Consumption Smoothing and Household Savings in India: Role of Demographics and Durables

Neha Bairoliya[*]   Areendam Chanda[†]   Jingyi Fang[‡]

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Abstract

Canonical life-cycle models predict that rational, fully forward-looking agents should perfectly smooth consumption over their lifetime. This prediction, while not supported by the data, has been mostly tested for developed countries like the U.S. We use recently available, rich longitudinal data for a large sample of households to understand patterns of consumption expenditures, income growth and savings rates in India. Our empirical analysis has several important findings. First, growth in total household consumption and income is comparable to that of the U.S. However, unlike the U.S., Indian households exhibit no growth in non-durable consumption expenditures after adjusting for family size. We document significant heterogeneity along various population sub-groups, but none of them exhibit growth close to U.S. households. Savings rates, measured as total income net of non-durable expenditures, on the other hand exhibits a strong hump over the life-cycle. We present evidence that the need to save for lumpy investments such as housing, cars, tractors and cattle are key drivers of the high savings rate growth over the life-cycle for Indian households.

Keywords: consumption, savings rate, demographics, life-cycle, durables, asset accumulation, household heterogeneity, panel data, pseudopanel, equivalence scales.

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[*]University of Southern California, Department of Finance and Business Economics, Los Angeles, CA 90089-1422, USA. Email: Neha.Bairoliya@marshall.usc.edu

[†]Louisiana State University, Department of Economics, Baton Rouge, LA 70803, USA. Email: achanda@lsu.edu

[‡]University of Southern California, Department of Economics, Los Angeles, CA 90089-1422, USA. Email: jingyif@usc.edu

1 Introduction

In macroeconomics, the canonical life-cycle model remains central to the study of both household consumption and the aggregate economy. With the increasing availability of rich survey based data over the course of last few decades, its predictions have been tested rigorously. In its simplest form, the model predicts that rational agents who are fully forward looking would perfectly smooth consumption. Yet as the vast literature has shown, this prediction is not supported by the data, and consumption tends to follow a hump-shaped profile during an individual's lifetime. To explain this, researchers have enriched the model by incorporating a number of additional elements including precautionary savings, changing demographics of the household, incorporating the role of housing, changing opportunity cost of leisure, alternative preferences, or dissecting consumption expenditures into finer categories. However, most of this work has been focused on either U.S. or other high-income countries. Low and middle-income countries, with their varied socio-political institutions, demographics and cultural norms, provide interesting lens through which these predictions can be tested, while also presenting formidable challenges. Yet, with the exception of China, the literature is sparse.[1]

This dearth of research can be attributed to a number of factors. Despite a large body of theoretical work on the institutional and cultural norms governing household income and consumption decisions in developing countries, it is not easy to translate this into aggregate dynamics. This is compounded by the lack of reliable household panel data that are necessary for empirical work. Further, economists studying development have focused, understandably, on the short run implications of weather, policy, and other exogenous shocks on consumption and other outcomes, especially for rural households.

In this study we use a recently introduced and increasingly adopted longitudinal survey on household expenditures and incomes in India, the Consumer Pyramids Household Survey, to investigate life-cycle consumption and savings rates from a developing country perspective. The survey interviews more than 150,000 households every four months, and records details on expenditures, incomes, indicators for a range of asset and liabilities, as well as demographic data. More specifically, in the first part of the paper, building on the established research for high income countries, we investigate the extent of consumption smoothing over the life-cycle of Indian households. We pay attention to non-durable consumption expenditures and examine its profile, and to the extent, it tracks household income. To provide a comparative perspective, we construct similar profiles for U.S. households using data from Panel Study of Income Dynamics. We also

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[1]Given the increasing availability of household survey data, there have been a lot of macroeconomic studies on China looking at household behavior in terms consumption, savings and the interactions with demographics. See for instance (Bairoliya et al., 2018; Bairoliya and Miller, 2020, 2021; Chamon et al., 2013; İmrohoroğlu and Zhao, 2018; Wei and Zhang, 2011)

examine the extent to which the life-cycle profile of consumption is altered when one accounts for demographic factors using adult equivalence scales.

Our first finding is that life-cycle growth of household consumption in India is somewhat smaller (36%), albeit comparable to that of the United States (50%), when looking at non-durable expenditures (non-durable goods, and services). However, and more importantly, once one adjusts for household demographics using adult equivalent scales this similarity goes away. U.S. households continue to exhibit consumption growth (at a lower rate of 30%, in keeping with much of the literature), while Indian households exhibit almost none (3%).

To gain further insight, we first explore whether these aggregate patterns obscure some of the sharp heterogeneities in Indian society. We look at differences along three key dimensions - nuclear vs extended families, rural vs urban households, and occupational differences. One of the reasons why research on life-cycle consumption is limited in developing countries is the fact that households tend to be multi-generational - implying that life-cycle of the household is not the life-cycle of the individual (Deaton and Paxson, 2000). When we separate households into those that are strictly nuclear vs those that are multi-generational, and account for changes in family size within each of these groups, we still find a relatively flat profile for the former and u-shaped consumption profile for the latter once we adjust for household size. The u-shaped profile may reflect some of the returns to scale from joint consumption goods in the extended families. Despite rapid economic growth over the past three decades, approximately 65% of the Indian population is classified as rural. Not surprisingly, we see that urban households exhibit faster consumption growth than rural households, and are closer to the U.S. average. Once we adjust for demographics though, urban households exhibit much lower growth of 10%. Rural households show no growth at all, and if anything a decline past the age of 50. We also consider three major occupational categories- agricultural labor, self-employed, and white collared workers. While the profile of agricultural labor is similar to that of rural households, both the self-employed and the white-collared workers are similar to the urban profile with consumption growing more for the self-employed but still peaking only at 10%.

The fact that households in India exhibit a flat profile for non-durables but U.S. households do not, could be attributed to a number of phenomenon. First, it's possible that Indian households do not face some of the constraints that are used to account for the consumption profile in the U.S. - in particular precautionary savings, liquidity constraints, uncertainty about income growth, to name a few. If anything, these constraints are more salient for Indian households despite informal risk-sharing and borrowing arrangements (which exist but are usually costlier). A second possibility is that the smooth profile does not reflect consumption smoothing but that non-durable consumption tracks income. When we look at the data however, unlike consumption, we find that income growth for households is actually close to that of U.S. households - 90% vs 100%. In fact, for

urban India, incomes are 110% greater at their peak compared to the beginning of the life-cycle. To put it differently, if we define savings broadly as the excess of income over current consumption expenditures, the savings rate starts at about 3% and reaches 28% when the head of household is approximately 55 years. This pattern is observable across major sub-groups as well.

The finding that non-durable consumption after adjusting for family size stays relatively flat, while savings rate starts at positive values and continues to increase in the aggregate, implies that households in India do not smooth consumption in the traditional life-cycle-perfect markets sense. Instead, they accumulate durable goods, physical and/or financial assets. For the rest of the paper, we investigate this in further detail. Indian households typically have very little financial savings (Badarinza et al., 2019). Therefore, to keep the analysis manageable we focus on physical savings. Although the survey does not provide us with actual amounts devoted to these categories, it records a physical inventory as well as both intentions and actual purchases in these categories. We focus on four major types of physical savings that lead to lumpy purchases- house and land, cars, tractors and cattle. The latter two are more applicable for farming households. We also construct an asset or durable goods index using all available information on major and minor durable goods owned by households. Empirically, we document that this asset index exhibits a strong hump over the lifecycle (roughly 80% growth) and at the same time we also find that intentions to purchase some of these assets are predictive of higher savings rates. This is further reinforced by event figures which show that purchases of durables, in particular housing, is preceded by an increasing savings rates, followed by a decline. The life-cycle profile of purchases of durables and physical assets also exhibits a clear hump shaped profile.

To summarize, this study presents, what we believe, is the first in-depth research of life-cycle consumption and savings in India. In doing so, we provide a perspective that is not only different from that observed in high-income countries, but also shed new light on how lack of access to credit markets might interact with the timing of consumption especially in case of lumpy durables. The rest of the paper proceeds as follows. In the next section, we provide some background on household savings and consumption expenditures in India, and relate our study to current research. We discuss the data and outline the methodology used to construct consumption and income profiles in section 3, and present the results in section 5. Section 6 revisits the consumption profiles and undertake some robustness analysis - the way head of households are defined, how adult equivalent scales are constructed, the treatment of home production, and methods used to create the pseudopanels. We discuss our findings in section 7 and conclude in section 8.

2 Background

One of the most widely documented features in household consumption is its hump shaped profile over the life-cycle. This finding, which goes back at least as far as Thurow (1969), has spawned an enormous body of work reconciling it with the consumption smoothing prediction of the life-cycle hypothesis. More recently, Fernández-Villaverde and Krueger (2007), using U.S. household data from the Consumer Expenditures Survey, show that this hump shaped profile is true for total consumer expenditures, non-durables, and durables even after factoring in family size. Researchers have attributed this to the importance of uninsurable permanent income leading to precautionary savings early in the life-cycle Gourinchas and Parker (2002), family demographics (Browning and Ejrnæs, 2009), absence of annuities combined with bequests (Hansen and İmrohoroğlu, 2008), the role of durables (Fernandez-Villaverde and Krueger, 2011), incorporating loss aversion (Pagel, 2017), the interaction between housing collateral and non-durable consumption (Yang, 2009), distinguishing between work and non-work related expenditures (Aguiar and Hurst, 2013). Beyond the U.S., the lack of consumption smoothing has also been documented in the UK (Browning et al., 2016; Browning and Ejrnæs, 2009) and Netherlands (Alessie and de Ree, 2009), but less so in Portugal (Alexandre et al., 2020).

Among developing countries, China stands out as one where a body of literature has emerged over the past decade. Chamon and Prasad (2010) is an early influential study documenting the absence of consumption smoothing even after controlling for demographic factors, and the close correlation between income and consumption for all cohorts over the life-cycle. A unique aspect of China is the inverted u-shaped profile of the savings rate. This has been attributed to rising income uncertainty, policy reforms, gender imbalances and the marriage market, etc. (Chamon et al., 2013; Du and Wei, 2013; Nie, 2020; Wei and Zhang, 2011). Apart from China, the literature is very limited. De Magalhães and Santaeulàlia-Llopis (2018) examine panel data from Malawi and note that households have relatively flat consumption profiles, and do not accumulate wealth along the life-cycle. The contrasting results between China, a high growth country, where households depress consumption at the beginning of the life-cycle to accumulate assets, and Malawi, a low growth country, where it stays relatively flat with little or no asset accumulation, provides further motivation for our analysis.

When it comes to India, there is a large literature on how households insure against income shocks, and also the determinants of consumption based measures of poverty. Much less attention, if any at all, has been paid to life-cycle behavior. This is both by design, and due to data limitations. Rosenzweig (2001) notes that households generally tend to save more for precautionary (high-frequency i.e. seasonal shocks) rather than life-cycle reasons. High short term income volatility combined with lack of access to formal credit and insurance markets historically mean that any

asset accumulation was also quickly depleted.[2] The inter-generational nature of households also makes computing life-cycle savings challenging (Deaton and Paxson, 2000). Further, households substitute high fertility rates for old-age savings. From a data standpoint, surveys such as the widely used ones on consumption expenditures by the National Statistical Survey Organization (NSSO) do not record income measures, and are not longitudinal.[3] While some of these concerns remain valid, the emergence of a large middle class (or at the very least, a large section of the population emerging out of poverty), combined with fertility rates now estimated to be below replacement, provides additional rationale for our research.[4]

As far as a macro perspective is concerned, the research is much thinner. Badarinza et al. (2017) exploit a 2013 NSSO cross-sectional survey on investment and debt among Indian households to provide a comprehensive overview of the nature of asset and liabilities. They note that the average household holds 77% of its total assets in real estate — a number higher than the 62% in China — and only 5% in financial assets. They note that these numbers stay remarkably stable over the life-cycle, and households have little or no retirement assets. A recent official summary of the 2019 round of the same survey indicates even higher numbers. Real estate comprises 77% of assets in urban India and 91% in rural India.[5] In a related paper, Gopalakrishnan et al. (2019), exploiting rainfall shocks, argue that Indian households engage in financial savings in the short run, but physical savings in the longer run.[6]

Givent the paucity of research, it is helpful to step back and first provide some background on what we know about household consumption expenditures and savings in India at the aggregate level. India's national accounts statistics estimate real private final consumption expenditures at approximately 57% of GDP in 2019-20 and 75% of disposable income, implying a household savings rate of 25%. This has largely remained unchanged since the beginnning of the decade. In per capita terms, annual expenditures stood at INR 62,056 (PPP USD 4,257) that year. However national accounts numbers even as an aggregate is of limited value. It is an order of magnitude higher than previous NSSO expenditure surveys as well as the panel data that we use. Apart from the fact that national accounts statistics includes imputed values of housing services (a common

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[2]The extent, and the methods used, to which farming households are able to insure against such shocks has been extensively debated going back to Rosenzweig and Wolpin (1993)

[3]A few papers such as those by Deolalikar and Rose (1998) and Anukriti et al. (2022) also exploit rural surveys to examine the effect of the birth of a female child on household savings. The surveys are either cross-sectional, or limited to a specific region of India.

[4]See Kapur et al. (2017) on the middle class in India, and IIPS (2021) on fertility rates.

[5]The results from the 2019 survey are compiled in Government of India (GOI) (2021). Even though there are no retirement savings, formal sector employees in India are required to contribute 12% of their salaries to their "provident fund", analogous to a funded social security system. However, 90% of the labor force remains in the informal sector.

