Life Cycle Savings in a High-Informality Setting

Evidence from Pakistan

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Abstract

The combined forces of population aging, weakening family and village risk-sharing networks, and low formal pension coverage will make financing elderly consumption a major challenge for the future. This study examines whether households in high-informality settings, where participation in pension schemes is rare, accumulate wealth over the life cycle and what mix of assets and liabilities composes that wealth. Pakistan is an ideal setting, with 88.5 percent of the population in informal employment and limited wide-scale social protection targeting the elderly. Data on housing wealth, land holdings, financial wealth, household durables, and owned businesses are assembled from eight rounds of representative household surveys that span 18 years (2001–18). Changes associated with age are disentangled from differences between cohorts and year effects by applying decomposition analysis. The average informal Pakistani household accumulates 4.2 years' worth of consumption between the head's ages of 25 and 65, mostly in the form of residential housing. Wealth accumulation is slower early in the life cycle and picks up speed between ages 40 and 65. Land is an important part of rural households' portfolio but grows little over the life cycle (10 months' worth). More liquid forms of wealth such as financial wealth also grow with age, but in much more modest amounts. Overall, consistent with improving living standards and expectations that family support may be less available than in the past, the fraction that reaches old age with significant net worth has increased over the period analyzed, suggesting a potential demand for long-term saving schemes designed for the informal sector.

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1. Introduction

In countries where formal pension schemes have wide coverage and guarantee high replacement ratios, individuals can rely on these programs to transfer consumption safely from their productive years to their retirement years. However, 61.2 percent of employed individuals around the world worked informally in 2019, without contributing to long-term saving schemes (Bonnet et al. 2019). They must therefore either save on their own while their income is high, as predicted by the life cycle hypothesis (Modgliani and Brumberg ,1954, 1979), or rely on transfers to consume in old age.

The consensus in the development literature has long been that life cycle saving is limited in developing countries, but this question should be reexamined considering major economic and demographic trends observed in recent decades. It is often assumed that individuals in developing countries work into old age and rely on children to support them in their unproductive years, reducing the needs for asset accumulation. However, three major socioeconomic trends could have strengthened longer-term saving in developing countries since that diagnostic was established. First, life expectancy (and thus the number of unproductive years to be covered) has increased significantly throughout the developing world. In Pakistan, the context of this study, it went from 60 years in 1990 to 67 in 2018 (World Bank, World Development Indicators 2018). Second, high fertility rates meant that the elderly could expect to rely on large cohorts of active individuals within their family and village networks for support in old age. While still relatively high compared to peer countries, the fertility rate in Pakistan has almost halved over the last thirty years, from 6.2 births per woman in 1990 to 3.5 in 2018, a trend that is common to many developing countries. Third, income growth is also correlated with higher saving rates (Loayza et a. 2000). Large increases in GDP per capita (USD371.7 in 1990 vs. USD1,284.7 in 2019 in Pakistan) could have also broadened the segments of the population that can afford to delay some consumption into the future.

To what extent these demographic and economic characteristics have impacted household asset accumulation over the life cycle remains an empirical question. Households may have more incentives to save but lack the saving technology (financial inclusion) or ability (commitment, need for liquidity) to safely put money aside for decades. Using Findex survey data, Demigurc-Kunt et al. (2016) report that in South Asia only 10-15 percent of individuals save for old age in their 50s. However, a larger fraction (32 percent in Pakistan) report saving more generally, and those savings may ultimately finance old age consumption, even if that is not the most urgent intended use. In addition, some components of household net worth such as housing may not be identified as savings by respondents, despite being indirectly consumed in old age in the form of saved rent payments and, while relatively illiquid, could be sold as a last resort.

This paper estimates patterns in household wealth accumulation over the life cycle in a lower-middle-income, high-informality context, using data from Pakistan, where 88.5 percent of employment was informal in 2017 (Bossavie et al, forthcoming). To identify the effect of age on household wealth, we apply the age-year-cohort decomposition techniques described in Deaton (1997) to the different components of household wealth, as well as household consumption and income, distinguishing households in rural versus urban areas and in different parts of the household consumption distribution.

One reason for the paucity of recent evidence on life cycle wealth accumulation in high-informality settings is the rarity of the repetitive, consistent, and representative microdata with reliable wealth variables needed to disentangle age, year and cohort effects. Most previous examinations of life cycle saving behavior have examined savings rates measured as the residual difference between income and consumption. For example, Deaton and Paxson (1994) examine the case of Taiwan, China, between 1975 and 1990, a country that was further along its demographic and economic transition to high-income status at the time than Pakistan is now. A smaller number of studies measure wealth and its changes with age directly (e.g. Lydall (1953), Shorrocks (1975), Wolf (1981) or more recently Cagetti (2003)) but focus on rich countries. We are not aware of low-income country descriptions of how the value and mix of assets owned by households evolves over the life cycle. Pakistan's PLSM survey is uniquely positioned to help empirically pin down the patterns in life cycle wealth accumulation, through the availability of repeated cross-sections spanning more than 18 years and detailed asset data that is homogenous over the survey rounds. This allows us to follow cohorts as they age and analyze most forms of savings (including housing, land, financial assets, business value, durables and liabilities).

We find that Pakistani households accumulate significant levels of wealth (relative to their consumption levels) and that most of that wealth is relatively illiquid. The average Pakistani household's net worth grows by 60 months' worth of consumption (5 years) between ages 25 and 65. The bulk of this increase in the form of residential housing, whereas other forms of wealth such as land, durables, business and farm values and financial assets stagnate over the life cycle. Asset accumulation is slower early in the life cycle and picks up speed between ages 40 and 65. This is corroborated by our findings on the age profiles of consumption, income, and the saving rate. Until age 40 consumption and income grow at identical rates, but consumption slows down relative to income thereafter, increasing the rate of saving. Land is an important part of rural households' portfolio but grows little over the life cycle (10 months' worth). More liquid forms of wealth such as financial wealth or durables also grow with age, but in much more modest amounts.

Consistently with the above, we find that accumulated assets are a significant source of subsistence for elderly Pakistanis, in the form of renting or selling land, equipment, animals as well as imputed rental income from living in one's own dwelling. Income extracted from assets represents roughly a third of household consumption in households that include an elderly member (labor income and transfers account for most of the remainder). However, labor force participation rates among elderly men are sizeable (39.1%) and very few elderly Pakistanis live alone or with their spouse. This indicates that asset accumulation is not sufficient to allow workers to retire or live on their own if they chose to do so.

Still, consistent with improving living standards and expectations that family support may be less available than in the past, the proportion of 65-year-old heads with more than 5 years' worth of consumption in net worth increased from 30% in 2001 to 50% in 2018. To the extent that pooling all wealth in housing is suboptimal, this pattern suggests a potential demand for long-term saving schemes designed for the informal sector.

2. Life cycle wealth accumulation in developing countries

Underlying this research is the life cycle hypothesis (LCH), originally proposed by Modgliani and Brumberg (1954, 1979), which posits that individuals will save and dissave to smooth consumption over their lifetime.[2] One recent approach, used in the Findex surveys, consists in asking households directly whether they save for old age. Demigurc-Kunt et al. (2016) show that in South Asia this fraction maxes out at around 10%-15% when individuals are in their 50s. However, larger fractions report saving more generally, and much of those savings may be multi-purpose, with old age consumption constituting a secondary, less urgent motive. Some components of household net worth such as housing may not be identified as savings by respondents, even though they are indirectly consumed in old age in the form of saved rent payments and, while relatively illiquid, could be sold as a last resort.

