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POLICY PAPER

Retirement Wealth Decumulation Patterns and Drivers in Middle-Income Households: Evidence from Ireland

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Abstract: This paper aims to identify patterns and drivers of asset decumulation for retired middle-income households in Ireland. The findings reveal that there is little change observed in housing wealth; however there is an increase in financial assets and a significant drawdown in vehicles and other real assets as households age. The effects of changes in long-term health status on households' asset holdings are relatively subdued, while marital status shocks result in a reduction of the probability of owning financial assets, vehicles, and other real assets. Overall, this study sheds light on the implications of these findings for retirement planning and policy.

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I INTRODUCTION

This paper focuses on asset decumulation patterns among retired middle-income households in Ireland. The decisions retirees make regarding asset decumulation can significantly impact their financial security and quality of life in retirement (Hulley *et al.*, 2013; Babbel and Merrill, 2006; Liu and James, 2021). The study aims to shed light on the patterns and drivers of asset decumulation, specifically focusing on housing assets, financial assets, vehicles, and other real assets, as households age. This study is underpinned by the behavioural life-cycle hypothesis (BLCH), which posits that individuals' financial decisions, including asset decumulation during retirement, are influenced by their life-cycle stages, attitudes and behaviours (Shefrin and Thaler, 1988). The study contributes to the literature on retirement asset decumulation (Coile and Milligan, 2009; Spicer *et al.*, 2016, Ventura and Horioka, 2020), focusing on Ireland's unique retirement landscape, and provides evidence-based recommendations for informed retirement planning and policy development.

Asset decumulation, the process of reducing or depleting accumulated wealth, holds significant implications for retired households. Ireland stands out among European Union countries for its high rate of homeownership, which exceeds the average substantially (CBI, 2022). This trend is particularly pronounced among current retired households, where over 85 per cent are homeowners with no or minimal mortgages. As of 2022, the Central Bank of Ireland estimated that housing assets accounted for €674 billion out of the net wealth of €1,025 billion for all households. Yet there is little evidence of supplementing retirement income from the deployment of housing equity, not only in Ireland but also in other jurisdictions, and the reasons vary from cultural barriers to the lack of suitable mechanisms available to do so (Ho *et al.*, 2022; Jaiyawala *et al.*, 2022).

Since retirees may have other accumulated assets to deploy in retirement, explaining the patterns and drivers of asset decumulation among the retired middle-income households with multiple asset-categories is therefore essential for informed retirement planning and policy development. The conventional life-cycle hypothesis (CLCH) posits that individuals gradually draw down their assets during retirement to smooth consumption across their lifetime (Modigliani and Brumberg, 1954). However, evidence from multiple studies (Lundberg *et al.*, 2003; Smith, 2006; Ameriks *et al.*, 2007) suggests that retirees often deviate from this model, retaining significant wealth late in life due to precautionary motives, bequest intentions, or psychological framing of assets such as housing. It remains unclear whether Irish middle-income retirees follow this conventional decumulation path, or whether their behaviour reflects behavioural and institutional factors. This study therefore investigates whether Irish middle-income retired households reduce their wealth holdings in line with the CLCH, or whether asset retention, selective drawdown, and responses to life shocks (such as health or marital status changes) indicate

alternative behavioural patterns. In line with this, we intend to address the following research question (RQ):

RQ: Do middle-income retired households in Ireland draw down their wealth in line with the traditional life-cycle hypothesis?

We utilise a quantitative analysis of four waves of the Irish Longitudinal Study on Ageing (TILDA) dataset. The TILDA dataset, a nationally representative longitudinal study of ageing in Ireland, offers a robust foundation for our analysis as it encompasses a wide range of socio-economic and health-related data.

Our analysis reveals intriguing insights into the decumulation of retirement assets among middle-income households in Ireland. Firstly, we find that housing wealth shows little change as households age, consistent with BLCH explanations. Moreover, we observe an increase in the ownership of financial assets with age, indicating a preference towards liquidity as retirees progress through their retirement years. On the other hand, vehicles and other real assets experience a significant drawdown with age, potentially due to changing mobility needs and preferences.

Furthermore, we investigate the impact of long-term health status and marital status shocks on households' asset holdings. Our findings indicate that changes in long-term health status have relatively subdued effects on asset decumulation. However, a marital status shock, such as a divorce or the death of a spouse, leads to a reduction in the probability of owning financial assets, vehicles, and other real assets. These findings highlight the influence of life events and transitions on asset decumulation patterns in retirement.

The next section provides an overview of empirical studies on decumulation along with the BLCH framework. This is followed by the data and methods used in this paper and subsequently we analyse the findings and discuss their implications. Finally, we summarise the paper's main conclusions.

II LITERATURE REVIEW

2.1 Behavioural Life-Cycle Hypothesis (BLCH) framework

The BLCH has evolved from the CLCH by recognising that households often deviate from consumption smoothing due to behavioural factors such as self-control, mental accounting, and framing (Shefrin and Thaler, 1988). Multiple empirical (experimental) studies have been conducted (Levin, 1998; Browning and Crossley, 2001; Gourinchas and Parker, 2002; Graham and Isaac, 2002) which tend to invalidate the thesis of the CLCH and uphold the BLCH. Further, empirical evidence suggests that individuals tend to consume more from current income and liquid assets first, followed by financial assets, and only later from housing wealth

(Levin, 1998; Laibson, 1998). These behavioural features imply that retirees may not fully decumulate assets in the manner predicted by the CLCH, particularly when housing wealth serves both as a financial asset and as shelter.

2.2 Empirical Studies on Decumulation

Studies of decumulation patterns started emerging at the turn of the millennium when the retirement population cohort began to increase, particularly with the retirement of the 'baby boomer' generation which was missing prior to 2000 (Liu and James, 2021). Webb (2009) argued that previous research lacked focus on the strategies employed by retirees to manage their decumulation of wealth. Post-2000, studies aimed to explain decumulation patterns using longitudinal data in countries such as the US, Canada, Europe, Australia and Japan.

In the US, Venti and Wise (2004), Coile and Milligan (2009), as well as Poterba *et al.* (2011) found that housing wealth is typically preserved until late life, with asset drawdowns primarily triggered by health or marital shocks. Smith *et al.* (2009) focus on US retirees born before 1947 and reveal that low and middle-income households experience asset drawdown in retirement, while high-income retirees maintain or accumulate assets passing them to the next generation. Nakajima and Telyukova (2013) conducted a similar study on US retirees as that of Venti and Wise (2004) and found that homeowners prefer to stay in their homes as long as possible but find it difficult to borrow against their home equity, leading to decumulation of non-housing assets to supplement consumption. Canadian evidence (Milligan, 2005) points to declining total assets during retirement, though liquid assets increase in relative importance.