[6]Apart from these papers, Hnatkovska et al. (2012) use the NSSO expenditure and employment survey data and document a decline in consumption and wage inequality between historically disadvantaged scheduled castes and tribes (SC/ST) and the rest of the population between 1983 and 2005. The research is not concerned with life-cycle behavior, and there is no income data beyond wages.

source of difference between national accounts and surveys in other countries as well), private expenditures includes purchases of goods and services by the informal sector. Similarly, savings, which is not measured as a residual of disposable income but arrived at separately, is also fraught with problems and reflects both physical and financial investments of the informal sector. In the next section we discuss our data in more detail.[7]

3   Data

3.1   Consumer Pyramids Household Survey

Consumer Pyramids Household Survey (CPHS) is a nationally representative longitudinal survey where each household's information is recorded tri-annually (once every four months). Approximately 158,000-165,000 households were interviewed in each wave during the period of our analysis, 2014-2019. Households are asked detailed questions about their monthly expenditure and income, or in the case of durables, assets, and liabilities- indicators about ownership, intentions, and purchases, over the previous four months. Additionally, the survey records demographic and income information on household members, as well as their employment status, and expectations about the economy and their financial well-being. Over the past few years, researchers have increasingly relied on the data to study household responses to important macro events in India such as demonetization in 2016, e.g. (Chodorow-Reich et al., 2020; Karmakar and Narayanan, 2020; Lahiri, 2020). More recently researchers have also used the data to investigate the effects of the Covid-19 pandemic (Anand et al., 2021; Gupta et al., 2021; Mohanan et al., 2021). Apart from these, the data has also been employed to study a range of research questions from financial inclusion (Agarwal et al., 2021) to labor market participation (Deshpande and Singh, 2021).[8] The survey represents 98.5% of the total population in India, and about two-thirds of the respondents live in urban areas and one-third live in rural areas. While this is opposite of the actual composition of the Indian population, survey weights are designed so that the aggregate values are representative of the entire country.[9]

How comparable are the CPHS survey estimates to other measures of consumption expendi-

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[7]See Government of India (2007) for a discussion on the sources and methods, and Patnaik and Pandey (2019) for discussion on aggregate savings in India.

[8]Traditionally applied microeconomic studies relied on NSSO expenditure and employment surveys which were repeated cross sections and did not record income data. Complicating matters, the Government of India decided not to publish the NSSO 2015-16 survey results. Researchers have also relied on Rural Economic & Demographic Survey (REDS) -a rural panel of households. Apart from being rural and a relatively smaller sample (about 9000), it was last conducted in 2006. Another survey is the IHDS conducted by the University of Maryland. They were conducted in 2004-05 and 2011-12 and has a panel component.

[9]The rationale for surveying more urban households is due to the larger heterogeneity in this population. Vyas (2020) provides a useful introduction to the survey

tures and incomes? While detailed survey data on incomes are hard to come by, we can compare consumption expenditures. Even though the Indian government did not release the latest consumption expenditure survey, a 2014-15 survey on durable goods and services also asks a question on total household consumption expenditures. The 2014 monthly household consumption expenditures from the CPHS survey can be compared to these. The latter values for India as a whole, rural and urban were INR 7,951 (USD 550), INR 6,802 (USD 471) and INR 10,270 (USD 711) respectively. These are 97%, 102% and 91% of the government survey counterparts - surprisingly close numbers.[10] Another way to evaluate reliability is to look at growth rates. While there are no other annual surveys on expenditures, over the period of analysis (2014-2019), the per-capita real consumption expenditure growth was 6.7% which was only a little higher than the national accounts per-capita private consumption expenditure growth of 6.2%.[11]

The CPHS constitutes of several modules. This study draws on expenditures, incomes (of households and individual members), assets and liabilities, and people of India (household member demographics and socioeconomic characteristics). From the expenditure categories we construct a measure of non-durable consumption which includes expenditures on food, intoxicants, clothing & footwear, cosmetics & toiletries, recreation, restaurant, rent and bills, power & fuel, transport, health, education and miscellaneous expenses.[12] The idea is to stay as close as possible to the PSID equivalent of non-durable expenditures. Households also report total income as well as income contributed by each household member in every wave. We use wealth indicators like reported intentions to purchase major durables such as house, car, two-wheelers, tractor, cow etc. as well actual reported purchases to analyze their implications for savings behavior. Finally, we use information from the "People of India" modules of the survey to understand the demographic structure and living arrangements of Indian households. In particular, we utilize information on total family size, and age and gender composition of the households.

In order to construct our sample, we first merge all wave-year files (2014 to 2019) for household income and expenses. In each wave, households are required to report income and expenditure information for the previous four months, giving us household-month-year level data. Since previous literature using this data has found little variation in expenditures at the month level for a given wave, we only use average monthly expenditures for each wave, giving us a household-wave-year level dataset. Next, we merge all the wave-year files for "People of India" module containing de-

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[10]The Govt. of India surveyed 83,600 households across India during 2014-15. While a precise mapping of sub-categories is difficult, we find that the non-durable expenditures were also 97%, 99%, and 91% respectively.

[11]The government's most recent (2017-18) expenditure survey was never released due to concerns regarding the numbers being lower than their earlier 2011 survey. We should note that despite the 6.2% annual growth , the CPHS estimates only surpassed the government's 2011 values in 2018.

[12]Two categories are excluded - appliances and equal monthly installments. The appliance category, despite its name, also records expenditures on a host of durable electronic goods. EMI's mostly reflect payment on loans for homes, vehicles, and other durables.

mographic information for each household member in each wave-year.[13] Table 1 provides some summary statistics that we discuss further below, after explaining the U.S. PSID data.

3.2   Panel Study of Income Dynamics

Panel Study of Income Dynamics (PSID) is a well known longitudinal dataset which started in 1968 with a nationally representative sample of over 18,000 individuals living in 5,000 households in the U.S., and who were followed annually henceforth.[14] The study covers years between 1968 and 2017 and contains detailed information on earnings, expenditures and employment. Historically, PSID only collected information on food and housing expenditures. However, starting 1999, it also started adding questions about spending on transportation, health care, education, utilities, and childcare. Expenditures are reported weekly, monthly, or yearly depending on the spending categories. Non-response rate is fairly low in PSID, and together with its long panel structure, has made it an attractive dataset for studying life-cycle facts about American households. For our analysis we use data beginning with the 2005 surveys.

Table 1 compares summary statistics of household expenditures and income for both India and the U.S. While columns 2 and 4 provide annual expenditures and income (converted to USD PPP for India) for both countries, columns 3 and 5 compare share of major consumption categories as a fraction of total non-durable consumption expenditures. A few important differences become obvious. In India, food takes up a little more than half of all non-durable expenditures, whereas for the U.S. this is only 22%. Interestingly, non-mortgage housing related expenditure shares which includes rent, utilities, and communications are roughly the same in both countries. Transportation, not surprisingly, is a much higher share in the U.S. and so is health. Appendix section A.1 provides a detailed discussion about each expenditure category for both countries. With respect to demographics, the age of head of household is higher in India. Given that India is a younger population, this reflects the importance of extended households. Within extended households, the nominal head might be a patriarch and not the main earner or the financial decision maker. In our robustness section, we re-examine life-cycle profiles by redefining the head of household to be the primary male earner. Lastly, the family size and also the OECD adult equivalent scales differences between the two countries are as expected.

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[13]Our data runs from the first wave of 2014 through the second wave of 2019. The end date is due to funding limitations but in any case with the Covid pandemic, waves from 2020 would be less useful. In general, the non-response rate averages about 15%. Attrition with such a large and frequent survey is certainly a problem, though approximately 100,000 households answered the survey for at least 14 out of the 17 waves that we cover.

[14]The survey was conducted annually between 1968 and 1997, and bi-annually since then.

Table 1: Comparison of PSID and CPS dataset

	CPHS		PSID	
	Mean	Fraction	Mean	Fraction
Age of household head	50.02		47.14	
Family size	4.09		2.31	
OECD scale	2.34		1.49	
Annual expenditures	8,476.09		38,388.44	
Annual income	12,216.55		76,665.31	
Adjusted expenditures	3,955.65		26,243.38	
Food	3,472.57	0.54	7,860.95	0.22
Non mortgage housing	1,473.57	0.21	8,377.49	0.27
Transport	1,869.79	0.03	9,722.70	0.24
Health	176.52	0.02	3,326.08	0.08
Education	279.83	0.03	1,399.44	0.02
Clothing	779.55	0.11	1,554.67	0.04
Recreation	37.88	0.00	2,613.33	0.06
Observations	974442	974442	61005	61005

Notes: The expenditure data for CPHS is in USD PPP converted values. Non-mortgage housing expenses in PSID includes rent, utility, internet charge etc.; housing category in CPHS includes housing, power, and communication fees. Others in PSID include repair and furnish expenses; Others in CPS include miscellaneous expenditures.

3.3 Pseudopanel Approach

Following Deaton (1985), we use the repeated nature of both the survey dataset and build a pseudopanel which reduces attrition problems and eliminates the need to control for individual fixed effects as it aggregates across agents.[15] We use the age of the household head to associate a household with a birth cohort bin. We define ten birth cohort bins, each with a length of 5 years. We generate a balanced psuedopanel by computing group specific means for each age and time period using the population weights provided in each survey. Our choice of the number of cohort bins is driven by sample size considerations where we have large enough observations in each cell to confidently assume that the sample means are good approximations for their population counterparts.

4 Methodology

4.1 Econometric Specification

Following Fernández-Villaverde and Krueger (2007), we estimate a flexible semi-nonparametric regression equation for understanding the effect of age, time and birth cohort on consumption expenditures, income and savings rate.[16]

$$c_{it} = f(age_{it}) + \alpha_i cohort_i + \alpha_t time_t + \epsilon_{it} \tag{1}$$

Where c_{it} is the cohort i average of monthly log consumption at time t, $cohort_i$ is a dummy indicator for each birth cohort, $time_t$ the time indicator for each wave-year period, age_{it} is the age of cohort i at time t, measured in years, $f(age_{it})$ is a smooth function of age_{it} and finally ϵ_{it} is an independent, zero mean, random error.

We estimate a partially linear regression model (a form of semiparametric regression model) using the Robinson (1988) double residual semiparametric regression estimator.[17] The main difference between several available PLM estimators is the estimation method used to estimate the nonparametric component, since the parametric component is estimated by least squares method mostly. The Robinson's estimator estimates the non-parametric part of the PLM using a Gaussian kernel weighted local polynomial fit. The optimal bandwidth used minimizes the conditional weighted mean integrated squared error.

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[15]Note that even though PSID has a much longer panel, we use the pseudopanel approach for the sake of uniformity.

[16]We model the consumption and income processes separately and do not allow for other age varying factors like health or labor supply to affect these. For instance, Miller and Bairoliya (2021); Miller et al. (2019) model the joint dynamics of consumption, health and labor supply evolution using a structural VAR model.

[17]We use STATA's implementation of the estimator using the *semipar* command.

In our analysis, we estimate the widely used age-period-cohort (APC) model, treating the multiple available waves of the survey data as repeated cross-sections. There is a clear identification problem in considering all three variables simultaneously in a statistical equation – there exists an exact linear dependency between them because $Cohort = Period - Age$. Following the literature, we use a nonlinear transformation to the age variable, and five year bins for the birth cohort to deal with the collinearity issue.

5 Results

We begin with a discussion of our key findings related to life-cycle patterns in consumption, compare them to the U.S., and explore three major sources of heterogeneity - family type, region and occupation. We then move on to income and savings for Indian households, to get a comprehensive understanding of how the evolution of income and consumption spending differs from that of a developed country like the U.S.
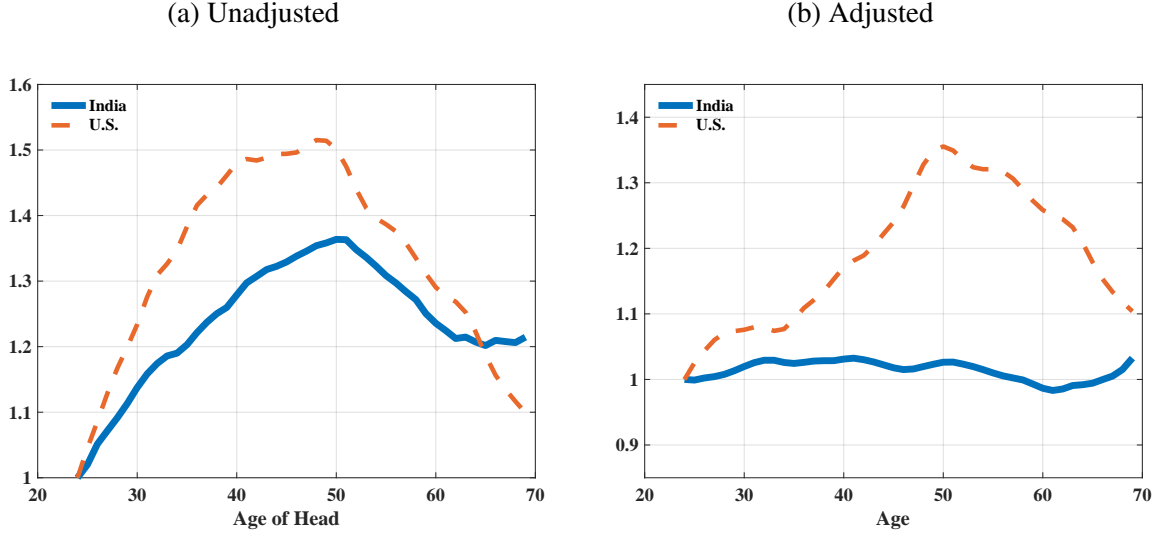
5.1 Consumption

Figure 1 provides a comparison between the evolution of life-cycle consumption between Indian and American households.[18] Panel (a) shows that while total household consumption grows by roughly 50% (as compared to age 24) for U.S. households, it grows by roughly 36% for Indian households.[19] Next, we adjust total household expenditures using OECD equivalents to understand the importance of changes in family size and age composition in determining the growth in consumption. In other words, we would like to understand how much of the growth in total household consumption is due to the fact that households may get bigger in size over the life-cycle (as proxied by the age of the household head) due to the presence of spouse, children, parents and or other family members. An extreme possibility in such a scenario could be that all the growth in consumption is then attributed to the aforementioned fact and at the individual level, household members are able to perfectly smooth consumption. We find that this is certainly not the case for the U.S. as even after adjusting for demographics, consumption grows by more than 30%. These findings are consistent with previous literature that has looked at consumption growth for U.S. households using Consumer Expenditure Survey (CEX) and PSID. However, a surprising finding for India is that almost all the growth in life-cycle consumption seems to be driven by changes in

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[18]Refer to column 1 of appendix tables A.3 and A.4 for time and birth cohort effects for Indian and U.S. households respectively.

[19]We net out payments towards property taxes and mortgage from PSID to have a more comparable measure with that of Indian household consumption. Figure A.1 in the appendix provides estimates of growth in consumption in the U.S. using total reported household expenditures in the PSID and the measure of expenditures constructed in this analysis by netting out mortgage payments, property taxes etc.

household size. After controlling for that, consumption growth declines from 36% to 3% as seen in panel (b) of figure 1.[20]

Figure 1: Life-Cycle Consumption
by Age of Household Head

(a) Unadjusted

(b) Adjusted

Notes: Household consumption relative to age 24 (household head) is reported for both U.S. and India. Data for the U.S. comes from Panel Study of Income Dynamics. Adjusted refers to total household consumption divided by family size using a modified OECD scale which assigns a weight of one to household head, 0.3 to each children under/of the age of 16 and 0.5 to each adult over the age of 16. Expenditure categories include total expenditures on 1) food 2) transportation 3) education 4) childcare 5) health care 6) clothing 7) household repairs and furnishing 8) trips and recreational activities 9) housing to related rent, utility, telephone and internet.

