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## Article

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## ECONOMIC METHODOLOGY, PHILOSOPHY & HISTORY | RESEARCH ARTICLE

# Household debt in different age cohorts: A multilevel study

Wajiha Haq<sup>1,2</sup>, Noor Azina Ismail<sup>3\*</sup> and NurulHuda Mohd Satar<sup>1</sup>

**Abstract:** There is a need to identify household debt behaviour in different age cohorts even in countries without prominent household debt problems so that the measures for vulnerable groups can be made. Authors used multilevel mixed effect analysis to test the effect of age and other variables on demand of debt. A national representative survey data of HIES (2001–2013) based on stratified sampling design was used. Household debt in mature workers was higher than youth whereas debt of older people was not significantly different from other cohorts. Education and household size positively affect the demand for debt. This study contributed to existing literature by exploring the demand for debt in different age cohorts, taking into account other socio-economic variables. The design of debt products should be such that mature workers should not accumulate a high level of debt.

**Subjects:** Sociology & Social Policy; Consumer Psychology; Economics

**Keywords:** Age; household; debt; financial satisfaction; socioeconomic; education; assets; household size; survey; stratified

**JEL codes:** D11; D12; D18

### 1. Introduction

South Asian countries are undergoing major changes in the size and age structure of the population. Most of the countries are either having demographic dividend or just have passed that phase. With

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### PUBLIC INTEREST STATEMENT

Ageing is a natural phenomenon but if proper measures are not taken for the increasing ageing population then it can be dangerous. In the absence of proper pensions systems and insurance plans, elderly people tend to take debts. It is important to see the household debt behaviour of different age groups so that proper measures can be taken if the elderly are found vulnerable. Currently, the population size of each age group is changing in Pakistan and expected to have an ageing problem in few upcoming years. It was found in Pakistan that people of age 50–59 have significantly higher debts. It is important for the government to take measures for elderly in the form of insurance plans, effective pension system and welfare nets so that the dependency ratio can be decreased and elderly people can be saved from getting highly indebted.

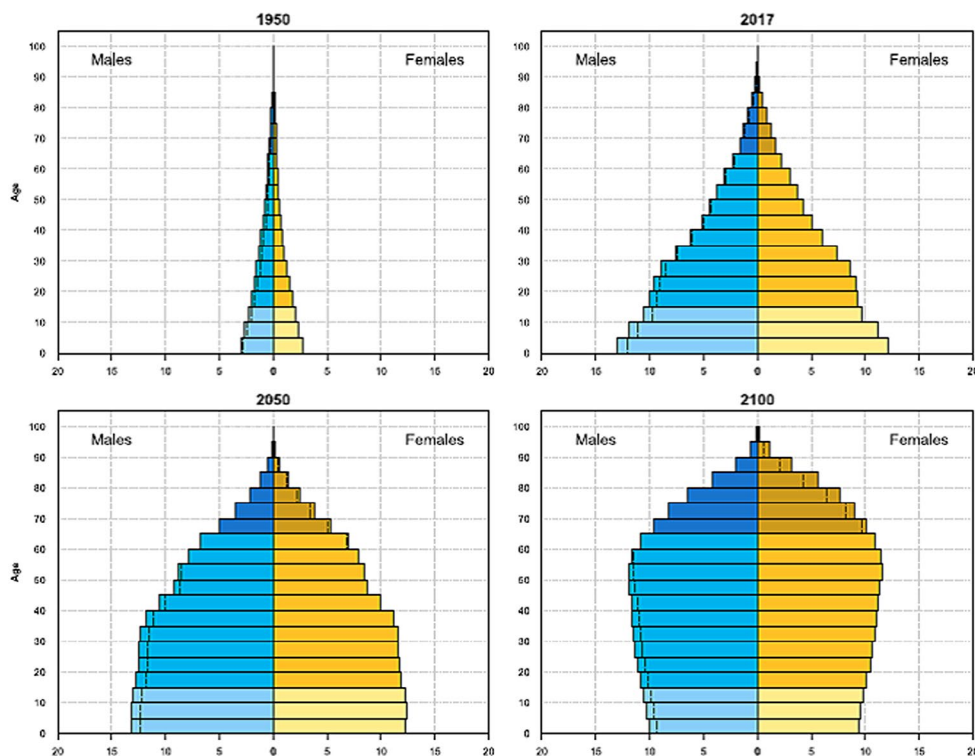
structural changes in population, there is always a need to invest in education and health. In addition, the employment sector also faces challenges as the unemployment rate increases. Along with demographic changes, the consumption patterns and the need for finances also changes. The South Asian population is expected to be 2.32 billion in 2050 with the normal fertility rate (United Nations, 2009). Pakistan, home of 11% of the South Asian population (United Nations, 2009), is also undergoing demographic changes. According to the World Bank (2016), there is a steady increase in the percentage of the population categorised as senior citizens (65 and above) from 6.8% in 2000 to 8.3% in 2015. The rate of ageing population has been slower in countries where the fertility rate has remained high.