European studies highlight that lower-income retirees decumulate faster than wealthier households (Dobrescu, 2015), and that financial literacy influences the ability to rebalance portfolios, leading to a shift from housing wealth to liquid assets (Romiti and Rossi, 2014). Studies from Australia highlight distinct wealth drawdown patterns. Hulley *et al.* (2013) find that poorer pensioners experience faster asset decumulation. Wu *et al.* (2015), analysing 10,000 retirees (2002–2010), report conservative use of financial and housing wealth, with bequests prioritised; the largest asset declines follow widowhood or relationship breakdown, consistent with Poterba *et al.* (2011). Spicer *et al.* (2016) further show that retirees shift toward safer portfolios with age, treating housing wealth differently from financial assets. Even households exhausting financial assets rarely liquidate housing wealth quickly, suggesting its special role in retirement. Studies from Japan also reveal slower decumulation than predicted by the CLCH.

Murata (2019) shows that retirees often preserve assets to leave bequests, with the pace of drawdown declining further with age. Precautionary saving plays only a limited role, except for households not expecting to bequeath. Similarly, Ventura and Horioka (2020) find Italian retirees display comparable patterns. Further, Nakajima and Telyukova (2013) find cross-country differences in decumulation

(using longitudinal data across 12 countries, such as the US, the UK, Sweden, Denmark, the Netherlands, Belgium, Germany, Austria, France, Spain, Italy, and Greece), with financial assets drawn down faster than housing wealth. This reflects retirees' cautious approach to liquid savings, while housing decisions are shaped more by health and bequest motives.

2.3 Synthesis and Research Gap

The international evidence on retirement wealth decumulation can be broadly understood through the lens of the BLCH, which predicts that retirees will draw more heavily on liquid assets while preserving illiquid ones such as housing. In conclusion, three broad insights emerge:

i. Housing wealth is generally preserved, while non-housing assets are drawn down first.
ii. Shocks to health and marital status are major triggers of decumulation.
iii. Heterogeneity by income, literacy, and culture explains divergent decumulation paths.

However, despite a growing international literature, evidence for Ireland is scarce. While studies across the world show strong behavioural influences on asset decumulation, little is known about whether Irish retirees follow similar or distinct patterns, particularly given Ireland's reliance on housing as a store of wealth and the relatively underdeveloped private pension system. Importantly, the BLCH suggests that retirees may prioritise accessible wealth while preserving illiquid assets such as housing, which could reinforce Ireland's unique reliance on property in retirement portfolios. This study addresses this gap by using TILDA data to examine the asset decumulation patterns of middle-income Irish households, identifying how health and marital shocks, income level, and asset type interact to shape decumulation behaviour in retirement.

III DATA

To study wealth decumulation patterns, we have used a longitudinal dataset stored confidentially in Trinity College Dublin (TCD) that includes households aged 50 or older and their partners. The dataset, known as TILDA, has been designed following best practices similar to international studies such as the HRS in the US (see Coile and Milligan, 2009), HILDA in Australia (see Spicer *et al.*, 2016), the ELSA in the UK (see Nakajima and Telyukova, 2013), and the JSTAR in Japan (see Murata, 2019). One limitation of the TILDA panel dataset is the exclusion of individuals in nursing homes, which affects wealth analysis, as retired households may retain assets to cover potential aged care costs. Public support for aged care is means-tested and capped, with limited private insurance options available.

The TILDA dataset consists of four waves of data collection conducted between 2009 and 2017. The first wave included data from approximately 8,500 individual participants, gradually declining to around 5,700 by the fourth wave. The survey includes detailed aspects, including health, economic and social characteristics; this study draws primarily on the economic module, covering income, assets, housing, education, marital and health status. The sample is restricted to households where one member (in single households) or both members (in couples) had retired, consistent with related international studies (Coile and Milligan, 2009; Spicer *et al.*, 2016).

The key variables used link to findings in previous decumulation studies (Venti and Wise, 2004; Coile and Milligan, 2009; Nakajima and Telyukova, 2013; Wu *et al.*, 2015) e.g. age, marital status changes, health shocks, housing equity, financial assets, other real assets, and vehicles. For the purpose of linear probability regression (LPR) analysis, these variables were transformed into binary and categorical variables to address conceptual and statistical considerations, (Cameron and Trivedi, 2013). The key variables align with previous decumulation research (Venti and Wise, 2004; Coile and Milligan, 2009; Wu *et al.*, 2015) and include age, marital status changes, health shocks, and asset categories (housing equity, financial assets, vehicles, and other real assets). To enable LPR, asset ownership variables were transformed into binary/categorical forms, consistent with econometric guidance (Cameron and Trivedi, 2013), such as investigating the likelihood of specific behaviours or addressing issues like heteroscedasticity and non-normality. This transformation helped in moderating challenges and comparing the results with previous research.

A sub-sample of middle-income retired households was identified using Wave 1 median household income by age group (±10 per cent), with outliers in assets and income removed via Z-tests. This ensured the focus remained on middle-income groups, avoiding skew from very high- or low-wealth households. Next, we describe patterns of wealth holdings (see Table 1) in middle-income households to drive our research focus. Middle-income retirees in Ireland are typically characterised by high levels of housing wealth, moderate levels of financial assets, and comparatively lower levels of vehicle and other assets. This composition suggests a potential mismatch between asset forms and retirement liquidity needs. The middle-income group is arguably asset-rich but cash-moderate, relying largely on illiquid housing wealth, in contrast to higher-income households who may maintain diversified portfolios or lower-income households, who may be more reliant on state support. Given policy interest in releasing housing wealth and lowering reliance on state transfers for old age, these patterns warrant a targeted investigation into their decumulation behaviour.

Median household income by age group from TILDA Wave 1 dataset was used to estimate the middle-income range during retirement, with a discretionary addition of a 10 per cent range to the median income. The common households between

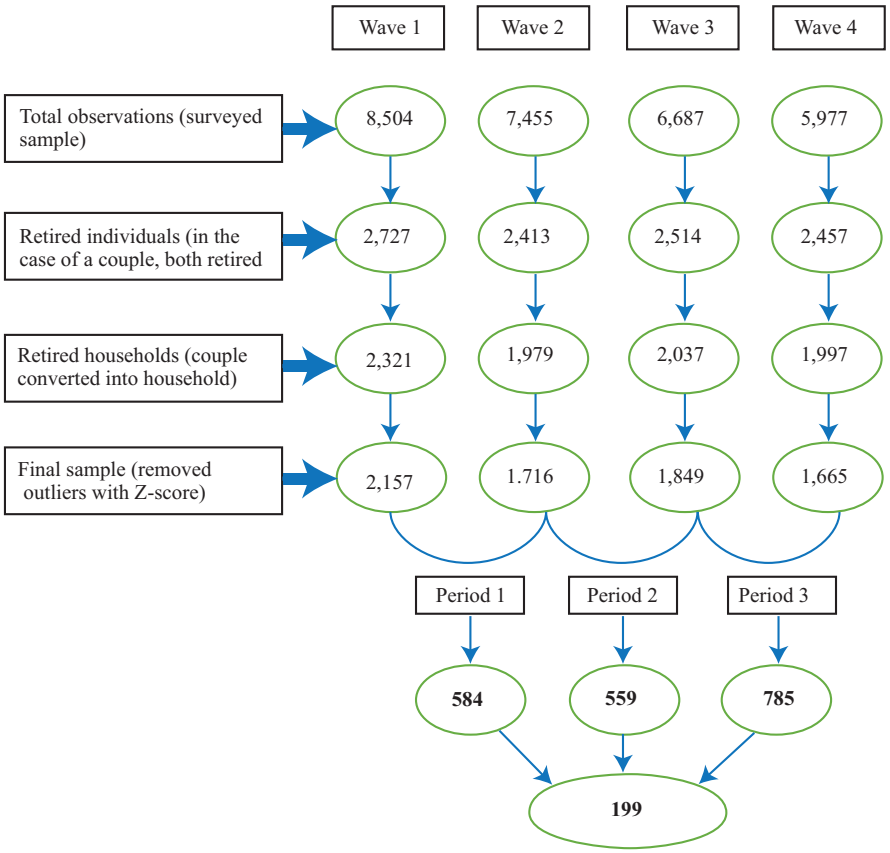
Table 1: Median Asset Holdings by Income Group at Retirement