In order to understand these striking differences between India and U.S., we look further into the demographic structure of households in both countries. Figure 2 shows a comparison in terms of both the family size and the number of children, both of which affect how much household consumption gets scaled. There are interesting differences between the two countries that are worth nothing. First, Indian households are on an average larger than U.S. households all through the life-cycle (average family size in the former is roughly double that of the later between ages 50 and 59). Second, changes in family size are more prominent for the latter as compared to the former. Finally, the distribution of children over the life-cycle of household differs in non-trivial ways for the two countries. While U.S. households, after an initial increase in the number of children between ages 20 and 40, experience a constant decline over the remaining life, Indian households experience a second, somewhat less prominent hump in the later part. This is due to the presence of grand-children in extended families. Extended families including parents and children

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[20]The OECD adult equivalence scale assigns a weight of 1 to the head of household, 0.5 to other adults, and 0.3 to children. In Section 6.2, we consider the use of alternate consumption equivalence scales.

from outside the nuclear family, are common in Asia, the Middle East, Central/South America, and sub-Saharan Africa, but not in other regions of the world like North America or Western Europe (Scott et al., 2015).[21]

Figure 2: Household Composition
by Age of Household Head

(a) Family Size (b) Children
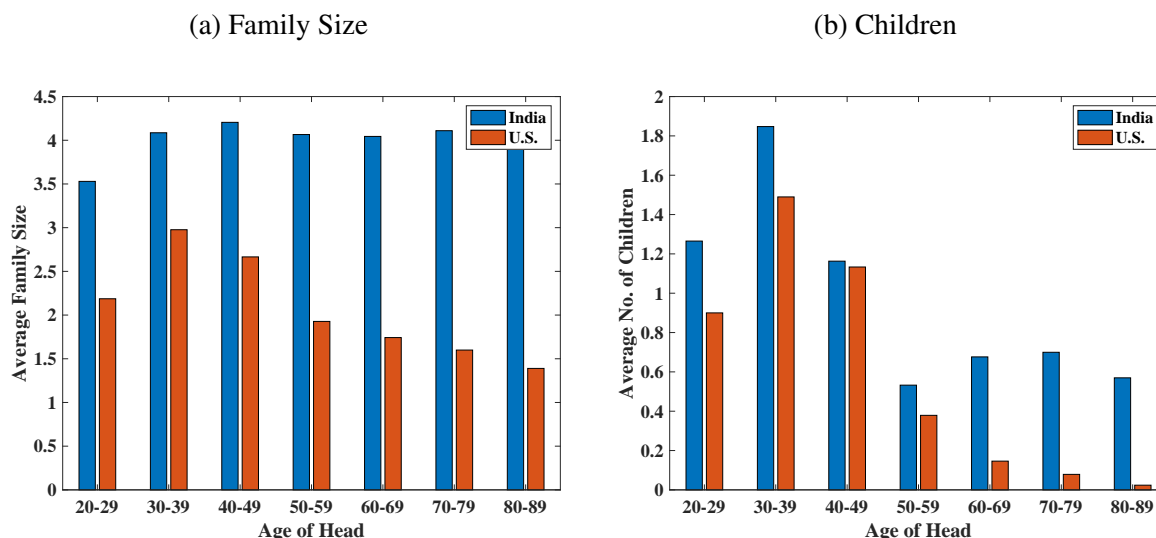
Notes: Data for the U.S. comes from Panel Study of Income Dynamics (PSID). Children are defined as members living within the same household under the age of 18.

Panel (a) of figure 3 displays the evolution of non-durable consumption for nuclear and extended families. In contrast to our finding that for the representative household, consumption peaks around age 50, we see that there exists substantial differences in the pattern of consumption growth between the two family types. While both groups show a peak consumption of almost 40%, it happens at very different points in the life-cycle. For nuclear families, it is around the same age (50 years) as that of India as a whole. In the case of extended families, it is at a much later age. In the latter case, consumption shows a fairly monotonic increase with a further inflection at sixty - capturing the likelihood that these are large inter-generational families. To further investigate this, we repeat the exercise after adjusting for family size using the OECD scale. The results are presented in Figure 3d. Adjusted consumption now shows a perceptible decline which bottoms out at middle ages before increasing again. This may reflect the possibility that an extended family with a head of household at age 45 has parents who are no longer earners, while those households with heads at age 60 or more, may still be earning while so do their cohabiting adult children. It

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[21]In this paper, we adhere to the common practice of defining a nuclear family as a basic social unit including a couple and their dependent children only. Appendix tables A.5 and A.6 provide details about the likelihood of the presence of different types of family members as well as their average number, respectively, for Indian households.

may also reflect some increasing returns to being in a joint family. However, note that expenditures here includes only non-durables and services. Other than utility expenses, most of the benefits of joint consumption is likely to come from durables.

Beyond inter-generational families, households in India also insure against income shocks by relying on local networks in the absence of formal institutions. Particularly important are caste networks (Munshi and Rosenzweig, 2016). While informal networks can exist in both rural and urban areas, the likelihood is much stronger for the former where seasonal fluctuations in incomes are also more salient. In the next set of figures, we examine whether consumption smoothing is different for rural and urban households. Figure 3b displays the consumption paths for the two groups along the life-cycle. Not surprisingly, urban households experience much faster growth (46%) compared to rural households (31%), with the former almost comparable to the peak values for the U.S.. However, once we adjust for family size, the relatively flat profile resurfaces (Figure 3e). In the case of urban households there is still a slight but noticeable increase in the early years, while in the case of rural households there is initially a flat, followed by a declining consumption profile towards the later years.

Finally, we look at the heterogeneity in consumption growth across different occupations of the household head. In particular we explore life-cycle consumption patterns for three distinct groups – farmers, self employed and white collared workers.[22] As the nature of income shocks would expectedly be very different across these different groups, so would be the extent of consumption smoothing. Figure 3c and 3f show the unadjusted as well as adjusted consumption respectively for these groups.[23] We find that across these households, farmers experience the least growth in consumption (both unadjusted and adjusted). The peak consumption growth for both self-employed and white collared worker households look very similar. However, the latter experiences a prominent growth in consumption after age 65. We find that this is primarily driven by a growth in income at these ages (shown in the next section).[24]

A concern regarding our study is that even though we have multiple years of data, it is all within one decade and thus may be influenced by macro-conditions. In particular, if younger households expect higher income growth in the future, they will have higher levels of consumption relative to income. This can cause the life-cycle profile to appear flat. To the extent that we see a steeper profile in the urban rather than the rural population, this seems less of a concern. However, one
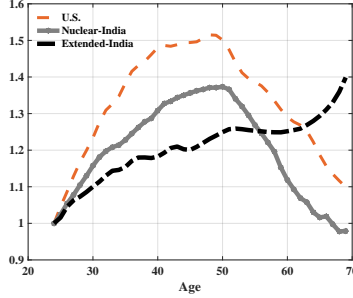
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[22]Appendix section A.2 provides details on how we construct these.

[23]Appendix figure A.4 provides estimates of both adjusted and unadjusted lifecycle consumption by education status of the head.
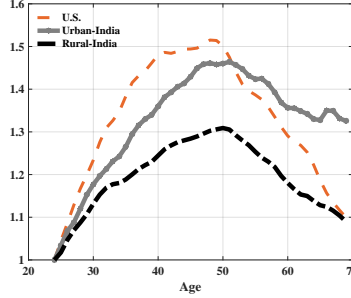
[24]The retirement age for government services in India is 60, while it ranges from 60-65 in the private sector. Therefore, the high growth in consumption and income for household heads with white collar jobs between the ages 65 and 69 could be driven by the presence of CEO's and other successful professionals in the survey. This rise indeed goes away when we winsorize the consumption expenditure distribution, trimming the top and bottom 1% of the observations.

Figure 3: Life-Cycle Consumption
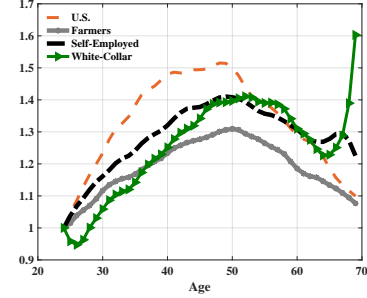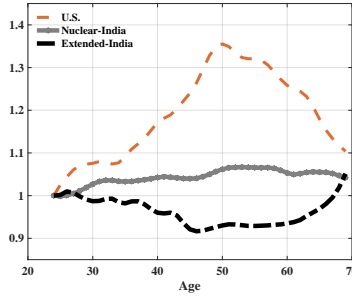### by Family Type, Region and Occupation

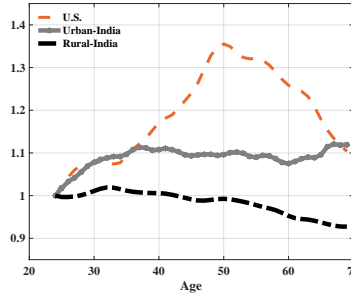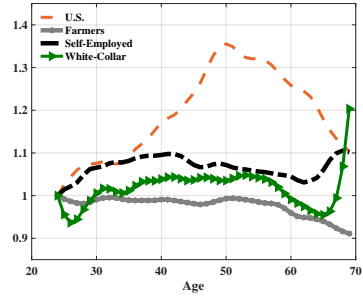| (a) Family Type - Unadjusted	(b) Region - Unadjusted	(c) Occupation - Unadjusted

(d) Family Type - Adjusted	(e) Region - Adjusted	(f) Occupation - Adjusted

Notes: Nuclear families are defined as those comprising only of the household head, their spouse and children. Extended families include all other members like siblings or parents of the household head, son-in-laws or daughter-in-laws, other relatives etc. Adjusted refers to total household consumption divided by family size using a modified OECD scale which assigns a weight of one to household head, 0.3 to each children under/of the age of 16, and 0.5 to each adult over the age of 16.

cannot rule out the possibility that in urban areas younger households face greater uncertainty regarding income growth, and thus consumption tends to track income growth more closely - as has been argued for the U.S. (Gourinchas and Parker, 2002).

An important source of distinction between U.S. and Indian households lies in the composition of non-durable expenditures. U.S. household are likely to spend far more on their own, or their children's higher education, and also on health expenditures. In the case of India, old age health expenditures are often borne by adult children even if they are not part of an extended household. Beyond that, home production of important categories like food are likely to differ considerably between the two countries. Transportation is an example of another category which is likely to be more salient for U.S. households. Some of these differences, in terms of shares, are apparent in Table 1. To gain further insight, Appendix Figure A.2 compares the evolution of total household

consumption spending on food, non-mortgage housing, education, health, and transportation. We plot data for U.S., India as a whole as well as for urban and rural India. We find that while growth in food and transportation expenditures in urban India are similar to that of the U.S., there are stark differences in education and health expenditure growth which remain negligible for Indian households. Housing expenditures (net of mortgage payments) grow substantially more for Indian households. Appendix figure A.3 confirms that the stark differences in consumption spending between Indian and U.S. households are not driven by differences in education and medical spending alone. Even after we eliminate these spending sources and re-estimate our life-cycle profiles, we find substantial differences in growth rates between the two countries.

Our analysis of consumption evolution for Indian households so far suggests a smooth age consumption profile, once the changes in household size and age composition is taken into account. This finding is at odds with the existing literature based on the experience of the developed world. Conventional economic thought suggests that if household's income growth over the life-cycle is uncertain, then some of this growth translates into growth in consumption. Even if growth is predictable, market incompleteness makes consumption smoothing difficult. The absence of growth in adjusted consumption for Indian households hints towards three different possibilities. First, Indian households are able to perfectly smooth consumption over the life-cycle and there are no market imperfections or uncertainty in wage growth. This seems very unlikely. Even though a sizeable fraction of Indian households reported some debt in 2019 - 35% for rural, and 22% for urban, the actual amount of debt relative to total assets was low at 3.8% and 4.4% respectively (GOI (2021)). In comparison, 77% of U.S. households carried some debt in 2019, and the debt to asset ratio was 15%.[25] This rules out the possibility that relatively younger households are borrowing against their future income growth to smooth consumption. A second possibility is the polar opposite - Indian households are severely borrowing constrained, consuming their income every period which in turn exhibits no growth (on an adult equivalent basis). Alternatively, they face seasonal fluctuations in income which lead to either precautionary savings that dissipate quickly, or cycles of indebtedness, leading to no growth in consumption. A third possibility is that in addition to standard life-cycle and precautionary savings motives that operate in high income countries, lumpy investments in physical assets and durable goods (that can also act as collateralizable assets) with incomplete markets means non-durable consumption stays relatively flat. In the rest of the paper we try to disentangle the second and third possibilities. To make further progress, we first look at the household income profile, followed by their savings behavior.

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[25]The first U.S. statistic comes from the Survey of Consumer Finances. The U.S. debt to asset ratio was was calculated from OECD.Stat.

5.2 Income

Figure 4 shows that growth in total household income in India is comparable to that of the U.S.[26] While U.S. households experience a roughly 100% growth in income (as compared to age 24), Indian counterparts experience about 90% growth.[27] The fact that Indian households exhibit income growth close to that of the U.S., but lower consumption growth is *prima facie* evidence that it is not income per se that constrains non-durable consumption. The variation in adult equivalents over the life cycle, which would affect both series similarly, would not change this. In addition to total household income, we also look at "adjusted income" - per earner household income.[28] Another important difference between India and the U.S. is now apparent. In the case of the latter, almost all income growth is due to growth in individual earnings. In the case of India, of the 90% growth, only 20% can be attributed to individual earnings growth, the rest is due to changes in labor force participation, i.e. along the extensive margin of various family members.