A much larger literature has taken a different approach and analyzed the main prediction of the LCH, which is that household consumption should be disconnected from income fluctuations (see Deaton, 1997, for a review). Comparing consumption and income over the life cycle, the literature finds that consumption generally tracks income more closely than would be implied by the theory (Carroll and Summers 1991, Attanasio and Davis 1996). Some studies have examined the extent to which liquidity constraints (Deaon, 1991), precautionary savings (Carroll, 1997), and cohort effects (Deaton and Paxson, 1994) can explain this puzzle.

When wealth is analyzed directly, households appear to save too little (Deaton, 1997) and concerns abound that households do not adequately prepare for retirement (e.g., Mitchell and Moore, 1998 for the U.S.). These findings prompted theoretical developments in behavioral economics aimed at capturing departures from rationality or time-consistency such as hyperbolic discounting (Laibson, 1997, Harris and Laibson, 2001). However, others have argued that properly modeling household consumption decisions (buffer stock behavior, end-of-life uncertainty, medical expenditures, asset-tested public transfers, family structure, etc.) can rationalize the saving behavior of American households (Scholz et al., 2006, Gourinchas and Parker, 2002).[3]

Most of the literature describing how household net worth changes with age (e.g. Lydall (1953), Shorrocks (1975), Wolf (1981) or more recently Cagetti (2003)) uses data from rich countries and we are not aware of low-income country descriptions of how the value and mix of assets owned by households evolve over the life cycle. An obvious reason is data scarcity. Such a description requires comprehensive data on household assets, but typical representative household surveys only ask about durable ownership and housing characteristics. Second, controlling for time and cohort effects requires repeated cross-sections spanning large periods of time, which are rarely available in low-income settings.

Here we are able to use detailed data from Pakistan to examine life cycle wealth accumulation, to understand trends in old-age savings and the changes in potential demand for long-term saving schemes.

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[2] Surveys of the literature on household saving decisions include Browning and Lusardi (1996) and Attanasio and Weber (2010).
[3] Another related puzzle is that households do not dissave enough in old age, compared to what the LCH would predict and that consumption tends to drop after retirement (Banks et al. 1998). The literature has attempted to quantify the role of possible explanations including bequests, asset illiquidity and longevity and health expenditure risk (e.g De Nardi et al. 2010, Poterba et al. 2011, Nakajima and Telyukova, 2016).

3. Data

3.1. The PSLM survey and the estimation sample

Our analysis is based on the data from the Pakistan Social And Living Standards Measurement (PSLM) Survey. It consists of eight irregularly spaced rounds (2001, 2005, 2007, 2010, 2011, 2013, 2015, and 2018) and contains individual-level data on various aspects including education, health, employment, as well as household-level data on assets, income, and expenditure. It has national coverage and despite changes to the survey structure over survey rounds, we obtain a consistent cross-section for the purpose of our analysis in each reported year.

Our population of interest includes all Pakistani households not in the formal sector. The relevant dimension of formality for our purposes is whether a household is participating in a formal pension program, but we do not have a direct measure of this in the survey. With informality around 88% of the labor force and public employment around 8% in the period covered by the survey, this leaves at most 4% of employment covered by private pension schemes, and possibly much less. In the absence of a direct measure of pension coverage, we keep all households where neither the head nor the spouse is working for the public sector in our sample.

Table 1 shows some characteristics of the households in the data: household heads are 46 years old on average; 28% of heads have primary education and 18% have secondary education; 66% of households are rural; and they earn and consume around PK20,000 (2011 PKR) on average.

Table 1 Summary statistics for the main variables

	N	Mean	sd	2001	2005	2007	2010	2011	2013	2015	2018
							Mean by survey round				
Age of the household head	141034	46.0	13.8	45.8	46.0	45.9	46.5	46.2	45.8	46.1	46.1
% household rural	141034	65.9%	-	71.8%	65.9%	66.5%	66.5%	66.1%	64.4%	64.1%	62.7%
% hh head with primary education	140918	27.9%	-	27.4%	27.0%	27.9%	28.0%	28.3%	28.1%	26.9%	29.5%
% hh head with secondary education	140918	18.4%	-	11.1%	17.5%	20.5%	20.6%	20.9%	20.4%	14.6%	20.9%
% hh head with tertiary education	140918	.	-	3.1%	6.9%	6.8%	6.7%	7.1%	6.9%	.	7.7%
Household consumption expenditure	139797	20136	15367	15636	19035	18989	19549	20219	21344	23224	22355
Household income	141034	21956	34734	14941	21806	22230	20684	22200	23205	24926	24954
Household wealth (multiples of monthly household consumption)											
Household net worth (excl. durables)	139797	72.6	118.5	60.2	72.3	82.0	68.2	74.4	72.6	74.2	75.7
Housing	139797	31.6	38.4	20.6	29.3	34.7	29.3	31.6	30.9	36.2	38.5
Land	139797	34.2	106.9	35.4	36.0	38.0	32.6	35.5	34.9	31.4	30.6
Durables	140918	1.4	2.8	1.5	1.8	1.8	1.4	1.5	1.4	.	1.9
Enterprise property (incl. livestock)	140918	5.2	19.4	4.6	5.8	6.5	4.7	5.3	5.1	4.9	5.0
Financial wealth (excl. loans)	139797	0.3	6.1	1.9	2.9	4.0	3.0	3.2	2.8	2.6	2.6
Loans	139797	1.4	2.8	2.4	1.6	1.2	1.4	1.2	1.2	0.9	1.0

Note: wealth variables winsorized at 1%. The value of household durables was not available in 2015. A change in education categorization makes 2015 data for tertiary education incomparable with other rounds.

3.2. Variables of interest

We extract the measures of household wealth, income and consumption listed below from the 2001-2018 rounds of the PSLM survey. They are inflated to 2011 Pakistani rupees and adjusted for regional differences by

the Paasche Index. All wealth measures are divided by household monthly consumption expenditures to obtain the number of months of consumption that the sale of an asset could sustain. Survey-based wealth measures are prone to measurement error and sensitive to outliers. Since our focus is not on the wealthiest households, we winsorize each component of wealth at the 99th percentile. We also report results on the 25th, 50th and 75th percentiles of household net worth and find that the mean and median behave similarly, which implies that outliers are not a major concern.

We construct the following household wealth variables:

- **Household net worth:** Includes all forms of household wealth included in the survey, and is a sum of housing wealth, land, financial wealth, the value of agricultural and non-agricultural businesses operated by the household. The value of household durables was not available in all years and is analyzed separately.
- **Housing**: Self-reported value of all residential buildings owned by the household, including the primary residence (if owned) and any other non-commercial buildings.
- **Land**: Self-reported value of agricultural and non-agricultural land owned by the household. In the module on agricultural activities, only the surface of agricultural land owned is reported by the household. However, a value per acre can be computed for each household from other owned agricultural land reported outside the agriculture module by dividing the declared value by the declared surface. The missing land values are then imputed using the product of the declared surface and the median acre value within each round, province and urban/rural sets of observations.
- **Durables**: Estimated resale value of durable goods owned by the household such as textiles, kitchen equipment, furniture, appliances, or vehicles.
- **Business value**: Resale value of equipment and property from agricultural and non-agricultural businesses owned by household members. This includes the expected value of animals (animals (cattle, buffalo, camels, sheep, goats, poultry, fish, etc.) owned by the household. However, the value of agricultural machinery was not elicited in the questionnaire and is therefore not included.
- **Financial wealth**: Includes net savings/deposits, gold/silver/jewelry, and securities. We consider loans separately and therefore exclude them from this measure.
- **Loans:** The outstanding value of loans owed by the household.