In Pakistan, the total fertility rate was more than six children per household until 1990. Later, as a result of birth control and family planning campaigns, the birth rate declined to 3.4 children per female in 2015. Due to this high birth rate, the population aged above 60 years decreased between 1950 and 1970, from 8–6%. The percentage has increased slightly to 6.6% in 2015. Recent declines in fertility rates are expected to accelerate the growth of ageing population in Pakistan. It is expected that an ageing population will increase between 11 and 14% in the low fertility scenarios. The population aged 60 years and above are expected to grow by 66% between 2015 and 2030 whereas only 10% of them have pension funds now. (United Nations, 2015). In addition to that, there are changes in the whole age structure of the population as shown by the population pyramid in Figure 1. The population size increased over the years in each age category and in the coming years, the problem of an ageing population will increase. The steady growth of ageing population should be closely monitored by socialist planners in relation to household debt and welfare nets as it can pose risks to the society in terms of increasing dependency ratio especially when the state-provided support system for elderly is weak (Hodson & Dwyer, 2014).

There are inconclusive findings related to debt behaviour of different age groups, especially of elderly people. Some researchers found that older people tend to consume more than young ones and use various forms of credit (Higgs et al., 2009; Lusardi & Mitchell, 2013; Lusardi, Mitchell, & Oggero, 2016). This is in contrast to the prediction of Life Cycle theory that individuals consume more when they are young, accumulate savings in midlife and start dissaving in older ages with a decrease in

**Figure 1. Changes in population pyramid of Pakistan from 1950–2050.**

Note: x-axis: Age in years, y-axis: Population in millions. The dotted line shows the male and females in excess. Source: United Nations (2017).



their expenditure (Modigliani, 1986). The diversion from Life Cycle theory prediction is in tandem with the increasing trend of household debt in some countries (Crook, 2006; Zinman, 2015). This article examines the characteristics of debt in different age groups of Pakistan. It is important to know the debt characteristics of different age groups so that debt providers can provide debt to each group customised according to their needs.

The growing trend of unsecured credit and loans has become prevalent across different socioeconomic categories and groups in Pakistan (Barba & Pivetti, 2009; Peñaloza & Barnhart, 2013). This reflects strict credit regulations of the formal institutions, non-provision of the required debt according to the eligibility of customers and culture in the society.

Pakistan lacks an efficient pension system due to which many people rely on their families for assistance (Jalal & Younis, 2014). Apart from pensions, elderly can borrow money to cover up their expenses in case of deficient income. High debt for elderly is an alarming sign for both individuals and lending institutions because most of the debt is usually repaid when individuals reach elderly age. Modigliani's Life Cycle Income Hypothesis (Modigliani, 1986) says that over the life, income increases, reaches its maximum in midlife and decreases later. Individuals save in early age in order to consume in later age after retirement so that they can enjoy smooth pattern of consumption. The problem is when household debt is still high in older ages which signals the lack of pension systems, insurance plans and support systems for elderly. This study emphasizes the need for support programs by providing evidence that people of age 50–60 have significantly higher debt than young ones. The current situation is still not worsening but in future, increasing ageing population without support programs can create a problem. Apart from age, the factors which affect the amount of household debt are the household size (Togba, 2012), income, employment (Crook, 2006), education (Del-Río & Young, 2005) and household assets (Leonard & Di, 2014). The significant relationships have also been found in this study between debt and the above-mentioned variables. This study revealed that older people need support in the form of pensions, insurance or other measures so that they may not incur more debt in old age.

In the scenario of declining fertility rates, expected increasing ageing population and changing structure of whole population pyramid, there is need to investigate the debt behaviour across different ages. The objective of this study is to investigate demand for debt across different ages of life. This study also examines the model of household debt by examining effects of different variables on debt which have been discussed in the literature. The focus of the article is on the behaviour of people across different ages towards debt in an economy where a big proportion of the population does not have pension funds. They either depend on their friends and family for financial support or take debt. Ageing is natural but the absence of proper management of increasing ageing population can be dangerous. Monitoring household debt across different ages will reveal the urgency of welfare assistance or debt programs for the different age groups. For example, if some age groups like elderly, are having a large amount of debt then it may signal weak welfare nets and state support which can create an urgency of welfare assistance. If youth used to have a large amount of debt then it may signal to expensive education or scarcity of jobs. This study not only highlighted the potential issue in the context of Pakistan but also contributed to the literature of risks faced by elderly through use of advanced econometric techniques

The rest of the paper includes literature review, methodology, results, discussion and conclusion. Literature review explains the reasons for borrowing, the role of different factors in household debt variation and relationship of age with household debt. Methodology section elaborates the data and analytical technique used to analyse data and derive the results. Results have been presented later and discussed. Later, the whole paper is concluded.

## 2. Literature review

Household debt “is an obligation or liability, arising from borrowing money or taking goods or services ‘on credit’ i.e. against an obligation to pay later” (Prinsloo, 2002, p. 63). In advanced

economies, individuals owe their household debts mostly to formal institutions (Georgarakos, Haliassos, & Pasini, 2014). In this article, the words credit, debt and borrowings are used interchangeably as they carry the same intrinsic meaning.