Figure 5 compares the life-cycle income profile of different types of Indian households – nuclear vs. extended families, urban vs. rural, and across different occupations, to U.S. households.[29] Interestingly, we find that income growth in urban India and that experienced by self employed households exceed that of the U.S. - 106% and 112 % respectively compared to 100%. The growth is lower for other household types, with the lowest being extended families (59%). The peak for all household types is also reached later, and in the case of extended families, it never quite drops off. Irrespective of the grouping, the fact remains that peak income is higher than peak consumption. These findings to a great extent rule out the second hypothesis that households maybe completely borrowing constrained, consuming their income every period which exhibits no growth. In the next sub-section, we look into this in more detail through the lens of savings rates.[30]

Appendix Figure A.5 displays the income per-earner vs. the total household income for each sub-group. After controlling for the number of contributing members, life-cycle income grows by roughly 27% for nuclear families, 57% for urban, 28% for self employed and 36% for white collared workers. Despite productivity growth, about 50-90% of the growth comes from increasing

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[26]Refer to column 2 of appendix tables A.3 and A.4 for time and birth cohort effects for Indian and U.S. households respectively.
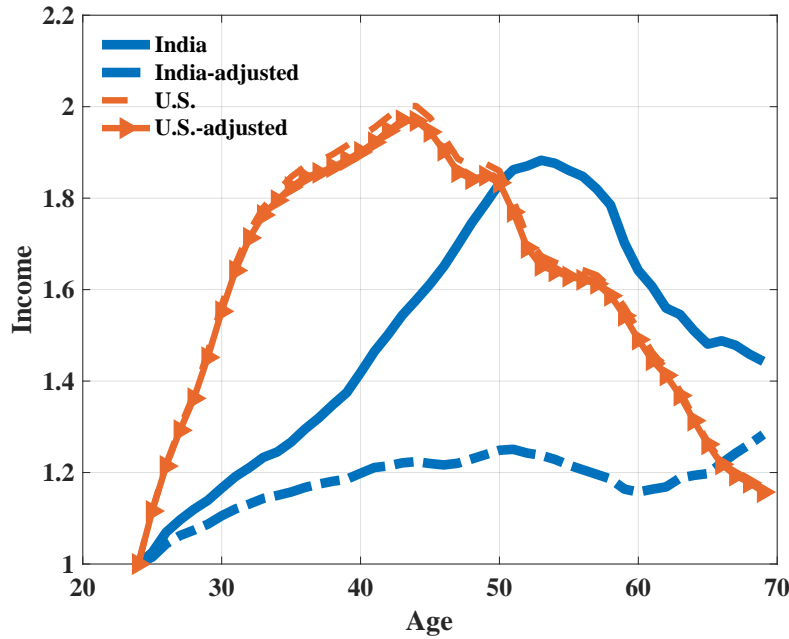
[27]For India, household income refers to income from all sources. This includes remittances, pensions and government support programs.

[28]For Indian households, total income is divided by total number of earning family members at each point in time. For U.S. households, total income is divided by two in the case where spousal income is positive. While the PSID data allows for the possibility to track income from children and other family members, extended families including cohabitation with adult children, during the working life, is very rare.

[29]Appendix figure A.7 provides these income profiles by education status of the household head.

[30]It is possible that even if savings is positive, the gap between income per adult equivalent and consumption per adult equivalent fluctuates during the life-cycle. However, this is less relevant since savings reflects forward looking behavior, and therefore need not be driven by the number of current adult equivalents. Also, savings in this paper includes outlays on physical assets and durables - categories which are more likely to feature joint rather than private consumption.

Figure 4: Life-Cycle Income
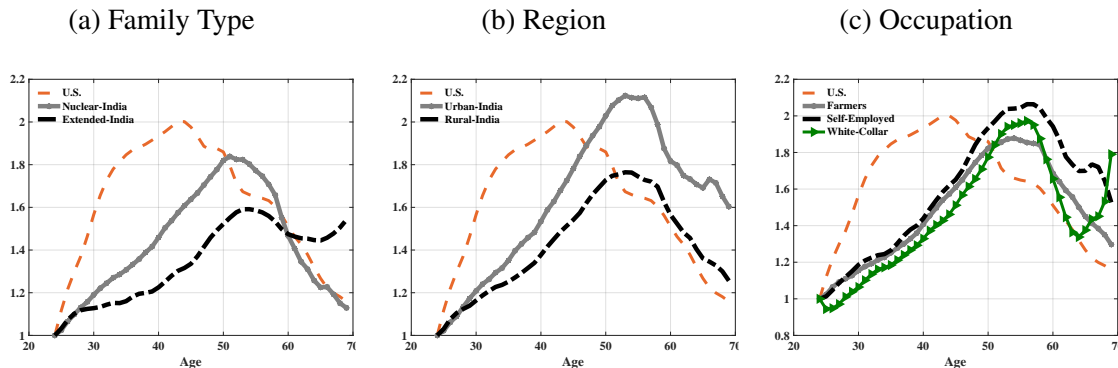by Age of Household Head

Notes: Total household income relative to age 24 (household head) is reported for both U.S. and India. Adjusted income refers to income per earning member. Data for the U.S. comes from Panel Study of Income Dynamics. Total family income for the U.S. includes total taxable income, transfer income and Social Security income of household members for a given year. Total family income for India includes income from all sources including private/public transfers, profits, lotteries, wages, overtime, bonus, imputed income, interest payments, dividends and insurance payments.

number of earners. In the case of rural India or farming households, we see very little individual income growth. About 80 and 86% of the growth in total household income respectively is due to increasing labor force participation. For extended families, things are quite different. The peak in household income and peak in per-worker income are at different years. The peak household income coincides with a more or less a bottoming out of the per-earner income when the head of household is in their mid fifties. This may reflect the fact that at that age, the second generation of members have just entered the labor force, and thus their starting income would be much lower than that of the household head. When the household head is older than sixty, incomes of individual earners continue to increase as the incomes of the second generation members also increase.[31] To summarize, we find that the contribution of rising productivity to total income growth is highest in urban areas (followed by white collared workers) and lowest for farming households.

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[31]It is also possible that the high individual income close to 70 reflects that the household head is a nominal head. We consider the implications of nominal head vs. primary earners in section 6.

Figure 5: Life-Cycle Income by Age of Household Head, Family Type, Region and Occupation

(a) Family Type   (b) Region   (c) Occupation

Notes: Total household income relative to age 24 (household head) is reported for both U.S. and India. Data for the U.S. comes from Panel Study of Income Dynamics. Total family income for the U.S. includes total taxable income, transfer income and Social Security income of household members for a given year. Total family income for India includes income from all sources including private/public transfers, profits, lotteries, wages, overtime, bonus, interest payments, dividends and insurance payments.

5.3 Savings Rate

Figure 6 displays patterns in the evolution of savings rate.[32] For India as a whole, we find a substantial increase in the savings rate — increasing from 3% to roughly 28% over the life-cycle.[33] This is true for all types of households – urban, rural, nuclear, extended, farming, self-employed and white collared workers. While urban households experience a peak savings rate of 37%, the rural savings rate peaks at roughly 23%. Interestingly, extended families also exhibit a similar increase. This is despite the non-overlapping life-cycles of residents in many such families. This is especially intriguing given that the per adult consumption also drops to its lowest value around the peak savings age. Moreover, they have a higher savings rate than nuclear families all through the life-cycle, and in fact, also start off at a higher rate than all the other sub-groups.

There are three interesting things to note along the occupation margin.[34] First, the savings behavior of self-employed households closely resemble that of India as a whole, especially between ages 55 and 70. Second, white collar worker households have the highest savings rate of all groups considered here (roughly 80% at its peak) and it rises sharply between ages 65 and 69. Third, farming households are the only major group which starts off with negative savings rates, though in their case too, it over time and reaches a peak of 20%. Put another way, these graphs suggest that income per equivalent adult increases faster than consumption per equivalent adult until around the

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[32]Since, the differences between India and U.S. with respect to consumption and income have been discussed at length, we restrict our attention to India for this and the remaining sections of the paper.

[33]Refer to column 3 of appendix tables A.3 for time and birth cohort effects.

[34]Appendix figure A.8 provides these savings rate profiles by education status of the household head.

age of 55. Furthermore, while the savings rate drops after that, it remains positive.

Figure 6: Life-Cycle Savings Rate
by Age of Household Head, Family Type, Region and Occupation
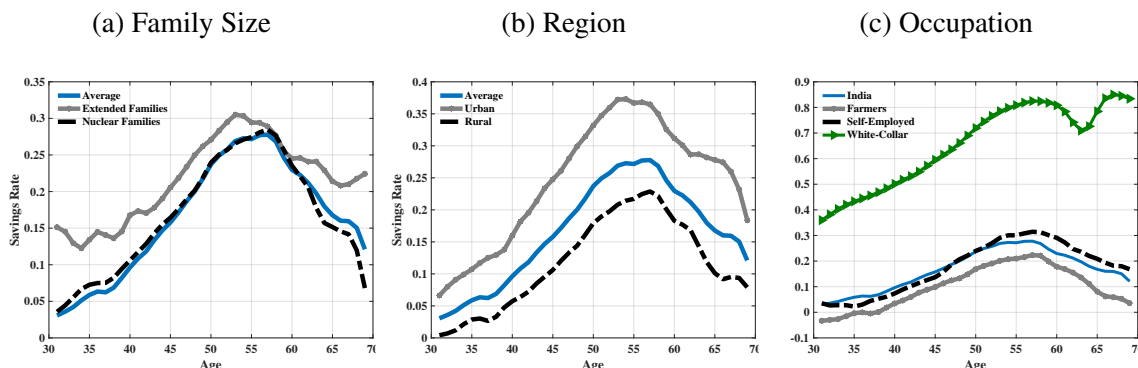
(a) Family Size   (b) Region   (c) Occupation

Notes: Savings rate is computed as total household income net of total non-durable consumption as a fraction of total household income.

Recall that our measure of savings is total household income net of total household non-durable consumption expenditures. In other words, it captures the accumulation of financial assets, physical assets, and durable goods. The CPHS data, unfortunately, does not allow us to observe the actual amounts spent on assets or durable goods. It could be that most of the surplus presented here is utilized to purchase consumer durables which we do not observe. It could also be the case that Indian households are saving for other reasons such as retirement, medical expenditure risk, insuring against life-cycle income risk (precautionary motive) and so on – factors which have been widely used to explain the drivers of savings for the U.S. households.[35] Indeed, a hump-shaped savings profile is consistent with the standard life-cycle model. However, this usually assumes market completeness, with consumption exceeding income during the early years.

Is it possible that once we take into account durable goods, consumption exceeds income during the initial years? Even though we do not have measures of durable spending, the survey provides other useful types of information - a) any type of borrowing to finance house/land purchases, b) to finance consumer durable spending, and also c) amount of monthly loan payments towards a house/land purchase and d) loan payments towards major durable goods. Appendix Figures A.9a-A.9d display these patterns over the life cycle. In the case of probability of borrowing from any source to fund a house or durable goods expenditures, there is very little to suggest here that a large fraction of households are borrowing early in their life-cycle to finance these investments. In the case of monthly installment payments, which captures repayments for borrowing from any source, if anything the amounts peak around the same time when savings rates are maximized. This is suggestive that household may supplement their accumulated savings with some borrowing

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[35] See for instance Bairoliya (2019); De Nardi et al. (2015); French (2005); Kopecky and Koreshkova (2014)

to finance these purchases. Thus, unlike some of the evidence for U.S. (Fernandez-Villaverde and Krueger, 2011), there no indication that households in India might be lowering non-durable consumption to purchase physical assets and durables early in their life cycle.

Having ruled out the two extremes - that households smooth consumption by borrowing from the future, or that they are hand to mouth, we now consider the remaining hypothesis - that one of the reasons why individual consumption remains smooth is because early on households start saving to make lumpy investments in physical assets and durables. Since we do not observe the actual amount spent for major investments such as homes and cars, we conduct this analysis in four steps. First, we construct an asset or durable goods index by using information available on possession of major and minor durable goods by households. We estimate an equation similar to 1 to analyze the age-profile.[36] This asset index is an imperfect measure of the actual expenditures incurred on durable goods over the life-cycle. However, the patterns in the evolution of this stock over the life-cycle can provide meaningful validation of our main hypothesis — motive to invest in lumpy durables drives the high savings growth as well as depresses other consumption growth over the lifecycle. Second, we test whether the savings rate can be explained by a desire to purchase such assets. One of the unique features of the CPHS data are a set of questions on intentions to make purchases of physical assets and durables over the next 120 days. For example with respect to real estate, the question is, "Does the household plan to buy a house/plot during the next 120 days?". This question is posed separately for house/plot, cars, two-wheelers, tractors, cattle, refrigerator, air-conditioner, air-cooler, inverter/generator, television, washing machine, and computer. For our main analysis, we examine the association between intention to purchase major physical assets - house/plot, car, two-wheeler, tractor, and cattle - and the savings rate. If indeed the purchases of durables is a motive for savings then we should expect to see an economically meaningful association between the two. Third, we construct event figures for savings rates around the actual purchases of these assets. If households save in order to purchase these assets, then at the very least we should observe a stable or rising savings rate preceding the purchases, and a declining savings rate soon after the event. Finally, we construct life-cycle profiles of purchases of these physical assets. If households indeed save over time to make lumpy investments, then we should also see a correspondence between the life-cycle profiles of savings rates and the purchases of these assets. In the next sub-sections, we present our findings along each of these three lines.
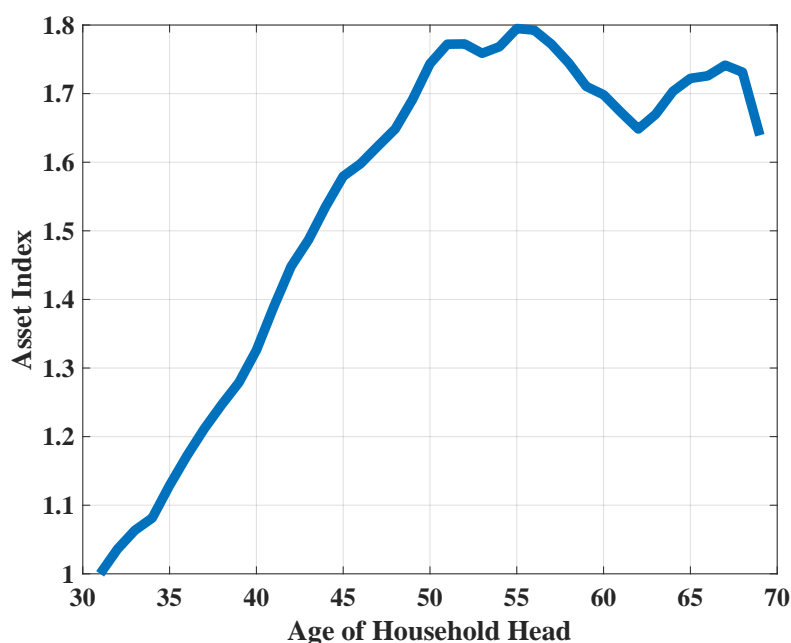
5.3.1 Asset Index

Figure 8 provides the estimated age profile of the asset index of Indian households. It is obvious that there is a substantial growth in this index over the life-cycle (roughly 80% at its peak). What

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[36]Appendix section A.3 discusses in detail our calculation of the asset index.

is even more interesting is that the peak is attained around the same time as the peak in savings rate (computed as income net of non-durable expenditures as a fraction of total income). This is a strong indication that households are utilizing a substantial part of the surplus in accumulating durable goods, some of which can also act as collateralizable assets. Appendix figure A.10 provides the heterogeneity by region, family type and occupation. Overall we find very similar patterns to those documented earlier for savings rate. In the next sections, we further explore the durables purchase motive for savings rate growth by looking at intentions and actual purchases.