Asset Type	*Lower Income (€)*	*Middle Income (€)*	*Higher Income (€)*
Housing equity	95,000	240,000	420,000
Financial assets	6,000	27,000	175,000
Vehicles	2,000	3,500	49,500
Other real assets	0	0	85,500
Total net assets	103,000	270,500	730,000

Source: Authors' calculations using TILDA Wave 1 data.
Note: These values are indicative medians from Wave 1 of TILDA, segmented by income cohort. Pension wealth is excluded due to limited data.

each wave and across all waves were sorted to identify the sub-sample for each period and panel data, as illustrated in Figure 1.

Figure 1: Data Sampling Flow



Source: Authors' calculations using TILDA Waves 1-4 panel data.

IV METHODS

The analysis is structured in two parts:

1. Descriptive analysis of asset decumulation patterns, and
2. Regression analysis to identify drivers of decumulation.

4.1 Descriptive Analysis

In line with previous literature (Coile and Milligan, 2009; Spicer *et al.*, 2016), the descriptive analysis focused on how household wealth evolves with age, specifically examining four types of net assets: net housing assets/equity, net financial assets, other real assets, and vehicles. The analysis categorised the total net assets based on different age-groups.[1] To leverage the panel nature of the dataset, only households present in all four waves (n=199*4=796) were included in this analysis.

4.2 Regression Analysis

As part of the second stage, a set of LPR equations were constructed and no specific hypotheses were formulated based on approaches used in previous studies (Coile and Milligan, 2009; Wu *et al.*, 2015; Spicer *et al.*, 2016; Ventura and Horioka, 2020). The analysis included households (1,571 unique) with at least two waves of data (n=4,159) to ensure multiple observations for each household.

OLS was chosen as the primary method in this study due to its simplicity and ease of interpretation. Although probit and logit methods are alternatives to OLS, they can be computationally intensive and may require larger sample sizes (Long and Freese, 2006; Wooldridge, 2010). Moreover, the results of probit and logit methods can be difficult to interpret and may not be easily generalisable to other populations or settings. We acknowledge the limitations of using OLS with binary or categorical dependent variables and conducted diagnostic tests to assess the model fit (Wooldridge, 2010). Diagnostic tests were conducted to detect potential issues such as multicollinearity and heteroscedasticity (Salkind, 2006; Bluman, 2013). The results were also cross verified using the probit method (Coile and Milligan, 2009; Spicer *et al.*, 2016).

We regressed asset holdings in various asset categories on age and other control variables based on the existing literature and the availability of relevant variables in the dataset. Control variables include household characteristics such as education, marital status, health status and location. There are two measurements of the dependent variable (asset holdings). The first way involves using a binary variable to indicate participation in each asset class, i.e. 1 is allocated for strictly positive holdings in a particular asset class and 0 otherwise. The second way in which it is

[1] TILDA dataset categorises the variable "age" into three groups of '50-64', '65-74', and '75 and above' to derive the variable "age group".

measured is by calculating the proportion of each asset class in the total assets of the household. In line with the approach used by Coile and Milligan (2009) and Spicer *et al.* (2016), these regressions were performed using three econometric specifications: (i) no fixed effects, (ii) cohort fixed effects, (iii) household fixed effects.

The preferred model specification was the one with household fixed effects because it controlled for time-invariant unobserved heterogeneity in unbalanced[2] panel data. By including multiple specifications, we assessed the sensitivity of the results to different assumptions and methods, which increase confidence in the robustness of the findings (Long and Freese, 2006).

For specification one, the following regression equation was formed:

$$Asset\ holdings_{jit} = \beta 0 + \beta 1 \text{age}_{it} + \beta 2 X_{it} + \gamma_i + \varepsilon_{it} \qquad 1(a)$$

Where:

$Asset\ holdings_{jit}$ = holdings in a particular asset class j by household i at time t
Age_{it} = Age of a household (i.e. oldest member)
X_i = Set of control variables
γ_i = Set of wave dummies

In specification two, we employed cohort dummies to separate the impact of ageing on the external macro environment. This approach assumes that individuals born in the same year share common experiences and characteristics that may influence their outcomes, but it does not control for all time-invariant heterogeneity across individuals or households. The following equation includes cohort dummies (C_k), and groups households by their respective birth year:

$$Asset\ holdings_{jit} = \beta 0 + \beta 1 \text{age}_{it} + \beta 2 X_{it} + \gamma_i + C_k + \varepsilon_{it} \qquad (1b)$$

Where C_k = Set of cohort dummies

The third specification incorporated household fixed effects α_i to better isolate the idiosyncratic characteristics of each household in the sample. In other words, this specification exploits the panel structure to estimate the effects of age on asset holdings. The following equation is formed for this purpose:

$$Asset\ holdings_{jit} = \beta 0 + \beta 1 \text{age}_{it} + \beta 2 X_{it} + \alpha_i + \varepsilon_{it} \qquad (1c)$$

Where α_i = Household dummies

[2] This analysis uses unbalanced panel data, which means that not all households are observed for each wave of the survey. In this study, households that appear in at least two waves are included.

We ran each of these equations eight times: for each of the four asset categories (i.e. housing equity, financial assets, other real assets, and vehicles) and for two measurements of asset holdings (i.e. positive asset holding and share of total assets in each category).