### **2.1. Reasons for borrowing**

Households borrow because of two reasons: income fluctuations and lower savings. According to Lorenzoni and Guerrieri (2011), people borrow because of transitory fluctuations in their income while Eggertsson and Krugman (2012) argued that people borrow because their savings are inadequate and they also use these borrowings for investment purposes. Households tend to maximise their utility through their consumption. Life Cycle Income Hypothesis theory says that households save in early ages and dissave in old ages. Sometimes they borrow when faced with temporary income fluctuations. Income during a lifetime is hump-shaped, it is low at early ages and after reaching a maximum point, it decreases. The more the income is hump-shaped, the greater the debt is incurred according to Life Cycle Income Hypothesis (LCIH) theory (Modigliani, 1986). Life cycle interpretations of consumer credit have however been questioned by contrasting empirical evidence (Barba & Pivetti, 2009).

Earlier, Friedman (1957) proposed that current consumption was linked to permanent income which was later negated by empirical evidence. Hall (1978) and Flavin (1981) found out that consumption was not determined solely by permanent income. However, Deaton (1992) discovered that consumption and current income are interdependent.

### **2.2. Sources of change in household debt**

People are usually compelled to take a loan when they want to bridge the gap between their current and desired level of income (Barba & Pivetti, 2009; Lusardi & Tufano, 2015). The excess credit is usually used for education, consumption and purchasing a house. The amount of debt varies with age (Del-Río & Young, 2005). Some researchers have highlighted that debt increases at decreasing rate with age (Fabbri & Padula, 2004; Magri, 2002; Yilmazer & DeVaney, 2005).

Household size also affects the amount of debt incurred, in view of constant income, it becomes difficult to manage expenditures and thus, the debt may be required (Livingstone & Lunt, 1992; Magri, 2002; Togba, 2012). Earlier, researchers showed that income plays an important role in affecting debt as individuals from higher income group can afford greater debts (Crook, 2006; Del-Río & Young, 2005; Petrides & Karagrigoriou, 2008). The type of employment also influences the amount of debt whereby those working in the formal sector accumulate greater amounts of debt (Crook, 2006; Tudela & Young, 2005). Education affects household debt positively as better education offers prospects of better earnings and a good understanding of financial options. Individuals access loans in anticipation of future income will be used to repay debt (Kim & DeVaney, 2001). Financial assets have a positive relationship with debt as they can be used as a mortgage for securing loans (Leonard & Di, 2014). Home ownership is also found to be important in explaining debt as many people take home loans. It is one of the major factors of rising household debt in many countries (Andrews, Sanchez, & Johansson, 2011).

### **2.3. Age and household debt**

Economic and demographic characteristics affect a household's borrowing decision. According to life cycle theory, the decision to take a loan is influenced by age. Younger people are more likely to borrow compared with the older ones because of their lower future income expectations while the latter are usually risk-averse (Modigliani, 1966). Thus, accumulation of debt over life period is affected by age and is consistent with the life cycle hypothesis and permanent income hypothesis. According to Modigliani (1986) life cycle income hypothesis (LCIH), a person seeks to smooth consumption over his/her lifetime and for that, he or she relies on savings and debt.

Debt is usually incurred during early stages of one's career when one's income is less than one's expenses. Debt accumulates until the person reaches middle age and attains seniority in the chosen

profession which translates into better income. Del-Río and Young (2005) found age to be one of the strongest determinants of debt level after income. The relationship between age and income was positive. A cross-country analysis by Austrian Central Bank included Bulgaria, Czech Republic, Albania, Poland, Romania, Hungary, Serbia, Croatia, Herzegovinian and Bosnia indicated that age has a positive relationship with loans (Fidrmuc, Hake, & Stix, 2013). However, research findings are inconsistent. Yilmazer and DeVaney (2005), for instance, discovered in the United States that older people decrease their spending associated with consumption. Hence, the need to finance their expenses lowers with age. Elderly people tend to maintain their assets rather than dissolving them to smooth their consumption.

Duca and Rosenthal (1993), for example, found the relationship between debts and age to be negative. Young households accumulate more debts because their income is low. The relationship between debt and age is U-shaped and it is interesting to study each segment which is achieved by categorising age into stages called family life cycle stage (Lansing & Kish, 1957). It has been shown that elderly people spend less than those in the younger age group (Danziger, Van Der Gaag, Smolensky, & Taussig, 1982). In the case of US, older people don't dissave but they decrease their spending associated with consumption. Hence, there is less need for debts to finance their living expenses. It is also interesting to note in certain case, debt increases with age (Yilmazer & DeVaney, 2005).

The issue of debt has been explored using primary data (Adnan, 2005; Ahmed, 2016) in the context of Pakistan but this study uses national data from 2001–2014 which will also provide insights into household debt in older citizens. It will provide a recommendation of welfare programs for older people to avoid a heavy burden of debt.

### 3. Methodology

Data for this study were obtained from Household Integrated Expenditure Survey for Pakistan covering the period of 2001/2002, 2005/2006, 2007/2008, 2010/2011, 2011/2012 and 2013/2014. The national representative data were collected by Pakistan Bureau of Statistics (PBS). The data are also disaggregated at the provincial level. PBS developed the sampling frame for this study by dividing cities and villages identified through map into enumeration blocks. A two-stage sampling design was used for data collection. At stage 1, Primary Sampling Units (PSUs) were selected consisting of enumeration blocks in urban areas and villages in rural areas. At the second stage, 12–16 households were selected from each PSU and the selection of households started randomly. Different socioeconomic and economic indicators have been covered by this survey.