The other variables used in the analysis are:

- **Household consumption**: Consumption is calculated as the sum of household expenditures including food and nondurable goods purchased during the year, the value of home-produced goods and flow of services from the household's stock of durable goods and housing and services purchased by the household such as education or health care.
- **Permanent income quintiles:** To approximate permanent income, we consider per capita equivalent monthly household consumption. Rather than computing quintiles of the overall distribution of household consumption, we first split the sample into 5-year age bins before computing quintiles within each bin. This is motivated by the fact that the permanent income hypothesis predicts that household consumption can exhibit an age trend determined by the discount factor and interest rate, which implies that households will switch consumption quintiles over the life cycle if those are computed based on the overall population.
- **Household income:** The sum of income from household-managed activities including the following sources: (1) labor income, (2) remittances, (3) social safety programs, (4) income from agricultural assets

(rent/sale of land, equipment, animals), (5) income from non-agricultural assets (rent/sale of household's land, enterprise land and equipment, as well as imputed rental Income from living in own dwelling), (6) income from financial assets (including jewelry, insurance, providence and lending), as well as (7) transfers from pensions, sadqa, inheritance, and other sources.

- **Age of the household head:** Age of the self-reported head of the household.
- **Elderly:** Individuals aged 65 or above. When considering household wealth accumulated over the life cycle, we consider households where the head is between 60 and 65, which is the typical range of retirement ages offered by formal pension systems around the world (60 in Pakistan). It corresponds to the age range at which individuals are generally expected to switch from being a net saver to being a net dis-saver.
- **Education of the household head:** Schooling attainment of the self-reported household head. It is categorized into Primary (or less), Secondary, or Tertiary education.
- **Rural:** Whether the household resides in an urban or rural area.

4. Pension programs, private savings, and other economic resources in old age in Pakistan

4.1 Pension programs

Most of Pakistan's working population is not covered by formal contributory social protection programs. Estimates suggest that formal wage employment is only 14 percent of all employment, out of which 7 to 8 percent are in the public sector and are covered by a tax-funded scheme for government employees. The rest is composed of 23 percent informal wage employment, 47 percent self-employment and 15 percent unpaid work (Choo and Majoka, 2020).[4] Informality has not evolved significantly over time: it was around 87.5 percent in 2008 compared to 88.5 percent in 2017.[5] Informality is pervasive across the income distribution: 70 percent of jobs in the top income quintile are informal (HIES 2016). Additionally, more than 40 percent of informal jobs in the top quintile correspond to non-agricultural self-employment. On the lower end of the income distribution, informality is associated with lower productivity or poor working conditions.

The Employees' Old Age Benefits Institution (EOBI), at the federal level, provides age, disability and survivors pensions through a voluntary pension scheme to private sector employees on a self-registration basis. Only around 1.5 of 40 million workers were insured under the scheme in 2000 (Mahmood and Nasir, 2008). The Employees Social Security Institutions (ESSIs) at the provincial level provide health services (through Social Security Hospitals, medical centers and dispensaries) and some cash benefits to employees of registered establishments. Punjab's ESSI serves above 2.5 million patients every year and requires the employers to contribute 6 percent of the wages of their employees (having wages up to PKR 18,000).

While no non-contributory social pension exists in Pakistan, there are several well-established social protection programs to assist households in poverty. The main safety net program, run at the federal level, is an

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[4] The definition of informal employment used by the Pakistan Jobs Diagnostic is anyone without a formal employment contract. NOTE: The International Labor Organization (ILO, 2013) distinguishes between *the informal sector*, which refers to the formality of production units and is usually linked to firms' registration, and *informal jobs*, which refer to workers' type of employment.

[5] These findings are based on the Labor Force Surveys of 2008 and 2017.

unconditional cash transfer program called the Benazir Income Support Program (BISP). It targets women in means-tested households and aims to safeguard the minimum levels of consumption of the poor, without a specific emphasis on the elderly. Impact evaluations of the cash transfer program have provided evidence of positive impacts on consumption, investments in assets and changes in labor market activities, notably a reduction in dependence on casual labor.[6]

4.2 Private savings

While section 6 will attempt to characterize private wealth accumulation rates, Table 2 summarizes the levels and types of private wealth owned by different categories of Pakistani households. It distinguishes between urban versus rural households and along the distribution of household consumption. Note that consumption quintiles are computed for each survey round and for each age group (up to 25, 26-35, 36-45, 46-55, 56-65, and over 65 years old), rather than for the overall pooled sample. This implies for example that Q1 households are among the 20% poorest households in their age group (based on the age of the head) and in that survey round.

In 2018, rural households owned 31.8% more wealth than urban households on average, relative to their consumption (76.5 months versus 58.0 months). Both groups have experienced substantial growth in their net worth over the period (52.6% for urban households and 20.6% for rural households). Households in the fifth quintile of the consumption distribution owned almost twice as much wealth as households in the first quintile, relative to their consumption (93.6 months versus 49.8 months). Net worth growth between 2001 and 2018 was much faster in quintile 5 (+24%) relative to quintile 1 (+7.4%). All categories of households hold the bulk of their wealth in residential housing with no clear time trends. Rural households also hold significant amounts of land (around a third of their net worth). Residential wealth accounts for a larger percentage of the wealth of rural versus urban households (70.8% versus 56.6% in 2018) and of poorer versus richer households (Q1: 66.7% versus Q5: 54.5%).

Table 2 also shows a much higher saving rate for urban households relative to rural households and for the fifth quintile of consumption relative to the first. Note, however, that saving rates subtract logged household consumption from logged household incomes and that home production is accounted for in consumption but not in income. The value of what a smallholder farm household grows and consumes is therefore not counted as income but it is subtracted as part of consumption when computing the saving rate, which could explain the negative saving rates obtained for rural and lower quintile households.

- *Table 2 Household net worth by categories of households (as a multiple of household monthly consumption)*

	Average Net Worth					% Housing					% Land					Average saving rate (%)				
Year	Urban	Rural	Q1	Q3	Q5	Urban	Rural	Q1	Q3	Q5	Urban	Rural	Q1	Q3	Q5	Urban	Rural	Q1	Q3	Q5
2001	40.9	65.1	47.0	59.1	72.2	77.8	52.9	64.0	62.2	48.9	5.6	33.5	19.7	27.3	29.3	4.8	-24.2	-17.4	-18.1	-8.3
2005	58.8	76.1	49.6	62.3	99.3	75.2	55.2	68.0	60.7	59.4	5.7	31.8	17.9	24.2	25.5	10.6	-11.9	-7.8	-7.3	6.1
2007	68.7	85.6	57.6	73.6	111.1	69.9	53.8	62.6	59.3	53.6	5.4	27.9	17.2	20.7	24.0	10.6	-7.1	-6.4	-3.9	9.6
2010	56.6	69.7	43.5	59.2	99.6	63.6	54.9	66.3	59.8	46.7	5.6	26.8	13.5	19.7	26.9	5.0	-15.0	-15.9	11.3	-4.8
2011	61.6	76.7	46.3	69.9	104.1	72.4	59.4	70.9	62.1	56.2	4.5	25.9	12.4	19.0	23.4	6.8	-10.1	-10.2	-6.9	7.8
2013	56.6	80.5	51.4	66.5	98.7	67.5	56.6	64.4	62.3	53.3	5.4	27.8	14.9	20.2	24.7	4.9	-11.7	-11.1	-8.3	4.0
2015	58.8	79.9	52.9	76.3	95.3	71.8	57.7	67.3	61.6	59.3	4.2	26.7	14.8	21.4	19.9	3.9	-9.1	-8.6	-7.0	7.1
2018	62.4	78.5	50.5	70.2	90.0	68.3	62.1	70.1	64.7	58.9	5.4	24.4	14.4	18.8	17.6	7.4	-6.2	-5.4	-5.1	8.7