Figure 8: Accumulation of Durable Goods
Over the Life Cycle of Hosuehold Head

Notes: Household asset index relative to age 31 (household head) is reported. Asset index is constructed using information on the possession of major and minor durable goods like television, cattle, tractor, refrigerator, house, car, two-wheeler, electric generator, washing machine and so on.

5.3.2 Intentions

We use the reported intentions to make inferences about their contributions to the high savings rate among Indian households.[37] Specifically, we estimate the following equation:

$$s_{it} = \sum_{j=1}^{J} \beta^j z_{it}^j + \alpha X_{it} + \epsilon_{it} \tag{2}$$

Where s_{it} is the savings rate of household i at time t (wave), z_{it}^j is reported intentions to purchase durable good j by household i at time t, X_{it} is a vector of controls and finally ϵ_{it} is an independent, mean zero, random error.

Table 2 provides OLS estimates of reported intentions to purchase major durables like house (or plot of land), car, two-wheeler, tractor and cattle on savings rate. Since intentions to purchase these assets may overlap, we include each of them separately as a distinct control. Column (1) provides the estimates for a base specification with no other controls, while subsequent columns repeat the estimation with additional controls. In particular to isolate intentions from any pure life-cycle and income effects on savings rates we also add controls for the age of the household head (column 3) and measures of household assets and education (column 4). Overall, we find that reported intentions of durable purchases have strong and significant effects on household's savings rate. For instance, in column (4) with full controls, reported intentions to purchase a house or a car increases household's savings rate by 3.67 and 2.75 percentage points (p.p.) respectively. Intentions to purchase a two-wheeler has a somewhat lesser (1.18 p.p.) albeit significant effect on savings rate as well. Intentions for tractor and cattle purchase increase savings rate by 1.93 and 1.30 p.p. respectively.

Appendix tables A.8-A.14 provide these estimates separately for urban and rural areas, extended and nuclear families, farmers, self-employed and white-collar worker households respectively. It is interesting to note that intentions to purchase a house has somewhat higher effect on savings rate in the rural areas than the urban areas (4.91 vs. 3.14 p.p. increase respectively). It is in fact highest for farmers (6.26 p.p.) and lowest for white-collared workers (1.64 p.p.). It is not surprising that intentions of car purchase has significant effects on savings rate in the urban areas and for non-farming households only (after controlling for household assets and education). While intentions for tractor and cattle purchase have insignificant (or smaller) effects on savings for urban households, they increase rural savings rate by 7.52 and 3.82 p.p. respectively. The effects are similar for farmers. Taken together, these exercises confirm that the desire to purchase these high-value assets is an important motive for savings.

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[37]These reported *intentions* also significantly predict *actual* purchases in the survey. Refer to appendix table A.7 for more details.

Table 2: OLS Estimates of Intentions to Purchase Durables on Savings Rate in India

	(1) Savings Rate	(2) Savings Rate	(3) Savings Rate	(4) Savings Rate
Intend to Buy House=1	0.0964***	0.0881***	0.0876***	0.0367***
	(25.73)	(24.00)	(24.01)	(10.51)
Intend to Buy Car=1	0.122***	0.103***	0.101***	0.0275***
	(44.65)	(38.68)	(37.87)	(10.80)
Intend to Buy 2-Wheeler=1	0.0109***	0.00540*	0.00477*	0.0118***
	(4.86)	(2.45)	(2.17)	(5.63)
Intend to Buy Tractor=1	0.0349***	0.0302***	0.0281***	0.0193***
	(5.97)	(5.26)	(4.92)	(3.53)
Intend to Buy Cattle=1	0.00113	-0.00648*	-0.00597	0.0130***
	(0.35)	(-2.04)	(-1.89)	(4.29)
Time Dummy		0.00529***	0.00302***	0.00272***
		(120.84)	(47.13)	(44.33)
Birth Cohort		-0.0306***	0.000580	0.00218**
		(-277.06)	(0.75)	(2.94)
Age of Head			-0.110***	-0.115***
			(-66.46)	(-72.09)
Age of Head × Age of Head			0.00270***	0.00277***
			(79.52)	(85.23)
Age of Head × Age of Head × Age of Head			-0.0000199***	-0.0000203***
			(-87.72)	(-93.36)
Asset Index				0.00242***
				(226.57)
Education				0.00828***
				(231.04)
Constant	0.291***	0.397***	1.557***	1.522***
	(1307.92)	(582.88)	(54.65)	(55.79)
Observations	2,073,080	2,073,080	2,073,080	2,073,080

Notes: The table estimates equation 2. Each observation is a household-wave. Intention to buy takes a value of 1 if the respondent plans to purchase the product over the next 120 days. For asset index, see appendix section A.2. *t* statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix table A.15 provides the effect of reported intentions to purchase other smaller durables like television sets, washing machines, coolers, power inverters, computers and refrigerators on savings rate. We find that intentions to purchase all of these, with the exception of power inverter, have positive and statistically significant effects on savings rate.

5.3.3 Purchases

Since, in our panel data, we observe households making durable goods purchases, we can also look at how the savings rate changes around the durable buying episode, to understand its role in determining overall savings behavior of Indian households. In particular, we estimate the following relationship:

$$s_{it} = \beta^j z_{it}^j + \alpha X_{it} + \epsilon_{it} \tag{3}$$

Where s_{it} is the savings rate of household i at time t, z_{it}^j now is reported distance (in time) to durable j purchase instance at say time τ. For instance, when $t = \tau$ (period of the durable goods purchase), $z_{it}^j = 0$, one period after the purchase $(t = \tau + 1)$, $z_{it}^j = 1$, one period before the purchase $(t = \tau - 1)$, $z_{it}^j = -1$ and so on. Finally, X_{it} is a vector of controls and ϵ_{it} is an independent, mean zero, random error. A time period here is a wave.

Figure 9 shows savings rates around the period of major durable purchase like house, car, two-wheeler, tractor and cattle for Indian households. In all these cases, we either find an increase in savings up to the period of actual purchase and/or a decline soon after the purchase. The evolution of savings rates is particularly clear for house/land purchases (Figure 9a). With respect to the others we see patterns that are also more or less consistent - especially for tractors and cattle.[38] The decline in savings immediately following the purchase is apparent for most durables but quite stark for housing (savings rate declines by roughly 7 p.p following a house purchase). Note that even though we observe households in our survey for multiple years, we can only reliably estimate these event-time relationships for a limited number of waves surrounding these purchases, as these purchases could be happening towards the beginning or end of the time horizon over which we observe the households.

Finally, we also consider the life-cycle profile of durable goods purchases. As already noted, this reflects the incidence of a purchase and not the actual amount. A concern however is that even though we have a very large sample of households, the chances that they would have actually purchased one of these goods within the six year span will be obviously low. Nevertheless approx-

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[38]In many of these cases, one can see that the savings rate continues to increase in the wave immediately after the purchase. In our view this does not undermine the broad patterns. Irrespective of the best planning and foresight, unforeseen expenditures can always arise with such large purchases.

Figure 9: Savings Rate and Durable Purchase Event

(a) House

(b) Car

(c) Two-Wheeler

(d) Tractor

(e) Cattle
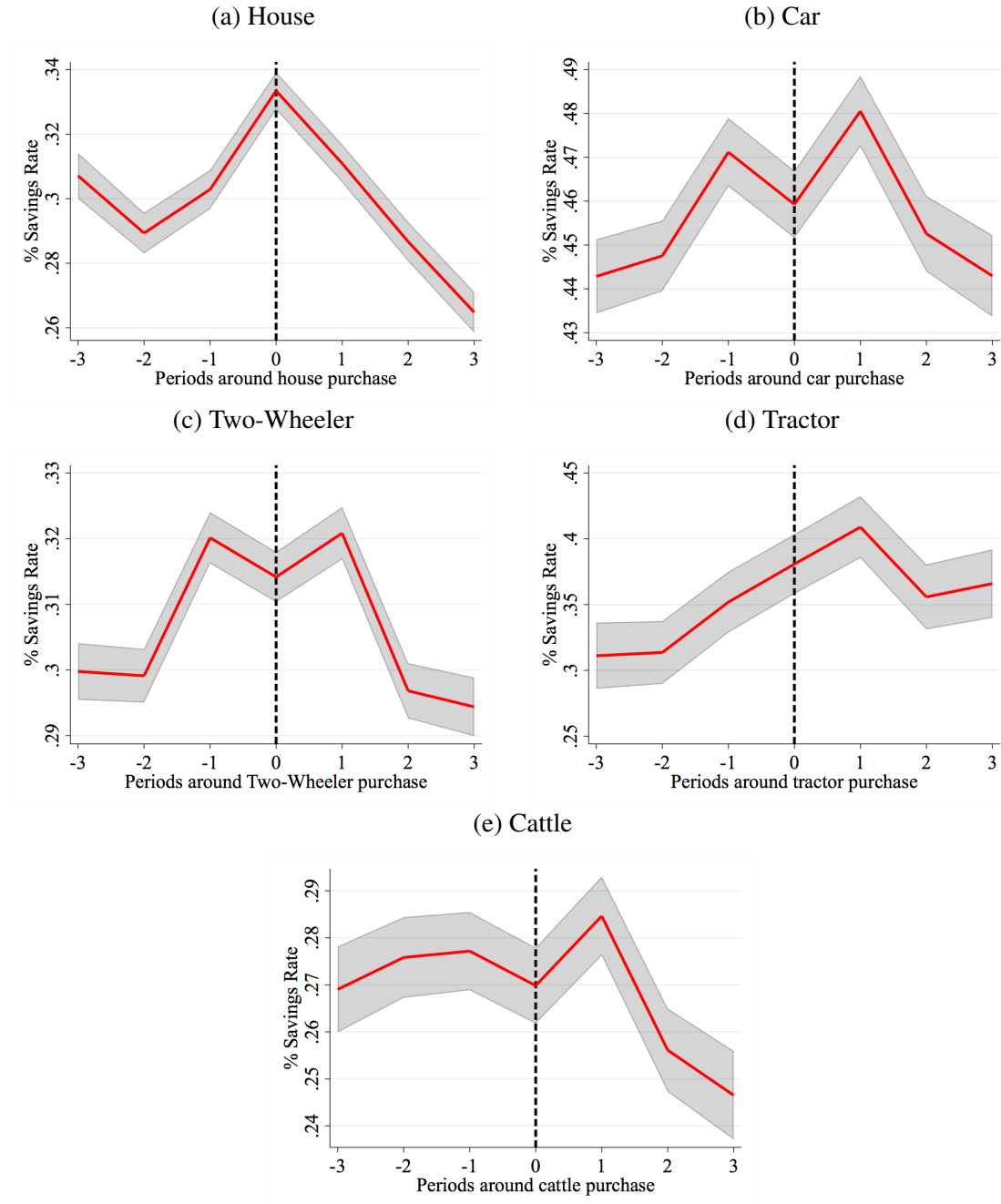
Notes: The graph reports household savings rate around the time of durable purchase. Controls include dummies for calendar time, birth cohort and a third order age polynomial.

imately 7.02 percent of households made a real estate purchase in our sample. Appendix figure A.11 shows the age distribution of heads at the time of major durable goods purchase. As one can see, there is a clear hump shaped profile for each of these goods that closely replicates the hump-

shaped profile for savings rates.[39] However, it could be possible that purchases themselves might follow the general age composition. In that case, the observe hump in the age distribution could simply be driven by demographics and may not convey anything particular about savings motive. In order to deal with this issue, we also regress the instance of durables purchase on a third order polynomial of age. Appendix figure A.12 shows that both major and minor durables purchases are more likely to happen in middle ages. For instance, the probability of buying a durable/asset is roughly 10 p.p. higher at age 50 than at age 30.

6   Robustness

So far our analysis has focused on the aggregate, and some large sub-groups that characterize households in India. We now revisit some of our results after factoring in definition and measurement issues that are likely to be pertinent not just for India but developing countries in general. We consider alternative definitions of the head of household, adult equivalents, and the treatment of home production for consumption. We also check the robustness of life-cycle measures to alternate polynomial functions of age.

6.1   Household Head

We use the self-reported status to ascertain the household head in the survey data. Since the focus of the paper is to understand the patterns in the evolution of consumption, income and savings over the life-cycle, it is important that the reported head of the household is an actual head and not a "figurative head". In other words, measurement errors in determining the head of the household could be problematic for our analysis of consumption and income growth over the life-cycle of the household, which is proxied by the age of the head. Household heads in census and surveys are usually individuals who are primary earners, and/or primary decision makers.[40] It is unclear if this is the case in the context of developing countries with different cultural norms and living arrangements. This can be particularly problematic in multi-generational households, which comprises roughly 30% of our sample. In such a setting, it is conceivable that households may be reporting the head based on seniority in terms of age and not household decision making.

To deal with this issue, we repeat our analysis, reclassifying the head on the basis of earnings status. Specifically, we use the earnings information for each household member to determine the highest earner, and designate this person as the financial head. Table 3 provides some insights on

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[39]Appendix table A.16 also shows the average age of durable goods purchase for Indian households, overall and by different sub-groups.

[40]Refer to Smith (1992) for an interesting history of family and households and Budlender (2003) for a discussion on identifying a household head in data collection.