Further, in order to examine whether the effect of age on asset decumulation is nonlinear, we re-estimated the baseline regressions with a squared age term (Age^2) to capture potential nonlinearities in the relationship between age and asset holdings. Age was mean centred prior to squaring to reduce multicollinearity between the linear and squared terms. The following equation is formed for this purpose:

$$Asset\ holdings_{jit} = \beta 0 + \beta 1 \text{age}_{it} + \beta 2 \text{age}_{it}^2 + \beta 3 X_{it} + \alpha_i + \varepsilon_{it} \quad (2)$$

Where age_{it}^2 = Squared value of age

The analysis also examined the impact of marital and health shocks on asset holdings. Marital shocks were defined as events such as becoming widowed or divorced, which could significantly affect household financial decisions. Health shocks included experiencing a long-term illness, which could impact both healthcare expenses and the ability to accumulate and decumulate assets. Dummy variables representing marital and health shocks were included in a regression model with household fixed effects (most stringent specification) to analyse their effects on asset decumulation.

$$Asset\ holdings_{jit} = \beta 0 + \beta 1 \text{MSshock}_{it} + \beta 2 \text{Healthshock}_{it} + \beta 3 age_{it} + \alpha_i + \gamma_i + \varepsilon_{it} \quad (3)$$

Here, marital shocks equal 1 if widowhood/divorce occurred in period *t* or earlier, and health shocks equal 1 if long-term illness occurred in period *t* or earlier.

V FINDINGS

5.1 Findings from Descriptive Statistics

Table 2 illustrates the changes in retirement asset holdings among different age groups (50-64, 65-74, 75 and older) based on four waves (between 2009 and 2017) of TILDA dataset, and was constructed using information from 199 households that had data in all four waves (i.e. 199*4=796). The table presents the percentage of households with positive asset holdings for each asset class (housing equity, financial assets, other real assets, and vehicles), the median value of each asset class, and the percentage share of each asset class within the total asset holdings.

Table 2: Households Assets by Age-Group (Panel Data, n=796)

Asset Class	*Wave 1 (2009-2011)*			*Wave 2 (2012-2013)*			*Wave 3 (2014-2015)*			*Wave 4 (2016-2017)*		
% With positive asset holdings	*<65*	*66-74*	*>75*	*<65*	*66-74*	*>75*	*<65*	*66-74*	*>75*	*<65*	*66-74*	*>75*
Housing equity	95%	87%	94%	95%	89%	92%	95%	88%	94%	95%	89%	94%
Financial assets	80%	77%	82%	88%	91%	92%	93%	93%	97%	85%	90%	92%
Other real assets	25%	10%	12%	20%	10%	10%	13%	08%	08%	13%	10%	06%
Vehicles	63%	64%	60%	78%	68%	65%	78%	69%	60%	78%	70%	53%
Median Value (€)												
Housing equity	250,000	200,000	300,000	200,000	180,000	255,000	200,000	185,000	275,000	210,000	200,000	300,000
Financial assets	30,000	20,000	25,000	27,451	20,300	20,000	42,500	20,000	25,500	35,000	20,000	22,500
Other real assets	0	0	0	0	0	0	0	0	0	0	0	0
Vehicles	2,500	2,000	1,000	4,000	2,000	1,000	5,500	2,750	1,100	5,000	4,000	750
% Share of holdings in assets												
Housing equity	66%	70%	77%	67%	72%	76%	68%	72%	76%	69%	80%	77%
Financial assets	20%	21%	19%	22%	21%	20%	23%	22%	21%	22%	14%	18%
Other real assets	10%	05%	02%	07%	03%	03%	04%	02%	01%	04%	03%	03%
Vehicles	04%	04%	02%	04%	04%	01%	05%	04%	02%	05%	03%	02%

Source: Authors' descriptive analysis using TILDA Waves 1-4 panel data.

The top panel in Table 2 reveals that housing equity is the most common type of asset class across all age groups, with a minimum of 87 per cent of households holding positive assets in this category throughout the waves. Financial assets are also commonly held across all age groups and waves, with a minimum of 77 per cent of households having positive holdings in this asset class in all waves, except for individuals aged 75 and above in Wave 1. Notably, the highest percentage of households with positive financial asset holdings is observed among those aged 75 and above in Wave 3, reaching 97 per cent.

In contrast to housing equity and financial assets, other real assets and vehicles are less frequently held by households across all age groups and waves. The percentage of households with positive holdings in other real assets varies from 6 per cent to 25 per cent. Similarly, the percentage of households with positive holdings in vehicles ranges from 53 per cent to 78 per cent. These findings indicate that other real assets and vehicles are not as commonly held as housing equity and financial assets across the age groups and waves analysed.

Furthermore, analysing the data reveals interesting patterns in the percentage holdings of different asset classes across age groups and waves over time. Housing equity holdings show relatively stable levels, with only small variations observed across age groups and waves. The percentage of households with positive holdings in financial assets, on the other hand, exhibits an increasing trend across all age groups over time. In contrast, the percentage of households with positive holdings in other real assets experiences a decline across all age groups over time. The percentage of households with positive holdings in vehicles presents mixed results. While there is a decrease in the first two age groups, the most substantial decline is observed among individuals aged 75 and above. These findings highlight the varying dynamics and trends in asset holdings across different age groups and waves, with housing equity remaining stable, financial assets increasing, and other real assets and vehicles displaying more fluctuation.

The remaining two panels in Table 2 provide additional information on the median value of assets and the percentage share of total assets within each asset class. It is evident that housing equity consistently represents the largest proportion of total assets across all age groups, ranging from 66 per cent to 80 per cent. Financial assets occupy the second-largest share, ranging from 14 per cent to 23 per cent. On the other hand, other real assets and vehicles constitute smaller shares of total assets. For residential property, the median value remains relatively stable over time, while the median value for financial assets experiences a slight increase from Wave 1 to Wave 3, followed by a slight drop in Wave 4.

5.2 Findings from Linear Probability Regression (LPR) Analysis

Table 3 exhibits the results of the three regression specifications of the first equation. In this part of the study, the primary focus is on the age evolution of portfolios.

Table 3: Effect of Age on Asset Holdings by Class (n= 4,159)

Asset Class		*Mean (proportion of households)*	*with wave dummies (Specification one)*	*with cohort dummies (Specification two)*	*with household fixed effects (Specification three)*
Positive asset holdings					
Housing assets	Beta[std. error]	0.889	0.000	–0.011*	0.000
			[0.001]	[0.006]	[0.000]
Financial assets	Beta[std. error]	0.829	0.001	0.006	0.004***
			[0.001]	[0.008]	[0.001]
Other real assets	Beta[std. error]	0.104	–0.003***	–0.002	–0.002**
			[0.001]	[0.006]	[0.001]
Vehicles	Beta[std. error]	0.658	–0.008***	–0.005	0.002**
			[0.001]	[0.009]	[0.001]
Share of holdings in the asset class					
Housing assets	Beta[std. error]	0.702	0.004***	–0.004	–0.003
			[0.001]	[0.008]	[0.002]
Financial assets	Beta[std. error]	0.192	–0.001	0.004	0.002
			[0.001]	[0.009]	[0.002]
Other real assets	Beta[std. error]	0.035	–0.001***	0.000	0.001
			[0.000]	[0.003]	–[0.001]
Vehicles	Beta[std. error]	0.037	0.000	0.000	0.001
			[0.000]	[0.004]	[0.001]

Source: Authors' econometric analysis using TILDA Waves 1-4 panel data.
Notes: We regressed asset holdings (an indicator for a positive holding in a particular asset class and share of holdings in asset class) on age (age of oldest household member) and other control variables using the three specifications: with wave dummies, with a wave and cohort fixed effects, and with household fixed effects. (1) Coefficient reported is for linear age. Standard errors appear in parentheses. (2) Statistical significance at the 10 per cent, 5 per cent, and 1 per cent levels is indicated by one, two, or three asterisks, respectively. (3) The sample includes unbalanced panel data of 1,571 households that appear in at least two waves (i.e. period 1 or period 2 or period 3 making n=4,159).