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[6] Oxford Policy management https://www.opml.co.uk/projects/evaluating-benazir-income-support-programme

Avg.	58.0	76.5	49.8	67.1	96.3	70.8	56.6	66.7	61.6	54.5	5.2	28.1	15.6	21.4	23.9	6.7	-11.9	10.3	-8.5	4.9

Note: Q1, Q3, and Q5 refer to the first, third, and fifth quintiles of per capita equivalent household consumption (see data section on the permanent income variable)

4.3 Means of subsistence for the elderly

Elderly Pakistani men and women currently resort to a variety of strategies to finance their consumption in old age, with labor force participation and co-residence among the main sources of support (Table 3). In 2018, only 5.6% of elderly men and women lived either by themselves or only with their spouse. This proportion has not changed significantly between 2001 and 2018. That is, most elderly individuals in Pakistan live with other family members whom they can presumably rely on for subsistence. Among households that include an elderly member, the main source of income is labor, equivalent to 31.2% of household consumption, followed by remittances (20.2%), and income from non-agricultural assets such as rent or sale of the household's land (18.7%). When combining income from all types of assets, they represent 34.6% of household consumption. Non-remittance transfers, which include any government transfers, account for less than 5% of household consumption.

Labor market income is also central: 39.1% of men keep participating in the labor force after age 65. This proportion exhibits a slight downward trend, from 40.2% in 2001 to 38.7% in 2018. In contrast, only 6.4% of elderly women worked in 2018, a slight decrease from 7.7% in 2001. Postponing retirement (understood as permanent exit from the labor market) can be a margin of adjustment to an increase in longevity and an increasing dependency ratio. However, the already high participation rate of elderly men and the fact that Pakistani women accumulate very little labor market experience imply that increasing elderly labor force participation further would yield low earnings and high disutility.

Table 3 Sources of income for households that include elderly members

	Labor force participation		Income sources of households with elderly members (% of hh consumption)						
Year	Elderly women (%)	Elderly men (%)	Labor income	Remittances	Safety nets	Agri. Assets	Non-agri. Assets	Fin. Assets	Other Transfers
2001	7.7	40.2	27.4	17.0	1.3	11.0	15.4	1.4	2.6
2005	8.0	41.9	37.5	23.1	0.8	12.4	19.9	0.6	1.8
2007	5.6	40.0	34.1	16.5	0.5	10.8	24.1	0.3	4.7
2010	4.9	37.6	28.6	18.7	0.6	8.1	16.0	0.5	4.9
2011	6.3	38.3	27.5	17.2	0.3	19.5	18.1	2.5	4.6
2013	5.9	37.1	31.0	21.4	0.7	5.3	16.3	1.2	6.0
2015	6.9	39.3	34.8	22.5	0.3	9.2	19.9	1.0	3.6
2018	6.4	38.7	29.0	25.3	0.8	9.2	20.0	3.4	5.2
Average	6.5	39.1	31.2	20.2	0.7	10.7	18.7	5.2	4.2

Perhaps in response to the demographic transition, we find that a growing proportion of households accumulate significant net worth over their life cycle. Table 4 shows that the levels of wealth among households headed by a 60–65-year-old have grown significantly over time: in 2018 the median net worth among this group was equivalent to 36.8 months (3 years) of household consumption. The 25th percentile of that distribution was 15.1 months (1.3 years) and the 75th percentile 74.6 months (6.2 years). This median wealth doubled relative to 2001, when it was 18.2 months (1.5 years). Therefore, a significant and growing fraction of the population, while

uncovered by formal pension schemes, reaches retirement with significant potential resources to partially maintain their levels of consumption in old age.

Overall, elderly Pakistanis are in fact less likely to live in a poor household, compared to non-elderly adults (Table 4). The ratio appears stable or to slightly go down over time, indicating that elderly Pakistanis have benefited from the reductions in poverty of the 2000s as much or perhaps more than the general population. This is also consistent with the fact that we documented earlier: wealth at age 60-65 has increased significantly over the period of our sample.

Table 4 Economic characteristics of elderly Pakistanis

	Household Net Worth (cons. Adjusted)									
Year	1st Quartile	Median	3rd Quartile	Elderly poverty ratio[1]	Co-residence rate[2]	Res. Wealth/net worth (%)[3]	Net worth > 6mo.(%)[4]	Net worth > 60mo.(%)[4]	Non-resid. wealth > 6mo.(%)[4]	Non-resid. wealth > 60mo.(%)[4]
2001	14.3	36.8	91.6	57.0	84.0	34.5	50.9	24.9	0.91	95.0
2005	20.7	51.4	111.7	67.6	91.9	45.1	56.9	27.4	0.91	92.8
2007	25.2	59.7	127.8	55.2	93.2	49.9	58.8	29.9	0.84	94.0
2010	17.9	46.8	105.4	54.9	87.9	42.4	53.4	24.2	0.82	94.3
2011	20.9	49.9	112.3	59.6	91.5	43.6	54.1	25.8	0.90	94.0
2013	22.5	55.3	118.9	57.9	90.9	47.2	55.0	27.2	0.77	95.1
2015	26.6	57.0	120.8	59.2	91.7	47.9	53.1	25.6	0.78	94.6
2018	24.5	61.6	120.6	60.8	91.4	50.8	53.5	24.1	0.84	95.0
Avg.	21.6	52.3	113.6	59.0	90.3	45.2	54.5	26.1	0.85	94.3

1. Elderly poverty rate: percentage of elderly Pakistanis living in households below the national poverty line over the percentage of households with non-elderly household head under the national poverty line.
2. Co-residence: percentage of elderly individuals living in type 1 and type 2 households.
3. Res. wealth/net worth: residential wealth as percentage of total wealth of households (average).
4. Net worth (or Non-resid. Wealth) > 6 (or 60) mo.: percentage of households that have net worth (or non-residential wealth) greater than 6 (or 60) months of the household's consumption needs.

5. Decomposition methodology

Our goal is now to measure how average household net worth evolves along the life cycle, but using a single cross-section of data (i.e. from one specific year) severely understates household net worth accumulation. To see this, Figure 1 plots household net worth, measured in multiples of monthly household consumption, against the age of the household head for the 2001, 2010 and 2018 PSLM survey rounds. Age profiles thus constructed appear to increase by around 1 month of consumption per year. However, this fails to consider that each cohort is wealthier than the next: the 2018 cross-sectional profile is shifted upwards by around 20 months of consumption relative to the 2001 profile.

Pooling multiple years of data allows us to follow each cohort as they age and measure the true rate of net worth accumulation. As an example, the three triangles in Figure 1 identify household heads born in 1960, whose net worth we observe at ages 41, 50 and 58. It appears clearly that when the 1960 cohort reaches age 58 (brown triangle), its average net worth is much higher than that of a 58 year-old in 2001. Therefore, the line that goes through the three data points corresponding to the 1960 cohort is much steeper than the cross-sectional profiles: over 20 years, the average net worth for that cohort increases by nearly 40 months of consumption. In other words, considering household net worth by age in a specific year significantly understates the rate at which households accumulate net worth over time. In the example from Figure 1, the rate would look two times slower.