Table 3: Share of Households With Heads as Primary Earning Members

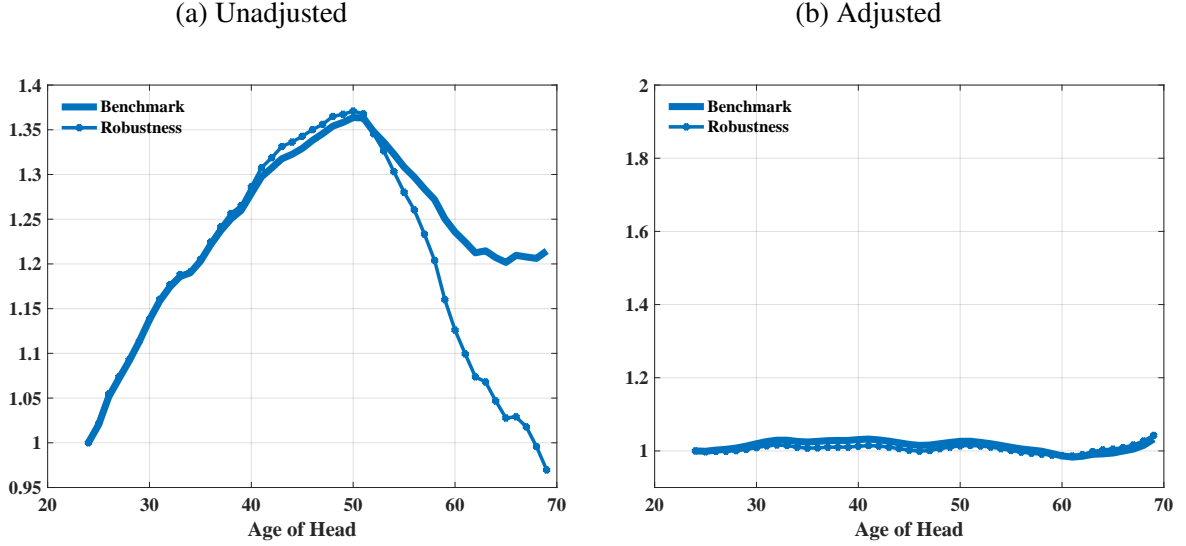|	Avg.	Urban	Rural	Extended	Nuclear	Farmer	Self-Emp.	White-Collar
Share	0.78	0.76	0.78	0.50	0.88	0.81	0.85	0.90

the overlap between the reported head and the financial head as constructed above. For India as a whole, the financial head is also the reported head for a majority (78%) of households. However, there are some interesting differences worth noting. Predictably, in the case of extended families, only half of the reported heads are also the prime earners. It is also interesting to note that living in a rural versus urban area does not predict divergence between the two definitions. Households where the reported head has a white-collared job are most likely to have the same person as the financial head. Appendix figure A.14 goes further and traces the likelihood of the financial head being the same as the reported head by age, for different regions, family type and occupations. The figures clearly show the "seniority" factor - older households are more likely to have reported a "figurative head" than a financial head. This is particularly true in extended families where only 20% of the reported household heads are also the financial heads at age 70. The analogous statistic being 70% for nuclear families.

Figure 10 shows both the household (i.e. unadjusted) and the adult equivalent (adjusted) life-cycle consumption profiles, when we only consider household where the heads are also the primary earners.[41] For easier comparison we also include the benchmark consumption profiles (i.e. using reported household head). The unadjusted consumption still peaks around age 50 with a roughly 37% growth (compared to age 24) as earlier. However, the decline in consumption after age 50 is much more pronounced compared to the benchmark. This indicates that while potential measurement errors in determining the household head may not have any effect on our measurement of consumption growth over the life-cycle of Indian households, it could result in underestimating the decline in household consumption at later ages. Indeed, the decline now closely resembles that of nuclear families (Figure 3a). Adjusted consumption patterns remain unaffected.

Appendix figure A.15 reports the savings rate of households after dropping heads who are not financial heads. We find the same hump shape pattern even though the levels are somewhat lower. We also revisited the consumption profile of extended families. Recall that the consumption per equivalent adult bottoms at around age 50. It turns out that even when we restrict the sample to only those extended families where the head of household is also the primary earner, this pattern does not change. In other words, the U-shaped behavior is not due to a mislabeling of the household head. The profile is displayed in appendix figure A.16.

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[41]We drop all household-wave observations from our sample where the reported head and financial heads are not the same.

Figure 10: Head Robustness: Life-Cycle Consumption
by Age of Household Head

(a) Unadjusted

(b) Adjusted

Notes: This robustness exercise drops all households where the head is not the primary earning member.

6.2 Consumption Scales

Adjusting total household consumption by an equivalence scale allows us to capture the effects of changing demographics on life-cycle consumption patterns. In our benchmark analysis, we have used an OECD scale which assign a value of one to the household head, 0.5 to each additional adult and a value of 0.3 to children. In order to test the sensitivity of our result to a specific form of scaling, we use an alternate household equivalence scale proposed first by NRC (1995), and later used by Scholz et al. (2006), Love (2010) and Nie (2020). This scale is given as:

$$n_i = (n_{Ai} + 0.7 * n_{Ki})^{0.7},$$

where n_{Ai} is the total number of adults in the household i including the head and n_{Ki} is the total number of children. This formulation allows the equivalence scale to distinguish between household composition effects (the different consumption requirements of adults relative to children) and economies of scale.[42] Figure 12 provides adjusted consumption expenditures using both the benchmark OECD and the NRC (1995) scale. We find that the latter results in slightly higher growth in adjusted consumption over the life-cycle than the OECD scale. Specifically, adjusted consumption

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[42]For a couple with 2 children, the value is 2.35 while it is 2.1 for OECD. In India, within family resource allocation tends to be highly skewed in favor of males which neither scale addresses. For more on the intra-household inequality in resource allocation see Browning et al. (2013). Calvi et al. (2021) argue that the OECD parameters over-correct for economies of scale, and lead to significantly lower consumption based poverty rates in Bangladesh.

now grows by 6.5% (3% in benchmark) over the life-cycle and reaches its peak at age 51 (41 in benchmark). The general pattern of relatively smooth consumption is largely unchanged though.

Figure 12: Scale Robustness: Adjusted Life-Cycle Consumption
by Age of Household Head
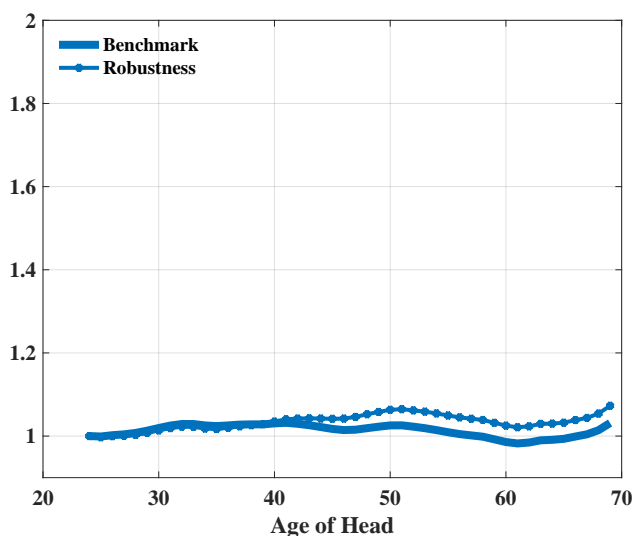
Notes: This figure compares consumption when using the OECD equivalent scale (Benchmark) to that proposed by NRC (1995): $n_i = (n_A + 0.7 * n_K)^{0.7}$.

6.3 Home Production

We next explore the possibility of home production crowding out some of the expenditures on non-durable consumption. There are two important types of home production that are relevant. First, households may engage in agricultural production for self-consumption. This is more likely to happen in rural areas. Second, there are standard household chores that constitute home production for which there are market alternatives (including the hiring of domestic help - a common phenomenon in urban Indian middle class households). Thus analyzing consumption expenditures and its growth over the life-cycle may not be reflective of actual growth in consumption.

While it is extremely difficult to get a good estimate of the total value of home production being carried out by households, the survey data utilized in this analysis calculates imputed values based on self reports that allow us to deal with the first problem. Households are asked about the "total quantity of agricultural or commercial goods produced that were self consumed by the household in the last month". The value of home production is then derived by multiplying the quantity of the agricultural goods produced by the household and the price of the crop in the local market. For self-employed households, goods taken from their own "kirana" (grocery) stores or

Table 4: Estimated Annual Value of Home Production
By Region Type

(in USD PPP)	Home Production		Non Durable Expenditures	
	Mean	Std. Dev.	Mean	Std. Dev.
Average	158.14	647.85	5945.14	3269.56
Urban	36.59	343.84	7381.07	4039.94
Rural	216.22	743.88	5258.96	2557.93

Notes: Home production here refers to the imputed value of agricultural and commercial goods produced for self-consumption.

restaurants or those earned in kind through the barter system are also included in this estimate. Table 4 provides some summary statistics of the monthly estimated value of home production in Rupees. It is interesting to note that these estimates are quite small compared to expenditures on monthly non-durable consumption, and somewhat larger in rural areas than in urban areas as expected.

We add these imputed values of home production to our non-durable consumption expenditure measure and re-run the benchmark analysis to estimate life-cycle profiles of consumption.[43] Figure 13 reports both adjusted and unadjusted consumption profiles. We find that there are no significant effects of food production on the growth of consumption over the life-cycle – both when adjusted and unadjusted for demographics. Appendix figure A.17 shows these profiles by region and family type. As expected the small differences are due to rural areas and extended families as urban profiles remain completely unchanged.

Female labor force participation in India is one of the lowest in the world, and in fact has been declining during this period (Deshpande and Singh, 2021). Since women do most of home production, are we severely underestimating the *growth* in life-cycle consumption? While it is hard to take this into account in our empirical analysis, it seems unlikely. A major component of home production centers around child rearing which is likely to be more pronounced during the earlier years of household's life-cycle. This would raise consumption during that phase. In other words, if we added this, it would lower consumption growth and not increase it. Second, as shown earlier, the bulk of rural income growth and almost half of urban total household income growth comes from increasing labor force participation. While Indian women are expected to shoulder the responsibility of household chores even if they have careers, at least on the margin, there are some households where market goods and services substitute home production over the life-cycle. Combined - these phenomenon would suggest a flatter, and not steeper, slope for consumption.

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[43]The survey already includes these imputed values in total household income but not in consumption.

Figure 13: Home Production Robustness: Life-Cycle Consumption
by Age of Household Head
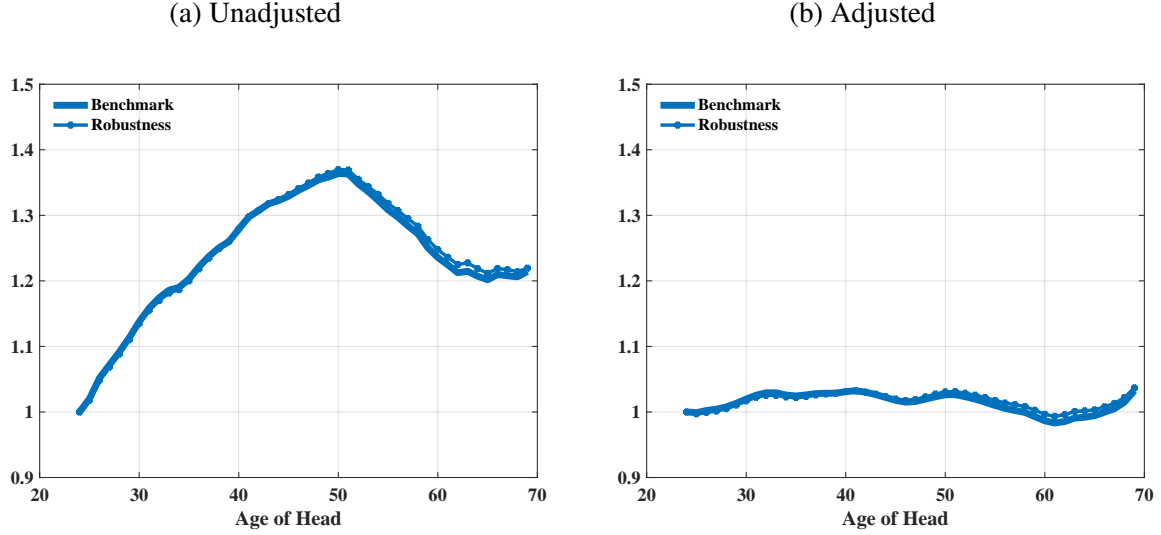
(a) Unadjusted

(b) Adjusted

Notes: This robustness exercise adds estimates of home production to household consumption expenditures.

6.4 Alternate Specification

Nonparametric regression estimators have become common tools for researchers as they allow for a flexible relationship between the control and the dependent variables of interest. Here we would like to test how robust our estimate of consumption growth is to the use of a standard parametric regression model. We use the same benchmark controls for birth cohort and time and a third or fourth order polynomial for age to estimate the non-linear relationship. Specifically, $f(age_{it})$ is now a third or fourth order polynomial of age age_{it} in equation (1). Table 5 shows that our estimates of consumption growth over the life-cycle vary somewhat across specifications. Unadjusted consumption growth varies between 33 and 36% while adjusted growth varies between 3 and 4%.

Table 5: Life-Cycle Consumption Growth in India
Under Alternate Specifications

	Unadjusted		Adjusted	
Spec.	Δ^*	Peak Age	Δ^*	Peak Age
Third order polynomial	1.33	48	1.04	37
Fourth order polynomial	1.34	47	1.04	41
Nonparametric	1.36	50	1.03	41

Notes: *Δ refers to the ratio of peak consumption expenditures to age 24 consumption expenditures. Peak age refers to the age at which highest life-cycle consumption is attained.

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7 Discussion

Using a recently introduced, nationally representative panel of Indian households, we investigate the patterns in life-cycle consumption, income and savings rate. We compare these life-cycle profiles to that of the U.S. households to further understand how consumption and savings behavior in a developing country differs from the experiences of a developed country like the U.S. Our study reveals intriguing similarities and contrasts between the two countries.

In the first part of the analysis, we find that the growth in total non-durable consumption expenditures in India, especially urban areas, is very similar to that of the U.S. households ($\approx 50\%$). However, stark contrasts are revealed when comparing family size adjusted expenditure profiles. While U.S. households still experience a 30% growth in expenditures, all the growth in non-durable consumption disappears for Indian households. This presents a puzzle given that Indian households experience a significant growth in income, even after adjusting for family size. To investigate this further, we estimate the age-profile of savings rate for Indian households and find that it exhibits a prominent hump where household income net of non durable expenditures grows from 10 to more than 30% between ages 35 and 55. The finding that non-durable consumption after adjusting for family size stays relatively flat, while savings rate grows implies that households in India do not smooth consumption in the traditional life-cycle - perfect markets sense. Instead, they accumulate durable goods, physical and/or financial assets.