Table 3 presents the findings of three regression models that examine the impact of age on asset holdings using a dataset consisting of 4,159 observations from 1,571 unique households. The table displays the mean values, represented as proportions of households, for four asset classes: housing assets, financial assets, other real assets, and vehicles.

We utilise household fixed effects in the third specification, effectively controlling for all time-invariant differences between households. In contrast,

specifications one and two only incorporate wave dummies or wave and cohort dummies, respectively. As a result, specification three is expected to provide more reliable estimates regarding the relationship between age and asset holdings compared to specifications one and two.

The results of the analysis regarding positive asset holdings with a linear age term are as follows. In specification one and three, the coefficient (0.000) for net housing assets indicates that retired households do not experience decumulation of housing equity. However, specification two reveals a marginal reduction of net housing assets with a coefficient of –0.011 and moderate statistical significance. For financial assets, the coefficient (0.001) in the first specification implies that the probability of owning financial assets increases by 0.10 percentage points with each additional year of household age. This effect is even more pronounced in the household fixed effects specification, where the probability of owning financial assets increases by 0.40 percentage points with a high statistical significance level. These findings indicate that households tend to accumulate more financial wealth as they age.

For the other real assets category, the coefficient (–0.003) indicates a decline in the probability of ownership by 0.30 percentage points with each additional year of age. Similarly, for vehicles, the coefficient (–0.008) suggests a decline in the probability of ownership by 0.80 percentage points with each year of age. These coefficients reflect a decreasing trend in the likelihood of owning other real assets and vehicles as households age. When considering cohort fixed effects and household fixed effects, the coefficients for both asset categories tend to be smaller, but statistically highly significant. In percentage terms, the coefficient for vehicles in the household fixed effects specification is the largest, implying a decline of 8 percentage points in ownership probability over a decade. Overall, these results suggest that the probability of owning other real assets and vehicles decreases as households age.

The second panel of Table 3 examines the impact of age on the proportion of assets held in each asset category by households, with an expectation that the proportion of assets increasing in one category will decrease the proportion in another category. The first specification indicates that as age increases, the proportion of assets invested in housing assets increases, while the proportion invested in financial assets and other real assets slightly decreases. The coefficients for housing assets and other real assets are highly significant, while those for financial assets and vehicles are not statistically significant. In the second and third specifications, which incorporate cohort and household fixed effects, none of the coefficients are significant.

To confirm the results, the probit method (refer to Appendix for detailed output) was also used, as previously stated in Methods section. The probit method produced similar results to OLS. For example, the coefficients from probit method for housing equity, financial asset, other real asset, and vehicles were 0.000, 0.005, –0.021, and

–0.024, respectively. Additionally, the first two coefficients did not have statistical significance, whereas the other two had a high level of statistical significance, which is again consistent with the results obtained through the OLS method.

Furthermore, in testing for nonlinear age effects, the household fixed effects specification was retained as the most robust specification (Wooldridge, 2005). Table 4 exhibits the results of the second equation with nonlinear age effects.

Table 4: Nonlinear Age Effects (Age and Age Squared) on Asset Holdings by Class (n= 4,159)

Asset Class		*Mean*	*Age*	*Age²*
Housing assets	Beta[std. error]	0.889	0.025***	–0.0003*
			[0.007]	[0.0002]
Financial assets	Beta[std. error]	0.829	0.018***	–0.0002**
			[0.004]	[0.0001]
Other real assets	Beta[std. error]	0.104	–0.006*	0.0001
			[0.002]	[0.0001]
Vehicles	Beta[std. error]	0.658	0.011***	–0.00014*
			[0.002]	[0.0001]

Source: Authors' econometric analysis using TILDA Waves 1-4 panel data.
Notes: Coefficients reported are for age and Age² to explain nonlinear age effects using household fixed effects. Standard errors appear in parentheses. Statistical significance at the 10 per cent, 5 per cent, and 1 per cent levels is indicated with one, two, or three asterisks, respectively.

Table 4 shows age has a positive effect on asset holdings for housing $\beta = 0.025$), financial assets ($\beta = 0.018$), and vehicles ($\beta = 0.011$). However, the negative and significant squared age coefficients for housing (–0.0003) and financial assets (–0.0002) indicate a concave relationship, suggesting a decelerating trend in this asset classes, consistent with the literature on wealth decumulation at older ages (Murata, 2019; Ventura and Horioka, 2020). Other real assets show a negative linear effect of age ($\beta = –0.006$, $p < 0.1$) with an insignificant squared term, suggesting a modest decline that stabilises rather than accelerates in later life. Vehicle ownership exhibits a similar nonlinearity: while age has a positive linear effect ($\beta = 0.011$), the negative squared coefficient (–0.00014) implies an inverted-U pattern, with ownership rising in midlife before tapering off in older age. These findings confirm that the dynamics of asset decumulation are indeed nonlinear and vary across asset classes. While housing and financial asset holdings display classic concave life-cycle trajectories, other assets may follow more nuanced paths, emphasising heterogeneity across asset classes.

Next, in order to examine the link between health and marital status shocks and changes in asset, we estimated the regression results based on Equation (2) which

are presented in Table 5. These regressions were also run only on the most robust specification (Wooldridge, 2005) which incorporates household fixed effects in order to manage unobserved heterogeneity. Marital shocks primarily refer to widowhood, while health shocks involve a deterioration in the long-term health condition of at least one household member.

Table 5: Effects of Marital and Health Shocks on Asset Holdings by Class (n= 4,159) With Household Fixed Effects

Asset Class		*Mean*	*Marital status shocks*	*Health shocks*
Positive asset holdings				
Housing assets	Beta [std. error]	0.889	0.001	–0.001
			[0.024]	[0.011]
Financial assets	Beta [std. error]	0.829	–0.044	–0.014
			[0.055]	[0.024]
Other real assets	Beta [std. error]	0.104	–0.051	0.040*
			[0.048]	–[0.021]
Vehicles	Beta [std. error]	0.658	–0.030	0.001
			[0.053]	[0.024]
Share of holdings in the asset class				
Housing assets	Beta[std. error]	0.702	0.032	0.007
			[0.042]	[0.019]
Financial assets	Beta[std. error]	0.192	–0.048	0.019
			[0.061]	[0.027]
Other real assets	Beta[std. error]	0.035	–0.001	–0.008
			[0.017]	[0.008]
Vehicles	Beta[std. error]	0.037	–0.004	0.006
			[0.023]	[0.010]

Source: Authors' econometric analysis using TILDA Waves 1-4 panel data.
Notes: Coefficients reported are for dummy variables indicating the given marital status shock and/or health shock was suffered in any of the past waves. Standard errors appear in parentheses. Statistical significance at the 10 per cent, 5 per cent, and 1 per cent levels is indicated with one, two, or three asterisks, respectively.