Figure 1 Household net worth by age in 2001, 2010 and 2018
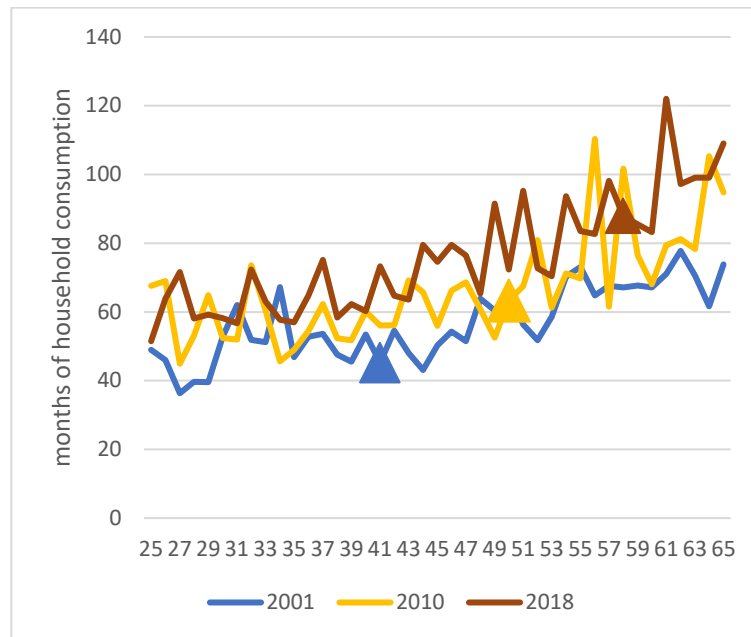
Note: triangles denote the average household net worth for the cohort born in 1960

To measure the rate of wealth accumulation experienced by households over their life cycle, net of differences across cohorts and years, we apply the decomposition methodology by Deaton (1997) after pooling 8 rounds of the PSLM spanning 18 years of data (2001-2018). For each of the variables of interest (measures of wealth, consumption, and income), we run a decomposition into age, cohort, and year effects. We estimate the following model using simple OLS regression, after applying cross-sectional sampling weights:

$$y = \beta + \alpha A + \gamma C + \delta Y^* + u, \qquad (1)$$

where A and C are matrices of age and cohort dummies, respectively, and Y^* is a matrix of year dummies with dummies defined as:

$$D_t^* = D_t - \big((t-1)D_2 - (t-2)D_1\big) \qquad (2)$$

In the above equation, D_t is the standard year dummy. We impose two conditions: (1) all year effects sum up to zero, and (2) year effects are orthogonal to a time-trend, which allows us to recover D_1^* and D_2^*. As in Deaton (1997), this implies that time trends are attributed to age and cohort effects. We take the first age dummy and the first cohort dummy as being equal to zero. The result section presents graphs of the estimated age coefficients α, which capture increments to the variable attributable to the aging of the household head, relative to household heads aged 25. In the decompositions, we restrict the sample to household heads aged between 25 and 65. Effectively, α in the above equation is a vector with each element corresponding to the isolated effect of each of the ages (between 25 and 65) on the decomposition's variable of interest.

It is important to recognize that assets are measured at the household level, but households do not have a well-defined "life cycle". Table 5 shows that most males between the ages of 40 and 64 are heads of the households they are part of. However, this rate drops when moving up the ages, reaching 28.6% between ages 25 and 29. Households headed by a younger individuals may be a selected sample with respect to saving behavior or initial net worth, making this type of household difficult to compare with those with older heads. Therefore, it is important to keep this source of selection bias in mind when interpreting the early segments of the life cycle profiles presented in this paper. Still, households with younger vs. older heads look similar on at least three dimensions: the gender of the head, the level of education of the head, and the fraction of households that are in rural areas (Table 5).

Table 5 Household characteristics over the life cycle

|	Age group								
	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
% males individuals who are hh head	28.6	53.6	74.2	86.3	92.0	92.5	91.9	87.2	69.0
% females individuals who are hh heads	3.2	6.0	8.4	9.5	10.1	8.8	8.5	7.8	6.8
% of hh heads in age range with secondary education or more	29.5	31.3	31.2	29.6	28.1	26.5	25.5	22.6	18.0
% of hh with heads in age range that are rural	70.0	67.8	64.6	62.9	62.3	61.8	62.5	65.4	69.3

6. Life cycle wealth accumulation

6.1 Decomposition of average household life cycle wealth and saving profiles

Before examining wealth measures directly, we examine the life cycle profile of saving rates extracted as the residual difference between age effects in income and consumption. Equation (1) is estimated with the logarithm of household income and of household consumption as dependent variables. The difference between the two sets of coefficients on the age dummy variables captures the saving rate increments associated with increasing age by one year.

Figure 2 shows that household income starts outpacing household consumption in the early 40s, allowing the household saving rate to grow by 20 percentage points by age 55. In the 20s and 30s, income and consumption

grow at the same rate, which implies that the saving rate is constant through that age range. The profiles we obtain are very similar to those measured using Taiwanese data in Deaton and Paxson (1994). They also show that the acceleration of saving after age 40 could be attributed to children exiting the household around that time, which is also a plausible explanation here.

Figure 2 Age effects in income, consumption and saving rates
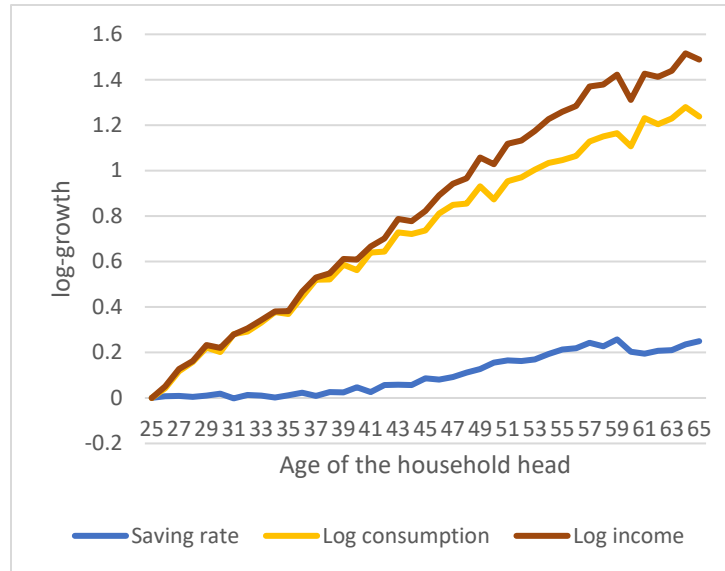
Turning to decompositions of direct measures of wealth, we find that households, on average, accumulate an amount of net worth equivalent to around 4.2 years' (50 months') worth of consumption between the ages of 25 and 65 (Figure 3). The plot shows the additional average household net worth relative to age 25. The accumulation is gradual, but it accelerates significantly in the second part of the life cycle. The slope of the household net worth curve in Figure 2 is 1.5 times steeper between ages 45 - 65 compared to 25-45: net worth increases by 20 months on average between ages 25 and 45, or 1 month per year and by 30 months between ages 45 and 65, or 1.5 months per year. The median behaves similarly to the mean, suggesting that outliers are not a concern. The percentiles 25 and 75 accumulate twice as slow and twice as fast, respectively.