The dependant variable is a debt amount which has been measured as a continuous variable based on the amount of money borrowed by people. The same method has been used by Magri (2002) to capture the desired amount of debt by households. Debt has been taken in logarithmic form in order to reduce the large variations in the amount of debt and to avoid heteroscedasticity of residuals.

One of the demographic characteristics which are considered to be important is age. The population is generally divided into three groups according to the age namely children, young and senior citizen. Children of age 0–14 are considered to be economically unproductive as they depend on family or working population for physical care, education and medical care. In 2017, 32.1% of the population was under 15 years and 6.5% of the population was of age above 60 years. The rest 61.4% of the population was between 15 and 59 years (Government of Pakistan, 2017). The working population in South Asian countries is further classified into youth, young working age and mature working age consisting of age categories of 15–24, 25–49 and 50–59 years, respectively. Youth usually spends on education. Young workers consume most of what they earn but they also have small savings. The mature working age population earn and save more (Navaneetham & Dharmalingam, 2012). Senior citizens usually depend on others (family or government support) to meet their consumption needs.

Employment status had four major categories including employer, paid employee, self-employed and agricultural employment defined by Pakistan Bureau of Statistics. Employer category includes all employers employing less than or more than 10 employees in the non-agricultural sector. Self-employed and paid employees are also in the context of non-agricultural employment. Agricultural employment includes owner-cultivator, share-cropper, contract cultivator, earning through livestock or unpaid family worker. Another question was asked about the presence of earning persons other than household head and contributing to the household budget. The aim was to find out if the number of working family members contribute to an increase in household debts as active persons in a labour market can easily have greater access to debt. The variable is coded as 1 representing the presence of more than one person employed and 0 as an absence. The number of years of schooling was divided by five to monitor 5 years change in the education on the amount of debt. This will also make coefficients interpretable. Household size is based on a number of family members. Households having a greater number of children are supposed to pose more financial burden leading to increased debts. Gender and marital status were not included because the data were skewed to only one category. More than 90% of the population is married and are male. Household assets owned and household income has also been used to see their effect on household debt. Household income represents the total annual income from all sources. Households might take debt to purchase assets. The market value of household assets has been included in the analysis to examine their relationship with debt. They have also been taken in logarithmic form. The interaction between education and household income has also been tested because better income may be related to better education (Gregorio & Lee, 2002; Thurow, 1972). The interaction between more than 1 employed person and household income has also been tested.

Some of the characteristics for example household assets, household income, household size and household debt are household characteristics whereas education, age and marital status are individual characteristics. Since the household head is the individual who is recognised as head by the other members of the household as a main financial contributor, decision-maker or the eldest one, it is reasonable to take the data of household heads as a representative of household and use their information as individual characteristics. This definition has been adopted from Nenova, Niang, and Ahmad (2009).

Based on data obtained from HIES, the response rate to the question of household debt is low. Selection bias was avoided by not including those who have not stated the amount of borrowing in the study sample. Zero in the data of household debt represents the non-borrowing of any amount of debt and they do not distort the normal distribution of the variable. The source of debt includes both formal and informal.

As it has already been mentioned that HIES data have been collected through stratified sampling techniques where the interviewers were based on Primary Sampling Units (PSUs). Simply assuming that people living in same PSUs may have same characteristics can create wrong estimates leading to Type 1 error. Multilevel mixed effect models are a remedy for stratified design effects (Arpino & Aassve, 2014; Grilli & Rampichini, 2015; O'Loughlin, 2004). Multilevel models allow to derive information about random variations and model them (Stoker & Bowers, 2002). The mixed effect regressions give reliable information about age cohorts as it allows to take advantage of the multilevel structure of the data using repeated cross-sections. This technique also provides accurate information about the individual characteristics related to response variable (Yang, Schulhofer-Wohl, Fu, & Land, 2008).

Multilevel mixed effect linear regression has been used to see the effect of different characteristics on the amount of debt. Let  $n_{ijk}$  be the number of observations of households of Pakistan ( $i$ ) from province  $j$  and region  $k$ .  $X_{ijk}$  represents the set of predictors of household debt. Let,  $v_k$  represents the effect of province,  $u_{jk}$  represents the effect of PSUs within a province and  $\epsilon_{ijk}$  is the error term of the model.  $\beta$  is overall random intercept at national level and  $y_{ijk}$  represents the amount of debt.