The first column of the upper panel in Table 5 demonstrates that experiencing a marital status shock is associated with a significant decrease in the likelihood of owning financial assets, other real assets, or vehicles. However, it has little impact on the likelihood of owning housing assets. Specifically, households that experienced marital status shocks have coefficients of 0.001, –0.044, –0.051, and –0.03 for housing equity, financial assets, other real assets, and vehicles, respectively. This means they are 0.1 percentage points more likely to own housing

assets, but 4.4 percentage points less likely to own financial assets, 5.1 percentage points less likely to own other real assets, and 3 percentage points less likely to own vehicles. However, these effects are not statistically significant. Similar patterns are observed for the proportion of assets held in each category. Experiencing a health shock is associated with a decline in the likelihood of owning housing assets, financial assets, and other real assets, except for vehicles.

VI DISCUSSION

The findings from descriptive statistics revealed several patterns. Firstly, a high proportion of Irish households (ranging from 87 per cent to 95 per cent) has positive housing wealth or net housing equity across all age cohorts and waves. This proportion is higher compared to other countries like the US, Australia and the Netherlands. For example, Coile and Milligan (2009) in the US report these values to be in the range of 54 per cent to 82 per cent, where a higher proportion is noted for young households (50-65 age) and subsequently reducing for older households which exhibit a substantial drawdown of housing equity. Similarly, Spicer *et al.* (2016) also report a lower percentage of households in the range of 67 per cent to 78 per cent for positive housing wealth in Australia. Van Ooijen *et al.* (2015) report an even lower proportion of households with positive housing wealth at only about 55 per cent at the start of the retirement period and subsequently reducing to merely 30 per cent at the age of 85 and older in the Netherlands.

Housing wealth constitutes a significant portion of Irish households' net aggregate wealth, with median home values ranging from €180,000 to €300,000 across age cohorts. The share of housing equity in total wealth is also higher in Ireland (66 per cent to 80 per cent) compared to the US (37 per cent to 51 per cent) and Australia (42 per cent to 58 per cent) across all age cohorts. Unlike the US and the Netherlands, and similar to Australia, the proportion of households with positive housing equity does not decrease with age in Ireland. This could be attributed to cultural differences and the lack of suitable replacement options for housing equity release. In both Ireland and Australia, there seems to be a strong cultural emphasis on homeownership, with many individuals considering it a symbol of stability, security, and legacy for heirs. This may lead retirees in these countries to hold onto their housing assets rather than actively decumulating them.

The proportion of households with positive financial wealth ranges from 77 per cent to 97 per cent across age cohorts, similar to the US (Coile and Milligan, 2009) and Australia (Spicer *et al.*, 2016). Median values of financial assets range from €20,000 to €43,000. This is in line with the values reported in the literature (Fahey *et al.*, 2004; Staunton, 2015) globally. The share of financial assets in total wealth ranges from 14 per cent to 23 per cent, with a tendency to increase with age. This share of financial assets in Ireland is similar to those reported in the US (Coile

and Milligan, 2009), Australia (Spicer *et al.*, 2016), and Japan (Murata, 2019). Although financial wealth (median of €30,000) reported in the case of the Netherlands is similar to Ireland in absolute terms, it is significantly higher in percentage terms due to the lower share of housing wealth reported in the Netherlands. Unlike the US and other international studies, Irish retired households tend to decumulate their financial assets as they age. This difference may be attributed to retired households tending to decumulate their housing assets in other jurisdictions (Coile and Milligan, 2009; Spicer *et al.*, 2016), which can lead to the accumulation of financial or liquid assets.

Other real assets and vehicles constitute a smaller proportion (2 per cent to 10 per cent) of Irish household wealth and exhibit a significant drawdown with age both in terms of ownership of these assets and median values. These assets are less commonly owned and make up a smaller share of total assets in older age groups. This may be due to the limited use of these assets in retirement. The highest drawdown is observed in the category of other real assets as ownership rates are cut in half between the 50-65 age group and the >75 age group. The findings concerning other real assets and vehicles are in line with the prior literature (Coile and Milligan, 2009; Poterba *et al.*, 2011; Wu *et al.*, 2015; Spicer *et al.*, 2016), where households reduce both of these asset categories as they age.

Overall, Irish retired households exhibit a tendency to hold onto their homes and have a higher share of housing equity in their total wealth compared to international studies (e.g. Coile and Milligan, 2009; Ooijen *et al.*, 2015; Spicer *et al.*, 2016). The decumulation rate of housing equity in Ireland is nil which is in line with Spicer *et al.* (2016) but in contradiction to Coile and Milligan (2009) and Van Ooijen *et al.* (2015). Coile and Milligan (2009) observed a contrasting trend in the US, where retirees demonstrated a significant reduction in housing equity over time. Similarly, Van Ooijen *et al.* (2015) found evidence of decumulation of housing equity among Dutch retirees. Financial assets tend to be decumulated to a greater extent in Ireland, contradicting findings from other countries such as the US, Australia and Japan. This may be attributed to the lower housing equity withdrawal in Ireland. Lastly, the proportion of wealth in other real assets and vehicles as well as the decumulation rate of these asset categories are similar to the prior literature (Coile and Milligan, 2009; Poterba *et al*., 2011; Wu *et al.*, 2015; Spicer *et al.*, 2016) where these two asset categories are decumulated significantly. As pointed out earlier, these two asset categories may be the least useful during the retirement period. For example, disposing of vehicles during old age may be attributed to physical limitations to driving, the need to renew driving licenses, the high costs of insurance, and free travel passes on public transport for elderly.

It is important to note that the findings from descriptive analysis may be influenced by various factors such as age effects, cross-cohort differences, and survivorship bias. Regression analysis with cohort dummies and household fixed effects was conducted to address these issues. These regression models include the

specification of cohort dummies and household fixed effects that helps to eliminate the survivorship bias of wealthier samples.

6.1 Effect of Age on Wealth Decumulation

We examined the impact of age on wealth decumulation using LPR analysis on household asset holdings. The findings indicated that ageing does not affect the decumulation of residential properties. However, the probability of having positive values for vehicles and other real assets decreases significantly with age. These results align with a study on Australian retirees by Spicer *et al.* (2016).

Research from the US (e.g. Coile and Milligan, 2009; Smith *et al.*, 2009; Poterba *et al.*, 2011) suggests that retirees tend to hold proceeds from selling their primary residence in liquid forms such as cash and deposits. In countries like Australia and possibly Ireland, retirees are incentivised to retain their principal residence due to means-tested age pensions that exclude the family home.