Figure 3 Increase of household net worth over the life cycle

a) Age effects: household net worth

b) Age effects: wealth subcomponents
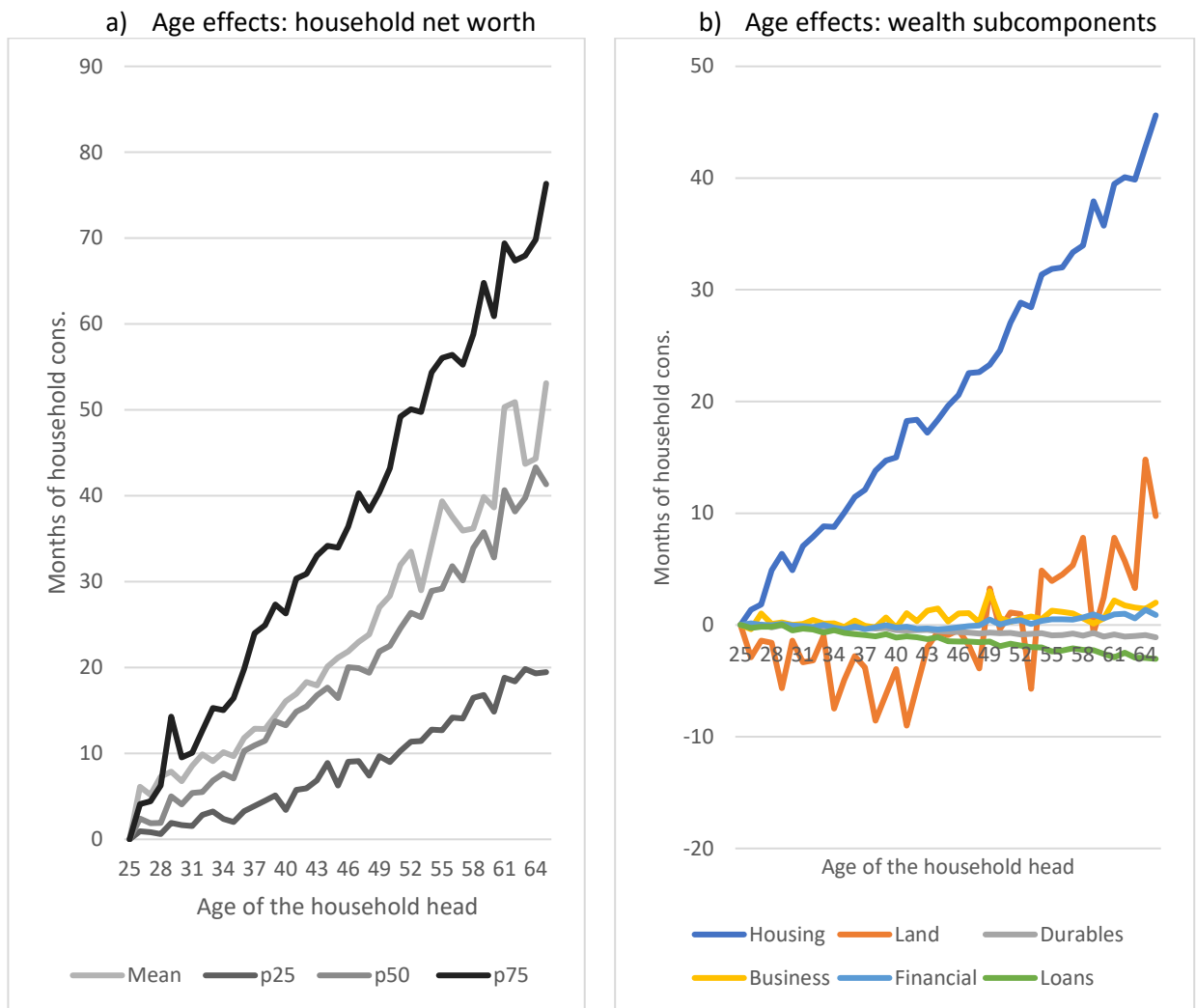
When we estimate profiles for each component of wealth, we find that residential real estate accounts for most of the net worth households accumulate (Figure 3). Residential real estate increases by 45 months of household consumption, which represents about 75% of the total increase in net worth. Our data measures the joint value of all residential buildings owned by a household without singling out the house they occupy. However, it is likely that the main residence accounts for most of residential wealth for all households but the very richest. The continuous increase in the value of residential real estate wealth owned by households could reflect several distinct phenomena that are difficult to disentangle with our data. The trend could reflect (i) a gradual increase in the proportion of households who own their main residence, or (ii) upgrading of the characteristics of the main residence through renovations or moving houses. While land constitutes a large proportion of total net worth, particularly among rural households, it does not exhibit the same pattern of accumulation as housing: land holdings tend to decline early on before picking up after age 40. Overall, 10 months' worth of consumption are accumulated in the form of land over the life cycle.
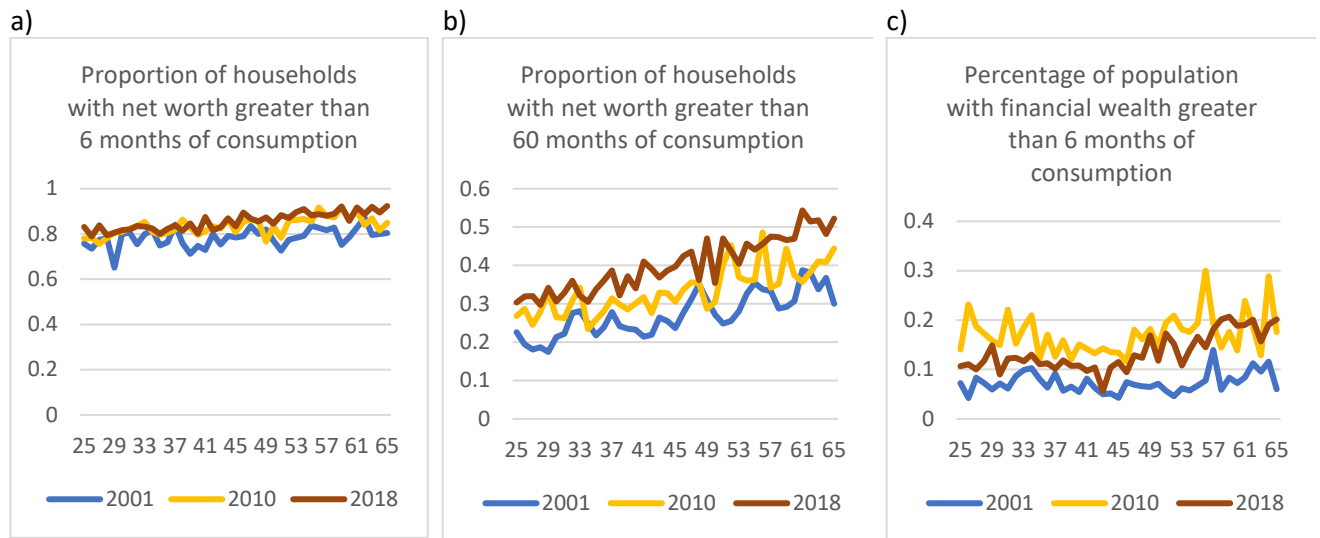
Other forms of wealth play much smaller role in the life cycle accumulation of household net worth. The value of durables tends to decline slightly with age. The value of business and farm assets (including cattle) increases slowly. Financial wealth (net savings and deposits, gold, silver, jewelry, and securities) tends to stagnate or decline slightly until age 45 before growing, for a net average increase of 1 month of consumption over the life cycle. This pattern could suggest that the need for liquidity does not increase or goes down over that part of the life cycle, perhaps because the levels of economic risk faced by the household diminish as well. However, we also observe that households steadily de-cumulate debt over the life cycle, for an improvement in their net position of around 3 months over the life cycle. A reduction in the level of debt should facilitate access to new loans, which would reduce the need to hold liquid wealth and explain why financial assets initially stagnate. Overall, financial wealth represents a negligible fraction of life cycle net worth accumulation. It may serve to finance lumpy expenditures or form a buffer stock of liquid funds in case of a shock but is not sizeable enough to finance retirement consumption needs.