Traditionally,

$$i = 1, \dots, n_{jk}$$

$$j = 1, \dots, J_k \text{ (total number of PSUs in the province } k)$$

$$k = 1, \dots, K \text{ (total number of provinces)}$$

Therefore the models used in this study are defined as

$$\ln y_{ijk} = \beta + v_k + u_{ijk} + \epsilon_{ijk} \quad \text{Model 1}$$

$$\ln y_{ijk} = \beta + \sum_{i=1}^n \beta_i X_{ijk} + v_k + u_{ijk} + \epsilon_{ijk} \quad \text{Model 2,3}$$

$$\ln y_{ijk} = \beta + \sum_{i=1}^n \beta_i X_{ijk} + \sum_{i=1}^n \beta_i X \times X_{ijk} + v_k + u_{ijk} + \epsilon_{ijk} \quad \text{Model 4}$$

Model 1 tests the random variations in the null model for household debt and investigates whether the single level model is preferred. After confirming that the use of multilevel modelling is appropriate, Model 2 includes only year dummies which show variations in the amount of household debt explained by year of the study. Age dummies along with other explanatory variables were included in Model 3 to explain the variation in household debt amongst different ages. Model 4 includes all explanatory variables along with interactions. Model 3–4 see the effect of different age groups on household debt. Through likelihood ratio test, we will decide final model.

Multilevel mixed effect linear regression helps to model the random variations in the data but it assumes higher level residuals to be homoscedastic (Bullen, Jones, & Duncan, 1997). This has been checked later after fitting the multilevel model and getting higher level residuals.

#### 4. Results

The sources of household debt include both formal and informal. The mean amount of household debt is around 0.1 million PKR. In the sample of 10,509, there are around 65% of the people who belong to the 25–49 age group. People belonging to the category of age 0–14 were only 0.001% so we dropped them as they are considered non-productive and also are legally ineligible to take debts. The mean size of household is seven members since Pakistan has a culture of living in form of extended families which is also reflected in the maximum number of households. Majority of the household heads are male and married due to which we will not include gender and marital status in the analysis in order to avoid biased estimates. Most the household heads are paid employee followed by agricultural employment. Around 55% of the households have earning-member other than household head to finance the household expenditures. The descriptive statistics of the sample are summarised in Table 1.

Model 1 represents the null model for the household debt. The likelihood ratio test shown in Table 2 shows that three-level model is preferred to single level model. There are around 12% variations present in the household debt at provincial level whereas around 16% random variations are present at PSU level. Most of the variations (around 73%) can be explained by the variables at the household level.

In Model 2, the trend of taking debt over time was significantly increased in every succeeding survey year as compared to 2001/2002. The results are evident in Table 3. Model 3 shows the main effect of all the independent variables included in the study. Results show that household debt is positively affected by household resources such as income and assets as these enable access to credit. Education also significantly and positively affects the amount of household debt. Household size also positively affects the amount of debt. Agricultural employment did not significantly affect the amount of debt whereas, with self-employment and paid employment, the amount of debt significantly decreases as compared to others. Households in the age category of 50–59 have significantly higher debt than 15–24 years of age.



**Table 1. Descriptive statistics**

| Variable                         | Mean      | Relative frequency                       | Standard deviation | Min | Max         |
|----------------------------------|-----------|--|--------------------|-----|-------------|
| Household debt (PKR)             | 100,160.3 |  | 259,538            | 100 | 8,700,000   |
| Age (years)                      |           | 0.001 (0–14)                             |                    |     |             |
|                                  |           | 0.045 (15–24)                            |                    |     |             |
|                                  |           | 0.656 (25–49)                            |                    |     |             |
|                                  |           | 0.185 (50–59)                            |                    |     |             |
|                                  |           | 0.113 (60 and above)                     |                    |     |             |
| Education (years of schooling)   | 7.867     |  | 3.648              | 0   | 23          |
| Employment status                |           | 0.110 (employer)                         |                    |     |             |
|                                  |           | 0.198 (self-employed)                    |                    |     |             |
|                                  |           | 0.483 (paid employee)                    |                    |     |             |
|                                  |           | 0.307 (agricultural employment)          |                    |     |             |
| Household size (No. of members)  | 7.167     |  | 3.27               | 1   | 47          |
| Household financial assets (PKR) | 986,786.8 |  | 2,932,106          | 400 | 115,000,000 |
| Household income (PKR)           | 176,367.9 |  | 255,901.2          | 50  | 10,500,000  |
| Marital status                   |           | 0.03 (never married)                     |                    |     |             |
|                                  |           | 0.92 (currently married)                 |                    |     |             |
|                                  |           | 0.04 (widow/widower)                     |                    |     |             |
|                                  |           | 0.002 (divorcee)                         |                    |     |             |
|                                  |           | 0.0006 (nikkah rukhsati not taken place) |                    |     |             |
| Gender                           |           | 0.05 (female)                            |                    |     |             |
|                                  |           | 0.95 (male)                              |                    |     |             |
| More than 1 employed             |           | 0.553 (yes)                              |                    |     |             |
|                                  |           | 0.446 (no)                               |                    |     |             |