The presence of a concave age-wealth relationship supports the view that asset decumulation is not linear through retirement. While some drawdown occurs in early retirement, households appear to moderate withdrawals later in life, possibly reflecting precautionary motives, uncertainty over longevity, or bequest intentions. This finding provides further behavioural evidence in support of the BLCH, which posits that psychological and institutional factors can temper the smooth consumption paths predicted by the CLCH.

In summary, the findings support previous Australian studies such as Wu *et al.* (2015) and Spicer *et al.* (2016) but contradict research conducted in the US by Coile and Milligan (2009), Smith *et al.* (2009), and Poterba *et al.* (2011) regarding the relationship between age and wealth decumulation.

6.2 Effect of Health and Marital Shocks on Wealth Decumulation

To examine the effect of health shocks, we conducted an analysis focusing on households where at least one member reported a decline in long-term health between consecutive waves. The analysis, using household fixed effects as the preferred specification, found no statistically significant effect of health status on asset decumulation, except for a significant negative effect on other real assets. Although housing and financial assets were negatively affected by long-term health conditions, the results were not statistically significant enough to draw conclusions about decumulation of these assets.

One notable feature of these findings is the limited number of significant relationships between deteriorating health and asset decumulation. This aligns with the findings of Spicer *et al.* (2016), indicating a lack of statistically significant evidence regarding the material effect of health shocks on most asset categories, including housing equity. However, there are exceptions, such as Milligan (2005), where housing equity is significantly decumulated due to changes in long-term health status. This may be attributed to the availability of generous medical facilities

and care for the elderly, which could discourage the decumulation of residential assets. Similar results are observed in the case of the Dutch elderly (Van Ooijen *et al.*, 2015) due to similar generous medical benefits provided in the Netherlands as well.

We also examined the effects of changes in marital status, such as divorce or widowhood, on wealth withdrawal. The regression analysis does not find any significant evidence of marital status shocks affecting the withdrawal of housing equity, contradicting the findings of Coile and Milligan (2009) regarding residential wealth decumulation due to widowhood. Similar results were found for Dutch retirees (Van Ooijen *et al.*, 2015). Marital status shocks do reduce the probability of owning financial and other real assets and owning vehicles albeit the results are not statistically significant. Since the rate of divorces in Ireland may be significantly less compared to some other countries such as the US (Raley and Sweeney, 2020), this may have a bearing on the findings from TILDA dataset and its interpretation in a comparative context.

The results highlight the limited exposure to investment risk, less generous public pension provisions in proportion to GDP, and limited spending on health costs among the retired cohorts surveyed in the four waves of TILDA dataset. While aged care costs can be high, out-of-pocket spending on other health services for the retired cohort in Ireland is typically low compared to international standards. The regression analysis reveals significant disparities in decumulation patterns across households and over time, depending on the asset category. Middle-income households either modestly increased their wealth or maintained it during all three periods analysed (from Wave 1 to 2, from Wave 2 to 3, and from Wave 3 to 4). Since the swings in financial and housing asset prices over the period of the four waves were exceptionally large, the responses of households from this sample have to be viewed with caution.

A notable contrast between Irish and US retired households is observed in the effects of health status changes. Deteriorating health leads to decumulation for US retirees but not for Irish retirees. While deteriorating health can influence the asset holdings of retired households, changes in health status seem to explain little about wealth levels, decumulation patterns, or portfolio choices in the TILDA dataset sample. These findings are consistent with the Dutch study analysed by Van Ooijen *et al.* (2015) and the Australian study by Spicer *et al.* (2016). Irish retirees receive good medical coverage, similar to Australian retirees, and do not face additional substantial premiums unlike their US counterparts. In Ireland this is a manifestation of life community rating in the private health insurance market for those who join before age 35.

Overall, the results suggest that middle-income retired households either maintain their wealth or experience modest accumulation. The findings provide evidence in support of the BLCH as against the CLCH in this study, as Irish retirees primarily rely on retirement income for consumption and show limited utilisation

of vehicles and other real assets without tapping into financial or housing assets. The increasing uncertainty surrounding retirement span and consumption needs may explain the consumption patterns observed among elderly Irish individuals.

While this study offers valuable insights into asset decumulation patterns using the TILDA dataset, the limited availability of detailed income and expenditure data needs to be acknowledged. As such, we could not incorporate the full spectrum of non-wealth balance sheet items in the analysis. Future research could enhance this work by linking TILDA with administrative records or complementing it with datasets that provide richer economic variables to explore the interactions between income, consumption, and wealth decumulation more comprehensively.

VII CONCLUSION

One could surmise that Irish middle income retired households are broadly in a satisfactory asset position. Largely owning their houses, they are protected from rent inflation and interest rate volatility affecting mortgages. They have an asset which may be relevant to long term residential care under the Fair Deal Scheme. Housing wealth remains relatively stable as households grow older, potentially due to rent and tenure uncertainty. The ownership of financial assets increases with age, indicating a preference for more liquid assets in retirement. Vehicles and other real assets show a significant decrease with age, suggesting that households prioritise decumulating these assets as they age. Limited mobility and reduced usage of other real assets in later life may be contributing to this trend. Long-term health status has a relatively subdued effect on asset holdings, while marital status shocks reduce the probability of owning vehicles, financial and other real assets without impacting housing equity withdrawal. Overall, Irish middle-income retirees appear to favour asset preservation and rebalancing over systematic drawdown, suggesting divergence from the CLCH and alignment with the BLCH.

From a policy perspective, these insights highlight the importance of integrating housing equity as a fourth pension pillar, expanding financial literacy initiatives, and promoting flexible retirement income products to support more balanced decumulation. Moreover, such a policy development could help mitigate the potential rise in the pension expenditure-to-GDP ratio, which may occur if public and non-contributory pensions remain at their current levels.

At the same time, this study is limited to middle-income retirees, in line with its research focus. Future work could extend the analysis to lower-income and higher-income groups, where asset composition and drawdown behaviour may differ significantly. In addition, richer financial data on portfolio allocation and individual risk preferences could help test whether Irish retirees, like their international counterparts, shift toward safer portfolios with age. Such extensions would allow for a fuller understanding of heterogeneity in retirement wealth decumulation across the income distribution.