To move beyond averages, we next document the proportion of households above several thresholds in net worth in the 2001, 2010, and 2018 cross-sections. We consider whether household net worth is above 6 months, 1 year and 5 years' worth of household consumption. While these thresholds are somewhat arbitrary, 6 months is a common rule-of-thumb amount of liquid wealth recommended by financial advisors. Households with at least 6 months in liquid wealth are assumed to smooth out the impact of most short-term life shocks. Households with wealth covering more than 5 years of consumption would be able to fund a significant part of their consumption needs in retirement, to the extent that they are able to extract income from that wealth.

Most households have a net worth above 6 months of consumption (Figure 4). The proportion has slightly grown over time (as seen in panel a). However, most of this wealth is in residential household housing and therefore difficult to access in the short run if a shock arises. If only financial wealth is considered, this proportion drops to less than 20%, which could signal vulnerability to economic shocks if combined with borrowing constraints and village or family networks are themselves under stress, for example in the case of aggregate shocks (panel c).

On the other end of the spectrum less than half of households had accumulated at least 60 months (5 years) of consumption in net worth by age 65 (Figure 4, panel b). Therefore, for most of the currently old in the sample, accumulated net worth is not in itself sufficient to cover a sizeable fraction of old age consumption. However, an upward shift over time is apparent: the proportion of 65 year-old heads above the 60 months threshold increased from 30% in 2001 to 50% in 2018. Therefore, the segment of the informal sector that accumulates significant net worth over their life is growing, in line with expectations that family support may not be as available as in previous generations.

Figure 4 Heterogeneity in wealth accumulation

a) Proportion of households with net worth greater than 6 months of consumption

b) Proportion of households with net worth greater than 60 months of consumption

c) Percentage of population with financial wealth greater than 6 months of consumption

6.2 Heterogeneity in household wealth accumulation

The decomposition of age profiles can be applied to subgroups as long as they are defined by permanent household characteristics such as level of permanent income, schooling of the head, rural or urban status to examine whether the patterns above hold for different types of households. We approximate quintiles of permanent income by computing per capita equivalent consumption quintiles over 5-year age bins, as described in the data section. Because schooling strongly correlates with permanent income and results in coarser and uneven groups, we only report results disaggregated by urban/rural status and permanent income quintiles.

Saving rates follow similar life cycle progressions across all consumption quintiles (Figure 5, left panel): saving rates are constant in the 20s and 30s before increasing by 15-30 percentage points in the second half of the life cycle. While households in the bottom quintile exhibit average saving rates that are 17pp lower than those in the top (Table 2) their progression over the life cycle progressions are not distinguishable.

The saving rates of rural and urban households exhibit very different life cycle patterns (Figure 5, right panel). In urban areas, saving rates decline early in the life cycle before stabilizing and then growing again from age 45 to age 60. In rural areas, the pattern found in the overall population holds. There again, this describes changes in the saving rate relative to the age 25 baseline. Table 2 suggests that this baseline is much lower for rural than for urban households, with the measurement caveats noted at the beginning of this section.

Figure 5 Age effects in the household saving rate, by categories of households
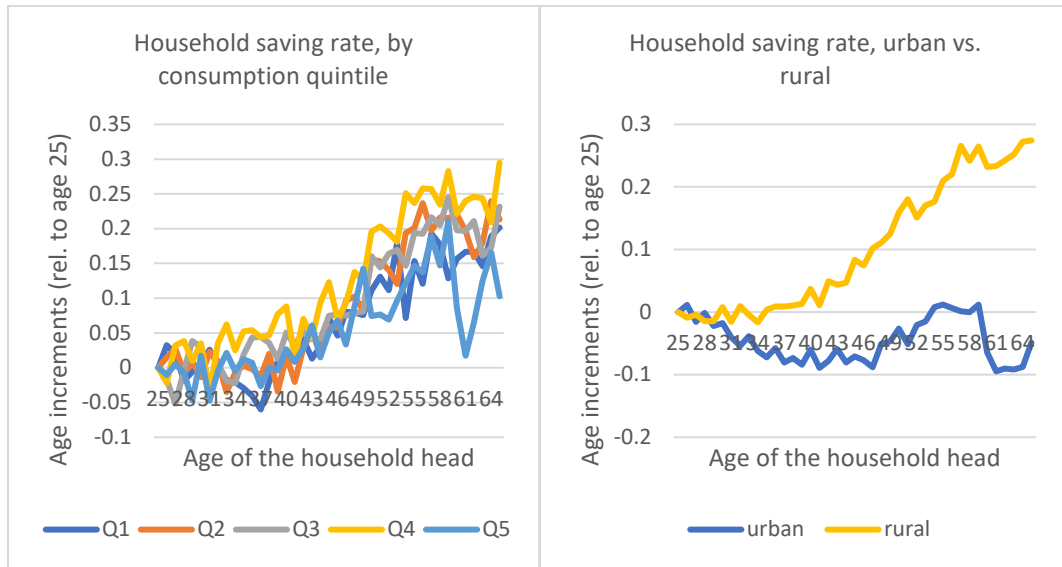
In keeping with saving rate patterns, patterns in household wealth accumulation are similar across consumption quintiles 2 through 5 (Figure 6, upper panels). Residential wealth increases at similar rates. Financial wealth stagnates early on, then picks up after age 45, and levels of debt decline steadily. Patterns differ somewhat for the first consumption quintile: residential wealth growth is markedly slower, even expressed in terms of their lower consumption levels. As we describe below, this appears to correlate strongly with the urban/rural divide.

Urban and rural households exhibit the same rate of growth in residential wealth, but their financial wealth evolves differently (Figure 6, lower panels). Urban households improve their situation steadily by increasing their financial wealth and reducing their debt throughout the life cycle. Rural households see a deterioration of their financial wealth and reduce their debt at a slower rate. Several explanations are consistent with these patterns. Rural households may be exposed to more frequent or damaging shocks early in the life cycle than the urban households, depleting their buffer stock. It is also possible that they benefit from better village networks to cope with economic uncertainty, reducing the need to accumulate liquid wealth in their 30s and 40s. Finally, since liquid wealth is also accumulated to pay for predictable lumpy expenditures such as schooling expenditures and ceremonial costs, the patterns exhibited by these expenditures could differ from those of wealthier urban households.