An interaction between more than one person employed and income was introduced in order in Model 4 to see the effect of income on the amount of debt for those who are still active in the labour market. Model 4 also shows the interaction of education with income which is significant. Having better education and higher income significantly and positively affects the amount of debt. Having more working people in the household improves the prospects of earnings and thus interaction of more than 1 person employed with income significantly and positively affects the amount of debt. On the basis of likelihood ratio test, we select Model 3 as our final model. As mentioned earlier, multilevel mixed effect linear regression allows the residuals to be heteroscedastic and helps in the modelling of their variance but higher level residuals need to be homoscedastic. The residuals of the final selected model have also been checked at PSU level for heteroscedasticity. The caterpillar plot in Figure 2 shows that all the residuals plotted with their confidence intervals touch the red line. Their distribution shows that they are not heteroscedastic. Figure 3 contains normal quantile plot which shows that the higher level residuals are also normal. The multicollinearity was also checked between the independent variables through variance inflation factor. If the value of variance inflation factor (VIF) is higher than 10 then it is considered as indicative of harmful multicollinearity (Kennedy, 1992, p. 183). Table 4 shows that VIF of independent variables is not greater than 10. The mean VIF is also not very high which indicates that the absence of multicollinearity. Hence the model fulfils all the assumptions of constant variance and normal independent residuals.

**Table 2. Multilevel model three level vs. single level**

| Parameter       | Model 1 (Three level) |                |                                     |   |
|-----------------|-----------------------|----------------|-------------------------------------|---|
|                 | Variance estimate     | Standard error | Variance partition coefficient      | Intra-class correlation coefficient         |
| Intercept       | 10.525                | 0.034          |                                     |   |
| Province level  | 0.240                 | 0.003          | 0.115 (0.240/1.508 + 0.240 + 0.331) | 0.115 (0.240/1.508 + 0.240 + 0.331)         |
| PSU level       | 0.331                 | 0.020          | 0.159 (0.331/1.508 + 0.240 + 0.331) | 0.275 (0.240 + 0.331/1.508 + 0.240 + 0.331) |
| Household level | 1.508                 | 0.021          | 0.726 (1 - 0.115 - 0.159)           |   |
| Log-likelihood  | -23,737,537           |                |                                     |   |
| Deviance        | 677.178               |                |                                     |   |

Notes: Null model: Single level.  
 Null model log-likelihood: -24,076.126.

**Table 3. Investigation of factors affecting household debt through multilevel mixed effect linear regression**

| Variables                                | Model 2               | Model 3                | Model 4                |
|--|-----------------------|------------------------|------------------------|
| Age of head of household                 |                       |                        |                        |
| Age (25–49 years)                        |                       | 0.0784<br>(0.0535)     | 0.0731<br>(0.0534)     |
| Age (50–59 years)                        |                       | 0.144**<br>(0.0581)    | 0.135**<br>(0.0581)    |
| Age (above 60 years)                     |                       | 0.0862<br>(0.0625)     | 0.0821<br>(0.0625)     |
| Reference category: Age (15–24 years)    |                       |                        |                        |
| Household income (Ln)                    |                       | 0.344***<br>(0.0125)   | 0.332***<br>(0.0263)   |
| Household assets (Ln)                    |                       | 0.215***<br>(0.0107)   | 0.213***<br>(0.0107)   |
| Status of employment                     |                       |                        |                        |
| Self-employment                          |                       | -0.441***<br>(0.107)   | -0.441***<br>(0.107)   |
| Paid employee                            |                       | -0.700***<br>(0.106)   | -0.704***<br>(0.106)   |
| Agricultural employment                  |                       | -0.0559<br>(0.107)     | -0.0632<br>(0.107)     |
| Reference category: Others (Employer)    |                       |                        |                        |
| Household size                           |                       | 0.0333***<br>(0.00359) | 0.0330***<br>(0.00359) |
| Multiple employments                     |                       | -0.437<br>(0.0233)     | -0.531**<br>(0.233)    |
| Education (Edu/5)                        |                       | 0.500***<br>(0.0161)   | 0.609***<br>(0.162)    |
| Year of the study                        |                       |                        |                        |
| Year (2005/2006)                         | 0.0836***<br>(0.0420) | 0.0976**<br>(0.0421)   | 0.0872**<br>(0.0420)   |
| Year (2007/2008)                         | 0.144***<br>(0.0448)  | 0.0244***<br>(0.0431)  | 0.0410***<br>(0.0431)  |
| Year (2010/2011)                         | 0.700***<br>(0.0460)  | 0.141***<br>(0.0410)   | 0.158***<br>(0.0410)   |
| Year (2011/2012)                         | 0.708***<br>(0.0430)  | 0.230***<br>(0.0422)   | 0.249***<br>(0.0423)   |
| Year (2013/2014)                         | 1.059***<br>(0.0454)  | 0.268***<br>(0.0427)   | 0.289***<br>(0.0428)   |
| Reference category: Year (2001/2002)     |                       |                        |                        |
| Education× Household income              |                       |                        | 0.0604***<br>(0.0138)  |
| More than 1 employment× Household income |                       |                        | 0.0461**<br>(0.0201)   |
| Constant                                 | 9.996***<br>(0.0649)  | 1.460*<br>(0.808)      | 2.804***<br>(0.854)    |