In the second part of the analysis, we focus on understanding the drivers of high savings rate for Indian households. While we do not directly observe the expenditures incurred on purchasing physical assets like housing, car, cattle and so on, we do observe a physical inventory of all major and minor durable goods owned by the households as well as reported intentions to purchase these in a tight window of four calendar months and actual purchase instances within the same time frame. We utilize the panel structure of our data-set in the second part to see how reported intentions or actual purchases shape the savings rate of these households. We document four interesting findings. First, we find that an index constructed using all major and minor durable goods owned by the households exhibit a significant hump (roughly 80% growth) over the life cycle. Second, we find that reported intentions to purchase physical assets are predictive of actual purchases and these intentions to purchase physical assets and durables increase savings rate. For instance, house buying intentions increase savings rate by roughly 4 to 10 percentage points (across specifications) and in rural areas, intentions to buy cattle or a tractor increases savings rate by 3.8 and 7.5 percentage points (specification with full controls) respectively. Third, household savings rate go up over the life-cycle leading to the actual purchase and then decline after the purchase for a majority of the durable purchases. And finally the durable purchases seem to be distributed around the middle of the life-cycle where savings rate peak.

We conduct a host of robustness tests to check the sensitivity of our key findings – growth in total and adjusted consumption expenditures over the life-cycle. A major threat to the life-cycle analysis is the variability of the household head — whether the reported "household head" meant different things at different points in a household's life-cycle — from a primary earning member to a figurative head later in life-cycle. In order to test this, we relabel household head as the member with the highest income in the family and redo all our analysis. We find that the growth in consumption is fairly robust to this alternate definition of head. All results also seem fairly robust to the inclusion of home production measures, different equivalence scales, and econometric specifications.

In summary, this study provides, what we believe, is a first in-depth view of life-cycle consumption and savings in India. In doing so, we provide a perspective that is not only different from that observed in high-income countries but also shed new light on how lack of access to credit markets might interact with the timing of consumption especially in case of lumpy durables. Our findings suggest a flat non-durable consumption profile once family size is taken into account but a potentially hump-shaped profile for major durable goods. In an incomplete markets world, consumption expenditures track income due to the inability of the economic agents to borrow against future labor income. In the case of Indian households, adjusted non-durable expenditures do not track income not because of the ability of agents to smooth consumption, rather the inability to spread out expenditures of lumpy durable purchases.

While our results provide a fresh perspective, it is also important to consider and address some of the limitations. Readers might be concerned that unlike the literature that has emerged from the U.S. and other countries, ours relies on a panel that has a much shorter time frame of six years. While a longer panel would have been ideal, the growth of the Indian economy during this period has also been rapid. Real per capita consumption expenditures both in the survey data and national accounts statistics average 6-6.5% growth annually. In other words, growth in expenditures during this period was equivalent to what one might see in the U.S. easily over more than a decade. Furthermore, even for the U.S. there is some recent evidence suggesting that life-cycle analysis using long panels may generate artificial humps that hide systematic time variation (Aksoy et al., 2020). Similarly Chamon and Prasad (2010) find evolving patterns for China. A related criticism with respect to a short panel is that younger households might be consuming more in anticipation of higher income growth compared to older households. This can naturally cause the consumption profile to appear smoother than the underlying data. This is a genuine concern especially in a fast growing economy. However, India has now been growing rapidly for more than two decades. Thus even those household heads who are in their forties and fifties would have formed similar expectations at the start of their earnings cycle. Moreover, urban households, where these effects might be stronger, actually show steeper growth. A third concern is whether specific

macro-events might have affected our conclusions. Since our analysis ends prior the Covid-19 pandemic, the other remaining crisis is the demonetization experiment in late 2016. Interestingly, the few household analyses of consumption expenditures have found very little effects (Chanda and Cook, 2020; Wadhwa, 2019), and even the macroeconomic effects seem to have quickly dissipated (Chodorow-Reich et al., 2020; Lahiri, 2020).

There can also be concerns about whether the survey correctly records income and consumption. As we noted earlier consumer expenditures closely match that of a recent government survey. The usual concern is whether income is recorded accurately. This is a problem with all surveys - especially at the higher end of the distribution. In our view, the bigger surprise here is the high savings rates. If income is being under-reported then that would mean even higher savings rates which would reinforce some of the novel findings of the research.

One area where more research needs to be done is the actual composition of savings. While we observe a large and increasing gap between household income and consumption, and provide evidence that consumer durables play an important role, we are unable to decompose the extent to which savings can be decomposed into financial savings, durables purchases, and jewelry. While this decomposition would be informative, it's already well documented that the bulk of Indian household assets are in the form of physical assets, and they have very little in financial assets. Badarinza et al. (2017) observed this for 2013, and the subsequent national survey reinforced this for 2019 (GOI (2021)) i.e. book-ending our period of study.[44] Gold jewelry too remains an important vehicle for savings. However unlike other major asset purchases, the survey data indicates that households smooth their gold purchases over the life-cycle. This is not surprising since, apart from being viewed as an inflation hedge, jewelry has been an important component of dowry and wedding expenses more generally, and families tend to incrementally accumulate it over many years.

This brings us to a topic that we have been silent about so far - the role of dowry (bride price) in the motivation for savings. In part this is because it is difficult to disentangle the dowry motive from other reasons such as precautionary savings. Certainly our twin findings that consumption per equivalent adult remains smooth, while saving for large durable purchases is consistent with a dowry motive. Beyond that separating a dowry motive from other drivers is difficult. This is well known in the development literature, where usually one has to use identification strategies such as the gender of the first child to extricate differences in savings and childhood investments.[45] The aggregate implications of the dowry motive for consumption and savings in India is an area ripe for future research.

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[44]Gopalakrishnan et al. (2019) use rainfall shocks to show that households use financial savings as a transitory asset class and real estate purchases for long term savings. Since they also use the CPHS data, they do not have actual values.

[45]Anukriti et al. (2022) use this strategy to examine savings behavior in rural households.

8 Conclusion

Using a newly available and nationally representative data set, we provide what we believe, is a first in-depth view of life-cycle consumption and savings behavior of Indian households. We find interesting similarities and well as stark contrasts in the evolution of consumption over the life-cycle of Indian and American households. Our key findings are robust to battery of tests. However, the study is not without limitations. The most salient being our inability to observe actual expenditures incurred for the purchase of durable goods. This is not an issue specific to our data but plagues, at least to some extent, every known survey of consumer expenditures. For instance, the durable expenditures reported in PSID or CEX (two widely used surveys conducted in the U.S.) are mostly confined to vehicle purchase and mortgage related expenditures. However, we can gauge how possession of physical assets grows over the life cycle by constructing an index of all major and minor durable goods owned by households. While we are able to conclude that households' purchase of physical assets and durables increase savings over the life-cycle, we are not able to isolate the drivers of these behaviors – precautionary motive, dowry motive, mortality risk at older ages, health risks and so on. We leave this important topic to be explored further in future work in this area.

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A   Appendix

A.1   Expenditure Categories

Our measure of total non-durable expenditures include major categories like food, non-mortgage housing, clothing, transport, health, education, recreational activities and other miscellaneous items. Both PSID and CPHS data report total household expenditures as well as on these major categories. We discuss the similarities and differences in these below.

Food

In CPHS, we sum up expenditures on three broad items — food, intoxicants and restaurant meals. Food items include cereals & pulses, edible oils, spices, vegetables & fruits, meat, fish & eggs, milk & milk products, ready-to-eat food, spices, bread, snacks, noodles & pasta, flakes, muesli & oats, confectionery & ice-creams, health supplements, tea, coffee, sweeteners, and beverages, juices & bottled water. Intoxicants include liquor and tobacco products. Restaurant meals include food and non-alcoholic beverages consumed in restaurants or snack joints.

In PSID, we use the total family food expenditure variable which includes expenditures for food at home, delivered, and eaten away from home. We do not have any measures of intoxicants reported separately in PSID. Even though households report annual expenditures on food starting 1999, we restrict our analysis to years between 2005 and 2019 as some of the other expenditure items like clothing, trips etc (present in CHPS) only became available in PSID starting 2005.

Housing

Non-mortgage housing expenditures in CHPS include expenditures on rent and bills, power and communication. Rents and bills include household expenditures on house rent, water charges, society charges, and any other taxes. Power expenditures are a sum total of the household expenditures on cooking fuel, petrol, diesel and electricity. Finally, communication expenditures include household expenditures on landline telephone bill and mobile phone charges.

PSID reports several categories of housing expenditures like mortgage and loan payments, rent, property tax, insurance, and utilities including gas, electricity, water and other items. Since, mortgage payments are not included in CHPS, we restrict the expenditures to those other than mortgage-related. Specifically, we exclude mortgage and loan payments, property tax and insurance from total housing expenditures.

Clothing

Expenditures in CHPS in this category include clothing, footwear and cosmetics. While former includes household expenditure on clothing (such as garments, jackets, woolens, etc), clothing accessories and footwear, latter includes household expenditure on cosmetics and toiletries including dental care products and bathing soap.

Clothing expenditures in PSID reported by households include expenditures incurred on on clothing and apparel, including footwear, outerwear, and products such as watches or jewelry. As far as we know, PSID does not report any expenditures separately on cosmetics.

Transportation

In CPHS, transport expenditures relate to various modes of transport and other charges. including "Daily Bus/Train/Ferry Fare", "Auto-rickshaw/Taxi Fare", "Outstation Bus/Train Fare", "Parking Fees", "Toll Charges and Airfare". Note that expenditures related to vehicle purchase are reported separately and not included in our measure.

Transportation related expenditures in PSID include expenditures for vehicle loan, lease, and down payments, insurance, other vehicle expenditures, repairs and maintenance, gasoline, parking and car pool, bus fares and train fares, taxicabs and other transportation. We net out vehicle down payment and lease related expenditures from this measure to get a more comparable measure to CHPS.

Health

CPHS data report health expenditures related to expense on medicines, doctor's fees, X-Ray tests, hospitalization fees, premium for health insurance, etc.

Health expenditures in PSID include total family health care expenditures including spending on hospital and nursing home, doctor, prescription drugs and insurance.

Education

In CPHS, this is the sum total of household expenditure on education. It includes expenses on stationery, school/college fees, private tuition fees, additional professional education, overseas education, hobby classes and other items of education.

Education expenditures in PSID include all schooling related expenditures.

Recreation

Recreation expenditures in CPHS include expenditure on electronic storage devices, entertainment and games/toys. Electronic storage devices include pen drives, hard disks, memory cards, CDs, DVDs, cassettes, records and other mediums. Entertainment includes movie tickets, theatre tickets for drama, music concerts or general entertainment programs, tickets and subscriptions to entertainment clubs such as discotheque, tickets to sports events like tournament matches or other sports events, tickets to the zoo, tickets to museums, art galleries, planetariums, circus, theme parks, etc. Games/toys includes all kinds of indoor or outdoor toys or sports equipments or materials for children and/or adults.

Recreation category in PSID inlcude expenditures on trips and vacations, including transportation, accommodations, and recreational expenses on trips as well as on other recreation and entertainment activities, including tickets to movies, sporting events, and performing arts and hobbies including exercise, bicycles, trailers, camping, photography, and reading materials.

Others

In CPHS data, the other category include household expenditure on domestic help/laundry, repair of vehicles, remittances sent, social obligations, religious obligations, etc. It includes all household expenses that were excluded from the above categories.

To keep the definitions close, we include expenditures on home repairs and maintenance as well as furnishing in PSID in this category as well as expenditure on household furnishings and equipment, including household textiles, furniture, floor coverings, major appliances, small appliances and miscellaneous housewares.

A.2   Occupational Classification

The "People of India" files provide information on the occupation of each household member including the head. Appendix table A.1 below shows the various occupations of the head and it's distribution in our sample for overall and for both urban and rural areas. Given these classifications, three broad groups emerge for the working-age head — those working on farm or related activities, those working on their own business and those working in professional white-collared jobs. Given this we re-code occupations for the analysis conducted in this paper into the following three groups. First we define farmer as those working as *Agricultural Labourer*, *Organised Farmer*, *Small Farmer* or *Wage Labourer*. We classify self-employed as those reported as *Qualified Self Employed Professionals*, *Self Employed Entrepreneur*, *Self employed professional*, *Small Trader/Hawker/ Businessman without Fixed Premises* or *Businessman*. Finally we combine categories such as *White collar worker*, *White Collar Clerical Employees*, *Legislator/Social Worker/ Activists*, *Manager* and *White-Collar Professional Employees and Other Employees* into a single white-collar category. Since reported occupation of the head can change over multiple observed waves leading to retirement, we classify household head's occupation based on the one reported at the time of first interview.

A.3   Asset Index

We construct a measure of household wealth by looking at physical asset holdings of households in our sample. We abstract away from financial assets as they form a much smaller share of total asset holdings of Indian households. The CPHS data provides information on assets and liabilities. However, it only reports an inventory of physical assets like television, tractor, refrigerator, house, car, two-wheeler etc. and not their monetary value. Adding up the physical count of these assets to construct an index would be problematic as different assets carry different weights — television set is different from a car. In order to deal with this issue, we follow Karmakar and Narayanan (2020) and construct a measure of wealth (A_{it}) in the following way:

$$A_{it} = \sum_{j=1}^{J} x_{ijt} * \omega_{jt} \tag{4}$$

Where x_{ijt} is a physical count of asset j for household i in wave t and ω_{jt} is the relative weight of asset j constructed as follows:

Table A.1: Occupation of Household Head

	All	Urban	Rural
Agricultural Labourer	4.14	0.74	11.24
Businessman	8.77	11.66	2.74
Home Maker	6.76	7.36	5.51
Home-based Worker	0.64	0.77	0.37
Industrial Workers	3.96	4.97	1.86
Legislator/Social Worker/ Activists	0.06	0.06	0.05
Manager	0.32	0.45	0.06
Non-Industrial Technical Employee	1.52	1.87	0.79
Organised Farmer	4.13	1.04	10.59
Qualified Self Employed Professionals	0.46	0.63	0.10
Retired/Aged	10.30	12.07	6.61
Self Employed Entrepreneur	9.28	11.42	4.82
Self employed professional	0.75	0.94	0.33
Small Farmer	9.32	1.50	25.66
Small Trader/Hawker/ Businessman without Fixed Premises	3.93	4.88	1.93
Student	0.01	0.01	0.01
Support Staff	7.16	8.89	3.55
Unoccupied	0.46	0.49	0.39
Wage Labourer	19.66	19.34	20.35
White Collar Clerical Employees	3.69	4.76	1.46
White collar worker	1.24	1.65	0.39
White-Collar Professional Employees and Other Employees	3.44	4.52	1.19
Total	100.00	100.00	100.00

$$\omega_{jt} = \frac{1}{\left[\frac{1}{N}\sum_{i=1}^{N} I\{x_{ijt} > 0\} * w_{it}\right]} \tag{5}$$

Note that the denominator in eq. (5) is essentially the weighted share of households owning a particular asset (w_{it} being the sample weight). As a result, this methodology assigns more weight to assets that are less widely held. The underlying assumption is that the lesser the share of a particular asset, the higher is it's relative valuation. Table A.2 provides some summary statistics of this measure of assets in our sample over time.