Figure 6 Growth in household wealth over the life cycle, by type of household
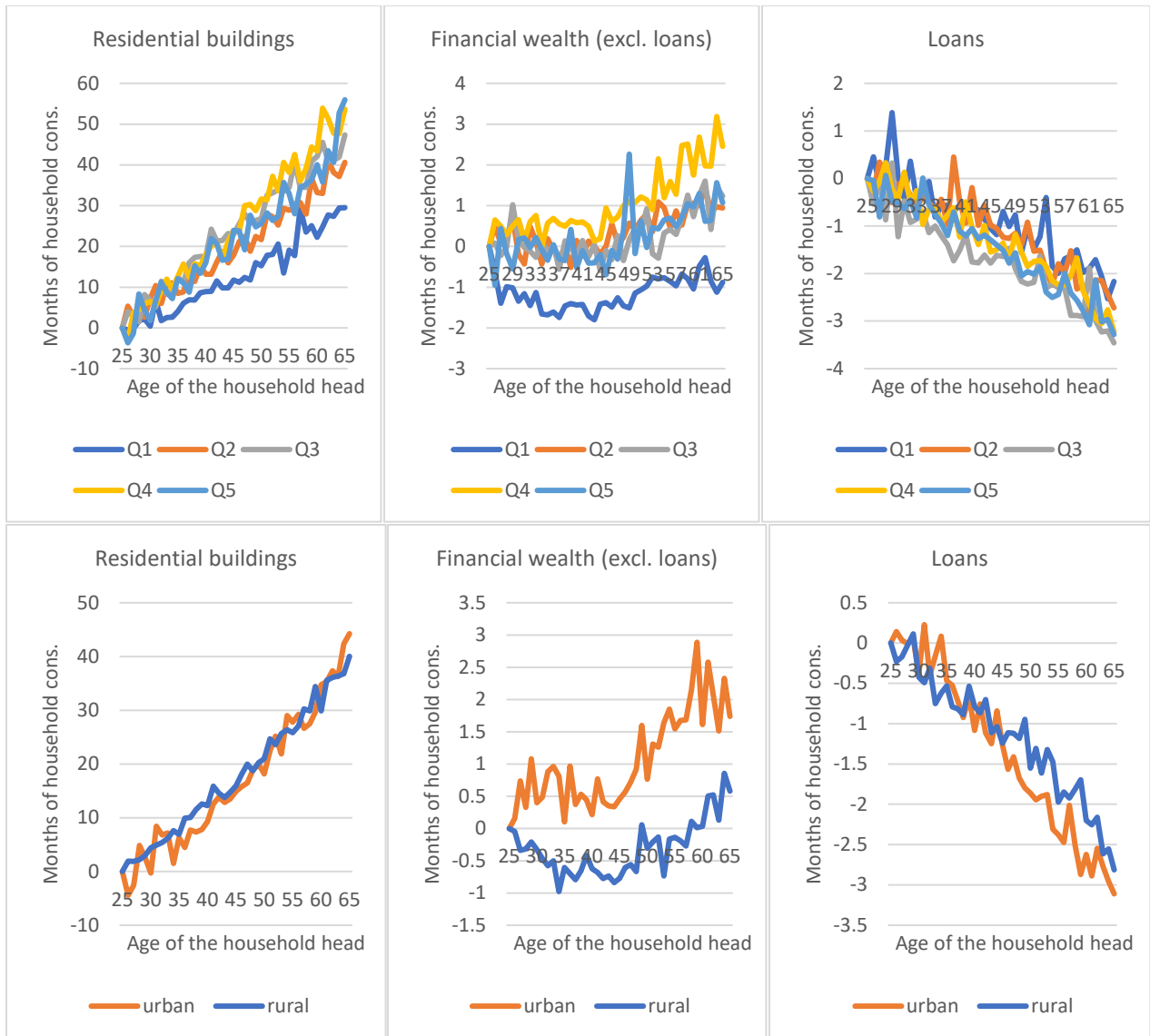
7. Conclusion

The combined forces of population aging, weakening family and village risk-sharing networks, and low formal pension coverage will make financing elderly consumption a major challenge for the future. Life expectancy (and with it, the number of unproductive years to be covered) has increased significantly since the early 1990s. In Pakistan, it went from 60.1 years in 1990 to 67.11 in 2018 (World Bank, World Development Indicators, 2018). While still relatively high compared to peer countries, the fertility rate in Pakistan has almost halved over the last thirty years, from 6.2 births per woman in 1990 to 3.5 in 2018, increasing the dependency ratio and reducing the availability of family or network members for support. Formal pension coverage is likely to remain low as a fraction of the labor force, as large cohorts of young workers enter the labor market, exceeding the availability

of formal jobs offering fringe benefits, even if GDP growth is strong (La Porta and Shleifer 2014). In sum, these socioeconomic trends further emphasize the need to understand the patterns of wealth accumulation over the life cycle in Pakistan and, thus, the assets and resources available in old-age in Pakistan.

We find that Pakistani households accumulate significant net worth but overwhelmingly in the form of residential buildings: on average, nearly 80% of the wealth accumulated by age 60-65 is comprised of residential buildings. This proportion has increased slightly over the period of our sample, from 73.0% in 2001 to 81.9% in 2018. The fact that households primarily save in real estate and land signals that this is considered a safe investment, relative to other available options. For example, housing may be a way to store resources for the long run in a way that cannot easily be stolen or appropriated by other family members. It could also reflect a lack of access to other safe, high return, and trustworthy long-term saving instruments. Low financial literacy, numeracy, and familiarity with formal banking institutions can all create barriers to participation in other forms of saving. Pakistan has been much slower than other neighboring countries in expanding financial inclusion and the barriers to this must be addressed.

The ability for elderly individuals to extract income from housing wealth may be a key parameter to evaluate in future research. This can take multiple forms, including renting out, downsizing, sophisticated financial instruments such as reverse mortgages but also implicit intergenerational arrangements in which children support their elderly parents in exchange for lodging and real estate bequests. Each of these strategies can have different costs and well-being implications. These concerns are greater for women, particularly older women and widows, who have less agency within the household and in the society to begin with, due to social norms around inheritance practices. Consistent with improving living standards and expectations that family support may be less available than in the past, the proportion of 65-year-old heads with more than 5 years' worth of consumption in net worth increased from 30% in 2001 to 50% in 2018. To the extent that pooling all wealth in housing is suboptimal, this pattern suggests a potential demand for long-term saving schemes designed for the informal sector.

While safe, housing is a relatively illiquid asset, which takes resources away from short-term consumption smoothing. According to Findex, only 3 percent of those aged 15 years and above in Pakistan report being able to rely on savings for emergency funds, while 49 percent say it is not possible to come up with emergency funds. The main source of emergency funds tends to be family or friends, according to 41 percent of the population aged 15 years and above; 25 percent report borrowing for medical expenditures. Policies that allow greater use of real estate assets as collateral to borrow against, through formal financial institutions, could in theory reduce the need for liquid precautionary savings, and free up resources to save for retirement. However, such initiatives may also encourage over-indebtedness and lead to evictions.

Lack of other safe, liquid forms of saving can also limit earning opportunities offered by self-employment. The self-employed tend to be older than informal wage workers but with similar levels of schooling. Almost half of the self-employed have no education. The older age of the self-employed might suggest that initial working years are spent acquiring start-up capital, as most of the self-employed enterprises are started using own capital (LSS Employer Survey 2014, Bossavie et al, forthcoming). According to the Findex surveys, only 11 percent of people aged 15 years and above borrow to start or expand a business.

Improving opportunities for safe long-term saving outside housing in the form of government-sponsored or subsidized old-age savings instruments could yield greater independence in old-age and reduce the burden on younger families. We find that average net worth accumulation accelerates midway through the working years, roughly around age forty. While some of this accumulation may reflect patterns in inheritances, we show that

active saving likely plays a significant part: household income growth starts to outpace household consumption growth around that time, and the saving rate increases by 20 percentage points between ages 40 and 65. This suggests that programs that aim to encourage formal saving may be most successful among individuals in that age range.

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