**Table 3. (Continued)**

| Variables                            | Model 2        | Model 3        | Model 4    |
|--------------------------------------|----------------|----------------|------------|
| Random intercept variations          |                |                |            |
| Province level                       | 0.120          | 0.113          | 0.115      |
| PSU level                            | 0.294          | 0.183          | 0.183      |
| Household level                      | 1.464          | 1.180          | 1.178      |
| Variance partition coefficient (VPC) |                |                |            |
| Province level                       | 0.064          | 0.076          | 0.078      |
| PSU level                            | 0.156          | 0.124          | 0.123      |
| Household level                      | 0.780          | 0.800          | 0.799      |
| Likelihood ratio                     | -17,457.421*** | -16,159.795*** | -16,354.23 |
| Observations                         | 10,509         | 10,509         | 10,509     |

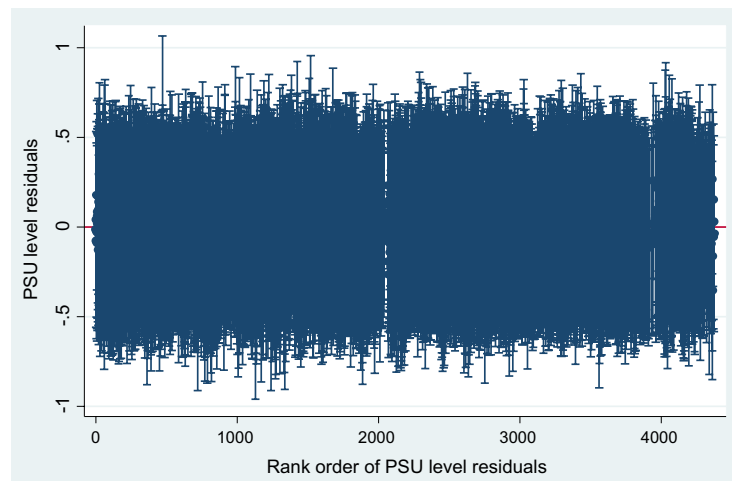
Notes: Dependent variable = Household debt. Standard errors are in parenthesis given under the estimate of each variable.

\* $p < 0.1$ .

\*\* $p < 0.05$ .

\*\*\* $p < 0.01$ .

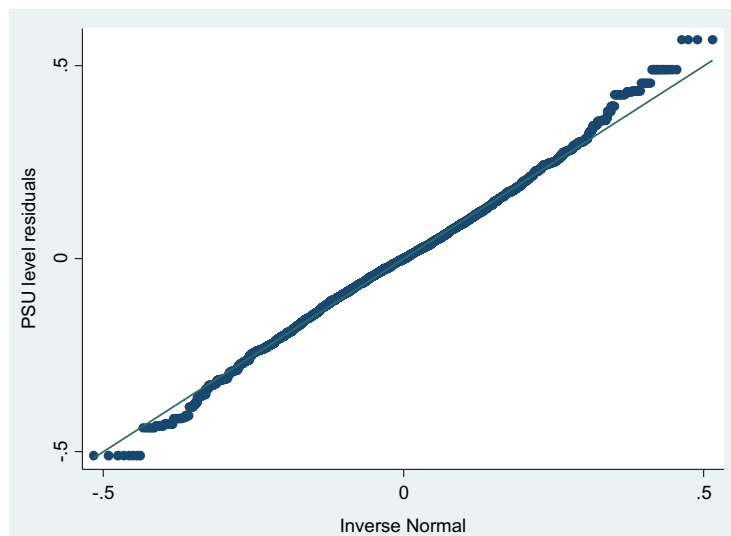
**Figure 2. Caterpillar plot of residuals at PSU level.**



Model 3 shows that households in the age category of 50–59 have 14% higher debt than those in the age of 15–24 whereas there is no significant difference in the debt of ages 25–49 and above 60 as compared to those in the age of 15–24. Households in the age category of 50–59 considered to be mature workers have higher debt compared with those under the age of 25 due to purchase of house, cars and investments. At an older age, people may not reduce their consumption, but at the same time, they may not feel the need for borrowings as they receive financial support from their children. Financial support for older people in the form of government pensions or welfare funds is minimal. Similar results were noted in another study on age cohorts for credit (Li & Goodman, 2015)

The amount of household debt is lower amongst those who are self-employed or are paid employees. We are examining a debt phobic society so when households have employment either self-employment or paid employment, their amount of debt decreases. The amount of debt is influenced by the number of employed persons in the household and its interaction with income is also significant. This means that having more than one working person in the household does not affect the relationship between income and debt; in fact, it may even increase the amount of household debt. However, the interaction between education and income is significantly positive as better education

**Figure 3. Normal quantile plot of residuals at PSU level.**



**Table 4. Variance inflation factors of independent variables**

| Variables                                 | Variance inflation factor |
|---|---------------------------|
| Age (25–49 years)                         | 2.36                      |
| Age (50–59 years)                         | 2.28                      |
| Age (above 60 years)                      | 2.24                      |
| Household income (Ln)                     | 2.11                      |
| Household assets (Ln)                     | 2.02                      |
| Self-employment against others            | 1.89                      |
| Paid employee against others              | 1.83                      |
| Agricultural employment against others    | 1.82                      |
| Household size                            | 1.79                      |
| More than 1 employment                    | 1.30                      |
| Education (Edu/5)                         | 1.26                      |
| Year (2005/2006)                          | 1.20                      |
| Year (2007/2008)                          | 1.15                      |
| Year (2010/2011)                          | 1.13                      |
| Year (2011/2012)                          | 1.48                      |
| Year (2013/2014)                          | 1.24                      |
| Education × Household income              | 2.17                      |
| More than 1 employment × Household income | 2.76                      |
| Mean VIF                                  | 1.78                      |

with higher income can assure higher sum of expected income and eligibility to a higher amount of debt for investment purposes.

