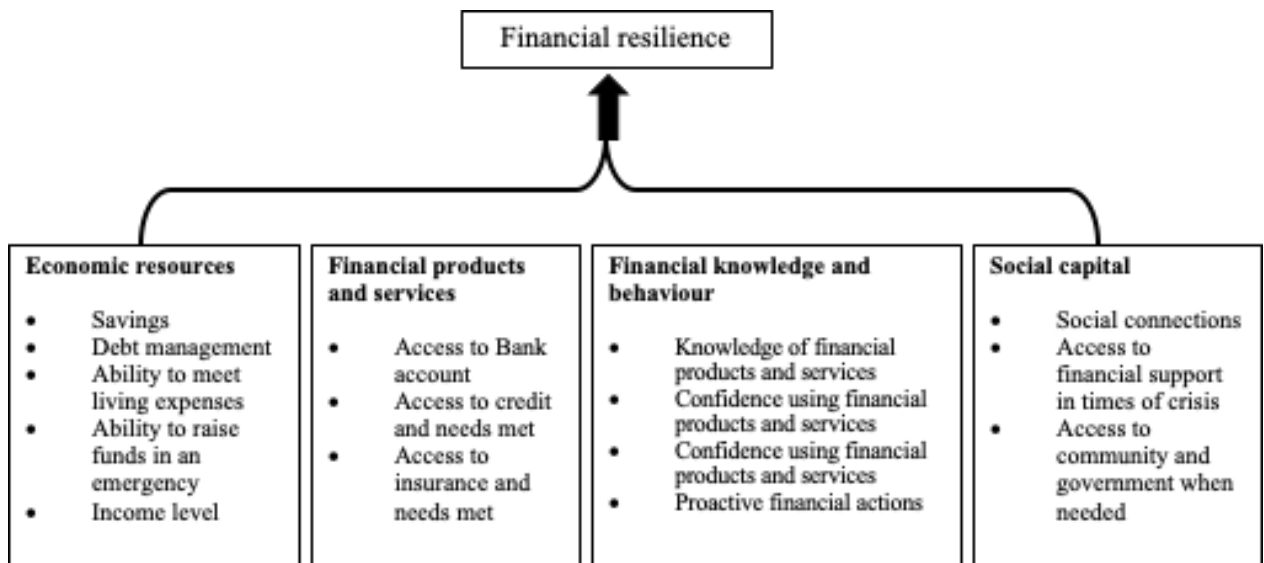
Note: Dependent variable is overall life satisfaction. p-values are in parentheses. * and ** refer to significance at the 5% and 10% level, respectively. 1=(15-24), 2=(25-34), 3=(35-44), 4=(45-54), 5=(55-64), 6=(≥65). D_i in group i where $D_i=0$ for age group 1 and $D_i=1$ for age group i ($i=2,3,4,5,6$).

Table 7: Financial resilience and life satisfaction by income group

Variable (1)	Income group 2 (2)	Income group 3 (3)	Income group 4 (4)
<i>LIVING EXPENSES PROBLEMS</i> (yes=1) (β_1)	-0.663* (0.000)	-0.705* (0.000)	-0.702* (0.000)
<i>EMERGENCY FUNDS</i> (yes=1) (β_2)	0.334* (0.000)	0.231* (0.000)	0.213* (0.000)
ln <i>INCOME</i> (β_3)	0.003 (0.289)	0.004 (0.354)	0.112* (0.016)
<i>FINANCIAL SERVICE PROBLEMS</i> (yes=1) (β_4)	-0.023* (0.001)	-0.023* (0.025)	-0.020** (0.054)
<i>EDUCATION</i> (β_5)	-0.029* (0.007)	-0.049* (0.000)	-0.040* (0.000)
<i>SOCIAL CONNECTION</i> (β_6)	0.201* (0.000)	0.199* (0.000)	0.216* (0.000)
<i>COMMUNITY SUPPORT</i> (yes=1) (β_7)	0.318* (0.000)	0.310* (0.000)	0.370* (0.000)
<i>INCOME GROUP</i> (β_8)	-0.746 (0.284)	-0.575 (0.545)	1.343* (0.003)
Interaction terms			
ln <i>INCOME</i> * <i>INCOME GROUP</i> (β_8)	0.151 (0.158)	0.043 (0.747)	-0.128** (0.081)
<i>COMMUNITY SUPPORT</i> * <i>INCOME GROUP</i> (β_9)	0.071 (0.252)	0.047 (0.785)	-0.159 (0.356)
<i>FINANCIAL SERVICE PROBLEMS</i> * <i>INCOME GROUP</i> (β_{10})	-0.003** (0.072)	-0.001 (0.946)	-0.019 (0.389)
<i>LIVING EXPENSES PROBLEMS</i> * <i>INCOME GROUP</i> (β_{11})	-0.182 (0.275)	0.179 (0.105)	0.061 (0.613)
<i>EMERGENCY FUNDS</i> * <i>INCOME GROUP</i> (β_{12})	-0.247 (0.721)	0.098 (0.302)	0.090 (0.405)
<i>SOCIAL CONNECTION</i> * <i>INCOME GROUP</i> (β_{13})	-0.002 (0.279)	-0.036 (0.600)	-0.067 (0.342)
<i>EDUCATION</i> * <i>INCOME GROUP</i> (β_{14})	-0.015 (0.504)	0.066 (0.111)	0.001 (0.946)
Ln(sigma)	0.012 (0.261)	-0.237* (0.026)	-0.034 (0.196)
Delta	-0.012	0.267	0.035

Note: Dependent variable is overall life satisfaction. p-values are given in parenthesis. * and ** refer to significance at the 5% and 10% level, respectively. D_i in group i where $D_i=0$ for income quartile 1 group and $D_i=1$ for income quartile groups i ($i=2,3,4$).

Figure 1: Components of financial resilience framework



Source: Muir et al. (2016)