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Appendix: Effect of Age on Asset Holdings (1st Specification with Wave Dummies) – Probit Method

Table A.1 Housing Equity

Parameter Estimates										
Parameter	*B*	*Std. Error*	*95% Wald Confidence Interval*		*Hypothesis Test*			*Exp(B)*	*95% Wald Confidence Interval for Exp(B)*	
			Lower	*Upper*	*Wald Chi-Square*	*df*	*Sig.*		*Lower*	*Upper*
(Intercept)	1.799	.3269	1.158	2.439	30.279	1	.000	6.041	3.183	11.465
age	.000	.0043	–.008	.009	.009	1	.926	1.000	.992	1.009
Edu_dummy_S	.203	.0701	.065	.340	8.347	1	.004	1.224	1.067	1.405
Edu_dummy_T	.442	.0787	.287	.596	31.461	1	.000	1.555	1.333	1.815
MS_dummy_S	–.821	.0882	–.994	–.648	86.587	1	.000	.440	.370	.523
MS_dummy_D	–1.390	.0962	–1.579	–1.202	208.832	1	.000	.249	.206	.301
MS_dummy_W	–.535	.0816	–.695	–.375	43.015	1	.000	.586	.499	.687
LTI_dummy_Yes	–.216	.0786	–.370	–.061	7.518	1	.006	.806	.691	.940
LTI_dummy_Limited	–.192	.0695	–.329	–.056	7.657	1	.006	.825	.720	.945
Location_dummy_Othercity	–.166	.0748	–.312	–.019	4.904	1	.027	.847	.732	.981
Location_dummy_Rural	.038	.0769	–.113	.189	.247	1	.619	1.039	.894	1.208
WaveNo=2.0	–.038	.0810	–.197	.121	.221	1	.638	.963	.821	1.128
WaveNo=3.0	.045	.0825	–.116	.207	.302	1	.582	1.046	.890	1.230
WaveNo=4.0	.151	.0911	–.027	.330	2.766	1	.096	1.164	.973	1.391

Source: Authors' econometric analysis using TILDA Waves 1-4 panel data.

Table A.2 Financial Assets

Parameter Estimates

Parameter	*B*	*Std. Error*	*95% Wald Confidence Interval*		*Hypothesis Test*			*Exp(B)*	*95% Wald Confidence Interval for Exp(B)*	
			Lower	*Upper*	*Wald Chi-Square*	*df*	*Sig.*		*Lower*	*Upper*
(Intercept)	.321	.2729	–.214	.856	1.386	1	.239	1.379	.808	2.354
age	.005	.0037	–.002	.012	1.885	1	.170	1.005	.998	1.012
Edu_dummy_S	.270	.0585	.156	.385	21.364	1	.000	1.311	1.169	1.470
Edu_dummy_T	.470	.0650	.343	.598	52.430	1	.000	1.601	1.409	1.818
MS_dummy_S	–.178	.0734	–.322	–.034	5.878	1	.015	.837	.725	.966
MS_dummy_D	–.300	.0925	–.482	–.119	10.526	1	.001	.741	.618	.888
MS_dummy_W	–.155	.0612	–.274	–.035	6.388	1	.011	.857	.760	.966
LTI_dummy_Yes	.184	.0696	.047	.320	6.963	1	.008	1.201	1.048	1.377
LTI_dummy_Limited	–.091	.0572	–.204	.021	2.550	1	.110	.913	.816	1.021
Location_dummy_Othercity	–.135	.0658	–.264	–.006	4.237	1	.040	.873	.768	.994
Location_dummy_Rural	–.230	.0628	–.353	–.107	13.400	1	.000	.795	.703	.899
WaveNo=2.0	.412	.0645	.286	.539	40.914	1	.000	1.510	1.331	1.714
WaveNo=3.0	.658	.0696	.522	.795	89.487	1	.000	1.931	1.685	2.213
WaveNo=4.0	.628	.0745	.483	.774	71.219	1	.000	1.875	1.620	2.169

Source: Authors' econometric analysis using TILDA Waves 1-4 panel data.

Table A.3 Other Real Assets

Parameter Estimates										
Parameter	*B*	*Std. Error*	*95% Wald Confidence Interval*		*Hypothesis Test*			*Exp(B)*	*95% Wald Confidence Interval for Exp(B)*	
			Lower	*Upper*	*Wald Chi-Square*	*df*	*Sig.*		*Lower*	*Upper*
(Intercept)	–.018	.3072	–.620	.584	.003	1	.953	.982	.538	1.793
age	–.021	.0041	–.029	–.013	26.545	1	.000	.979	.971	.987
Edu_dummy_S	.109	.0717	–.031	.250	2.324	1	.127	1.115	.969	1.284
Edu_dummy_T	.407	.0694	.271	.543	34.304	1	.000	1.502	1.311	1.721
MS_dummy_S	–.141	.0806	–.299	.016	3.081	1	.079	.868	.741	1.017
MS_dummy_D	–.132	.1008	–.330	.066	1.716	1	.190	.876	.719	1.068
MS_dummy_W	–.276	.0706	–.414	–.137	15.245	1	.000	.759	.661	.872
LTI_dummy_Yes	–.002	.0695	–.138	.134	.001	1	.975	.998	.871	1.143
LTI_dummy_Limited	–.126	.0671	–.257	.006	3.504	1	.061	.882	.773	1.006
Location_dummy_Othercity	–.066	.0774	–.218	.085	.737	1	.391	.936	.804	1.089
Location_dummy_Rural	.478	.0676	.346	.611	49.986	1	.000	1.613	1.413	1.842
WaveNo=2.0	.127	.0752	–.021	.274	2.844	1	.092	1.135	.980	1.316
WaveNo=3.0	.034	.0778	–.119	.186	.186	1	.666	1.034	.888	1.204
WaveNo=4.0	.150	.0817	–.010	.310	3.362	1	.067	1.162	.990	1.363

Source: Authors' econometric analysis using TILDA Waves 1-4 panel data.

Table A.4 Vehicles

Parameter Estimates

Parameter	*B*	*Std. Error*	*95% Wald Confidence Interval*		*Hypothesis Test*			*Exp(B)*	*95% Wald Confidence Interval for Exp(B)*	
			Lower	*Upper*	*Wald Chi-Square*	*df*	*Sig.*		*Lower*	*Upper*
(Intercept)	2.018	.2366	1.554	2.481	72.749	1	.000	7.521	4.731	11.958
age	–.024	.0031	–.030	–.018	57.774	1	.000	.976	.970	.982
Edu_dummy_S	.477	.0507	.378	.576	88.512	1	.000	1.611	1.459	1.780
Edu_dummy_T	.867	.0561	.757	.977	239.071	1	.000	2.379	2.132	2.656
MS_dummy_S	–.651	.0631	–.775	–.527	106.290	1	.000	.522	.461	.590
MS_dummy_D	–.507	.0820	–.668	–.347	38.300	1	.000	.602	.513	.707
MS_dummy_W	–.470	.0528	–.573	–.366	79.105	1	.000	.625	.564	.693
LTI_dummy_Yes	–.090	.0580	–.204	.024	2.404	1	.121	.914	.816	1.024
LTI_dummy_Limited	–.216	.0504	–.315	–.117	18.329	1	.000	.806	.730	.890
Location_dummy_Othercity	–.203	.0550	–.311	–.095	13.592	1	.000	.816	.733	.909
Location_dummy_Rural	.054	.0542	–.053	.160	.982	1	.322	1.055	.949	1.173
WaveNo=2.0	.230	.0588	.114	.345	15.253	1	.000	1.258	1.121	1.412
WaveNo=3.0	.403	.0600	.285	.520	45.075	1	.000	1.496	1.330	1.682
WaveNo=4.0	.400	.0638	.275	.525	39.386	1	.000	1.492	1.317	1.691

Source: Authors' econometric analysis using TILDA Waves 1-4 panel data.