### 5. Discussion

What motivates people to borrow? It is largely to increase consumption or to fulfil financial needs. Older people may borrow in order to fulfil their needs due to decreased income. Most of the debt is repaid when the person reaches old age. Table 3 shows that mean debt in old age does not vary greatly from the young. It signals that old people are borrowing to meet their basic consumption needs.

**Figure 4. Household debt and household income of different age categories.**

Note: x-axis: age categories where 1 = youth (15–24), 2 = young workers (25–49), 3 = mature workers (50–59), 4 = elderly (above 60). y-axis: average amount in PKR

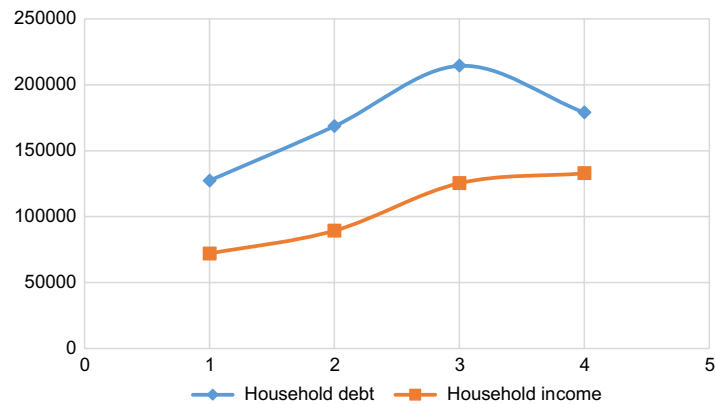


Figure 4 shows that the trend of income follows Modigliani's Life Cycle Income Hypothesis (Modigliani, 1986). The income and debt are highest in mature working age. The income and debt are lowest in youth followed by young working. People in older age have lower debt than mature workers because, until retirement age, they would have paid off most of the debts.

The point to ponder here is that people in old age still have outstanding debts.

Elderly people are generally satisfied with their with assets and wealth which is called ageing paradox or satisfaction paradox (Olson & Schober, 1993). It was also found that elderly people have fewer debts and are satisfied with their life (Hansen, Slagsvold, & Moum, 2008) In short, elderly people are more financially satisfied and they usually have less materialistic aspirations. They take fewer debts as discussed above. However, data show that debts increase with age, but at a decreasing rate. Hence, social safety nets are important and policy-makers must have in place a funding scheme which includes provident funds and insurance policies for older people. Household heads also feel financial stress from education, marriage, loss of a job or not having own house for living for which they may take loans.

## 6. Conclusions

This study was aimed at examining household debt across different ages and the relationship between different socioeconomic factors with household debt. Pakistan does not have a problem with regards to surging household debt; rather, efforts are being made to increase financial inclusion in the country. Household surveys have indicated that debt of older people was not significantly lower than the youth. It can be argued that the debt amount may reflect the decision to borrow in early age, but if that was true then they should have repaid most of their debts. The young are usually driven by materialism and are usually not satisfied with their financial state. In order to have something now which they will only buy in the future, people borrow. But older people are usually satisfied with what they have even if they are poor, known as the ageing paradox or satisfaction paradox. Results of this study also showed that those in the age group of 50–59 years have significantly higher debt than the young workers. Older people borrow out of needs rather than desire if they have to. Thus, social welfare nets which function as to make a support system for the poor otherwise they may get into trouble to repay.

This study also analysed the relationship between socioeconomic variables and debt. Findings indicated that self-employed and paid employees take significantly lower debt than the employers. It was also found that education, income, financial assets and household size positively affect debt. This study has contributed to existing literature by exploring risks faced by individuals in middle and old age. It has limitations though. The psychological aspect related debt taking and based on age cohorts was not examined and may be an interesting future research.

Pakistan has young age structure where 60% of the population is in 15–59 years (Government of Pakistan, 2017). This age group includes youth and young workers who contribute towards the economic growth of the country. In order to take advantage of this demographic dividend, they need education and training. Apart from other measures, the debt for education, start-up businesses and training should be provided on easy terms for youth. This will not only help to increase financial inclusion but will also increase economic growth. In addition, the debt products design should be such that mature workers should not be motivated to get over-indebted.

Like other developing countries, Pakistan does not have an efficient pension system covering everyone. People usually rely financially on the next generations to provide them for their expenditures. The retirement age of Pakistan is 60 years. A large proportion of the population has no pension provisions and thus they rely on their joint family/extended family for providing financial assistance (Jalal & Younis, 2014). As mentioned earlier, only 10% of the population currently has funds (United Nations, 2009). This study revealed that older people need support in the form of pensions, insurance or other measures so that they may not incur more debt in old age. The current scenario is not worse but increasing ageing population creates concerns.

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