Table A.2: Wealth Index Distribution

	mean	sd	min	max
2014 Wave 1	18.9	27.0	0	380.8
2014 Wave 2	18.7	26.5	0	284.4
2014 Wave 3	18.1	21.1	0	279.7
2015 Wave 1	18.0	30.2	0	7575.1
2015 Wave 2	17.6	20.5	0	191.4
2015 Wave 3	17.8	20.4	0	207.2
2016 Wave 1	17.5	20.0	0	276.8
2016 Wave 2	17.3	20.3	0	222.8
2016 Wave 3	16.9	20.7	0	388.5
2017 Wave 1	16.9	21.4	0	556.8
2017 Wave 2	16.7	20.8	0	497.7
2017 Wave 3	16.3	19.8	0	708.5
2018 Wave 1	16.3	22.3	0	4043.3
2018 Wave 2	16.4	18.9	0	882.1
2018 Wave 3	16.5	18.6	0	595.8
2019 Wave 1	16.4	18.2	0	338.5
2019 Wave 2	16.4	18.4	0	1435.2
Observations	2096472			

A.4 Additional Figures and Tables

Table A.3: OLS Estimates of Birth Cohort and Time Effects on Consumption, Income and Savings Rate of Indian Households

	Ln(Consumption)	Ln(Income)	Savings Rate
Birth Cohort Dummy = 2	0.00334	-0.0299**	-0.0283***
Birth Cohort Dummy = 3	-0.0137	-0.0901***	-0.0556***
Birth Cohort Dummy = 4	-0.0525***	-0.137***	-0.0566***
Birth Cohort Dummy = 5	-0.0730***	-0.162***	-0.0486*
Birth Cohort Dummy = 6	-0.0632***	-0.157***	-0.0477*
Birth Cohort Dummy = 7	-0.0496*	-0.135***	-0.0375
Birth Cohort Dummy = 8	-0.0511*	-0.113***	-0.0138
Birth Cohort Dummy = 9	-0.0613*	-0.0968**	0.0209
Birth Cohort Dummy = 10	-0.0748**	-0.0769	
Time Dummy = 2	0.0421***	0.0416***	0.00692
Time Dummy = 3	0.00813	0.0122	0.0212**
Time Dummy = 4	0.0319***	0.00871	-0.00537
Time Dummy = 5	0.0470***	0.0135	-0.0117
Time Dummy = 6	0.116***	-0.0228**	-0.126***
Time Dummy = 7	0.134***	-0.00740	-0.113***
Time Dummy = 8	0.0831***	-0.0246**	-0.104***
Time Dummy = 9	0.0293***	-0.0509***	-0.0942***
Time Dummy = 10	0.0450***	0.0171*	-0.0211**
Time Dummy = 11	0.0933***	0.0844***	-0.0153*
Time Dummy = 12	0.182***	0.140***	-0.0534***
Time Dummy = 13	0.185***	0.206***	0.0118
Time Dummy = 14	0.208***	0.232***	0.00157
Time Dummy = 15	0.217***	0.243***	-0.00129
Time Dummy = 16	0.246***	0.278***	0.0176*
Time Dummy = 17	0.236***	0.275***	0.0332***
Observations	780	780	663

$* \ p < 0.05$, $** \ p < 0.01$, $*** \ p < 0.001$

Table A.4: OLS Estimates of Birth Cohort and Time Effects
on Consumption and Income of U.S. Households

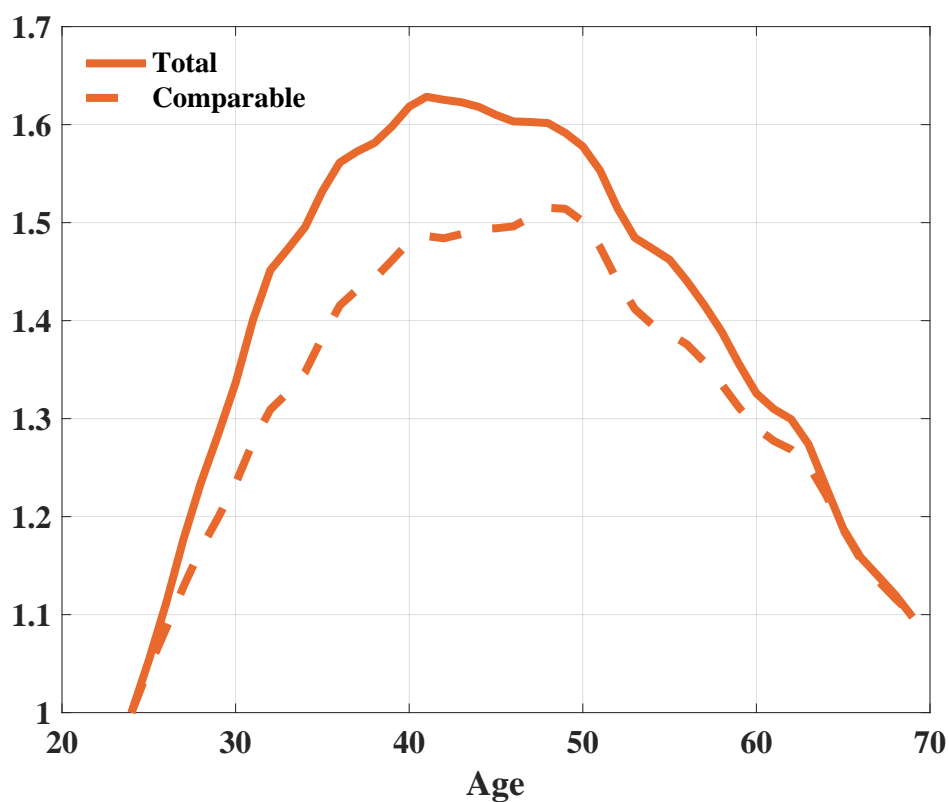|	Ln(Consumption)	Ln(Income)
Birth Cohort Dummy = 2	-0.0153	0.00359
Birth Cohort Dummy = 3	0.0805*	0.0449
Birth Cohort Dummy = 4	0.0485	0.0501
Birth Cohort Dummy = 5	0.0985	0.128
Birth Cohort Dummy = 6	0.0100	0.0323
Birth Cohort Dummy = 7	-0.0581	-0.109
Birth Cohort Dummy = 8	-0.0542	-0.173
Birth Cohort Dummy = 9	-0.00880	-0.155
Birth Cohort Dummy = 10	-0.0116	-0.163
Birth Cohort Dummy = 11	-0.00906	-0.147
Birth Cohort Dummy = 12	-0.0536	-0.248
Birth Cohort Dummy = 13	-0.0753	-0.305
Birth Cohort Dummy = 14	-0.0347	-0.263
Time Dummy = 2	0.0280	0.0155
Time Dummy = 3	-0.0147	0.0359
Time Dummy = 4	-0.0434	-0.0352
Time Dummy = 5	-0.0629*	-0.00155
Time Dummy = 6	-0.0691*	0.0114
Time Dummy = 7	-0.0563	0.0290
Time Dummy = 8	0.0663	0.0914
Observations	505	505

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.5: Household Composition by Age of Household Head

Age Group	Spouse	Children			Parents	Grand children	Others	Number
		0-5	6-10	11-16				
20-29	0.87	0.54	0.38	0.05	0.17	0.00	0.12	3.53
30-39	0.92	0.23	0.63	0.44	0.11	0.00	0.05	4.09
40-49	0.89	0.05	0.21	0.55	0.07	0.03	0.08	4.20
50-59	0.83	0.10	0.13	0.18	0.03	0.18	0.26	4.07
60-69	0.75	0.13	0.21	0.16	0.01	0.37	0.45	4.04
70-79	0.69	0.10	0.21	0.22	0.00	0.47	0.52	4.11
80-89	0.59	0.06	0.15	0.22	0.00	0.51	0.56	4.11
Total	0.84	0.12	0.26	0.33	0.06	0.15	0.21	4.10
Observations	2356598							

Notes: Columns 2-8 report the fraction of households reporting the presence of respective members.
Others in the extended family refer to presence of siblings, their families or other relatives living
in the same household. Family size refers to the total number of members in the household.

Figure A.1: Unadjusted Life-Cycle Consumption in the U.S.
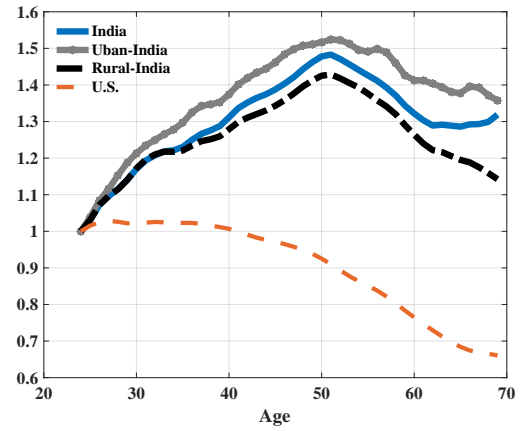by Age of Household Head

Notes: Total household consumption relative to age 24 (household head) is reported. Data for the U.S. comes from Panel Study of Income Dynamics. Comparable categories include total expenditures on 1) food 2) transportation 3) education 4) childcare 5) health care 6) clothing 7) household repairs and furnishing 8) trips and recreational activities 9) housing related to rent, utility, telephone and internet. Total consumption includes, in addition to comparable categories, mortgage, property taxes and home owner's insurance.

Figure A.2: Unadjusted Life-Cycle Consumption
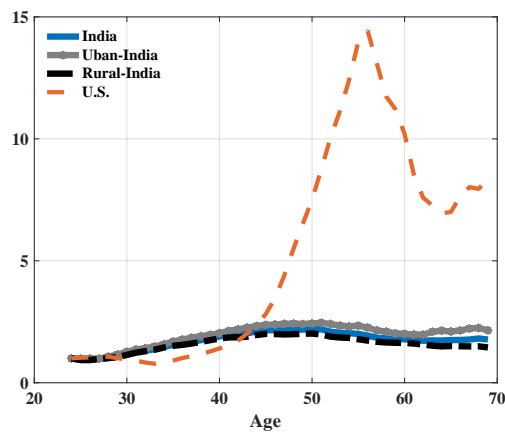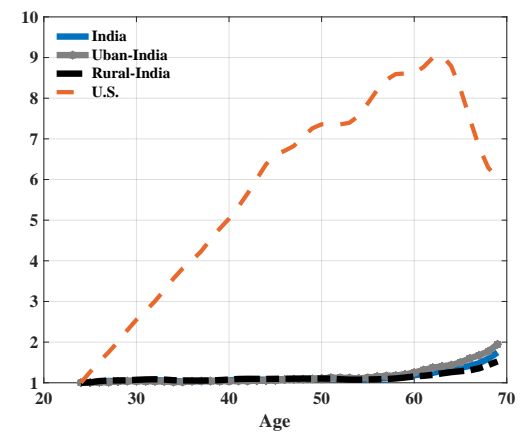## by Age of Household Head and Expenditure Categories

(a) Food
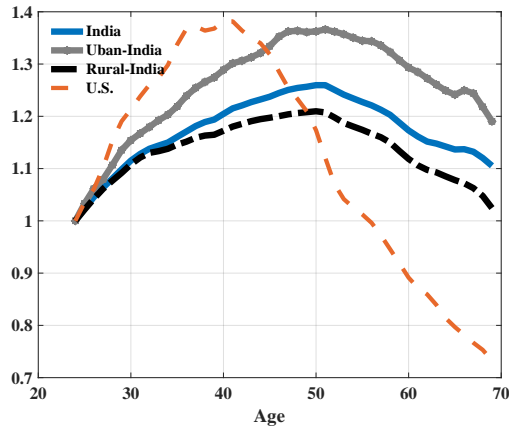
(b) Non-Mortgage Housing
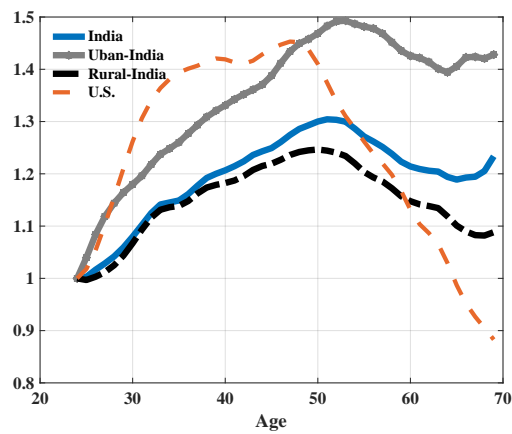

(c) Education

(d) Health

(e) Transportation

Table A.6: Average household size by age of household head

| Age Group	Children			Parents	Grand children	Others
	0-5	6-10	11-16			
20-29	1.29	1.35	1.22	1.25	1.48	1.68
30-39	1.18	1.48	1.47	1.20	1.55	1.62
40-49	1.18	1.31	1.51	1.14	1.51	1.27
50-59	1.23	1.34	1.34	1.07	1.70	1.16
60-69	1.21	1.37	1.40	1.04	1.89	1.14
70-79	1.18	1.33	1.39	1.05	1.99	1.14
80-89	1.16	1.32	1.35	1.04	2.02	1.14
Total	1.21	1.39	1.46	1.16	1.83	1.19
Observations	1472085					

Notes: Columns 2-7 report the average number of each type of member present in the household, conditional on having them. Others in the extended family refer to presence of siblings, their families or other relatives living in the same household.

Figure A.3: Life-Cycle Consumption Less Education and Health
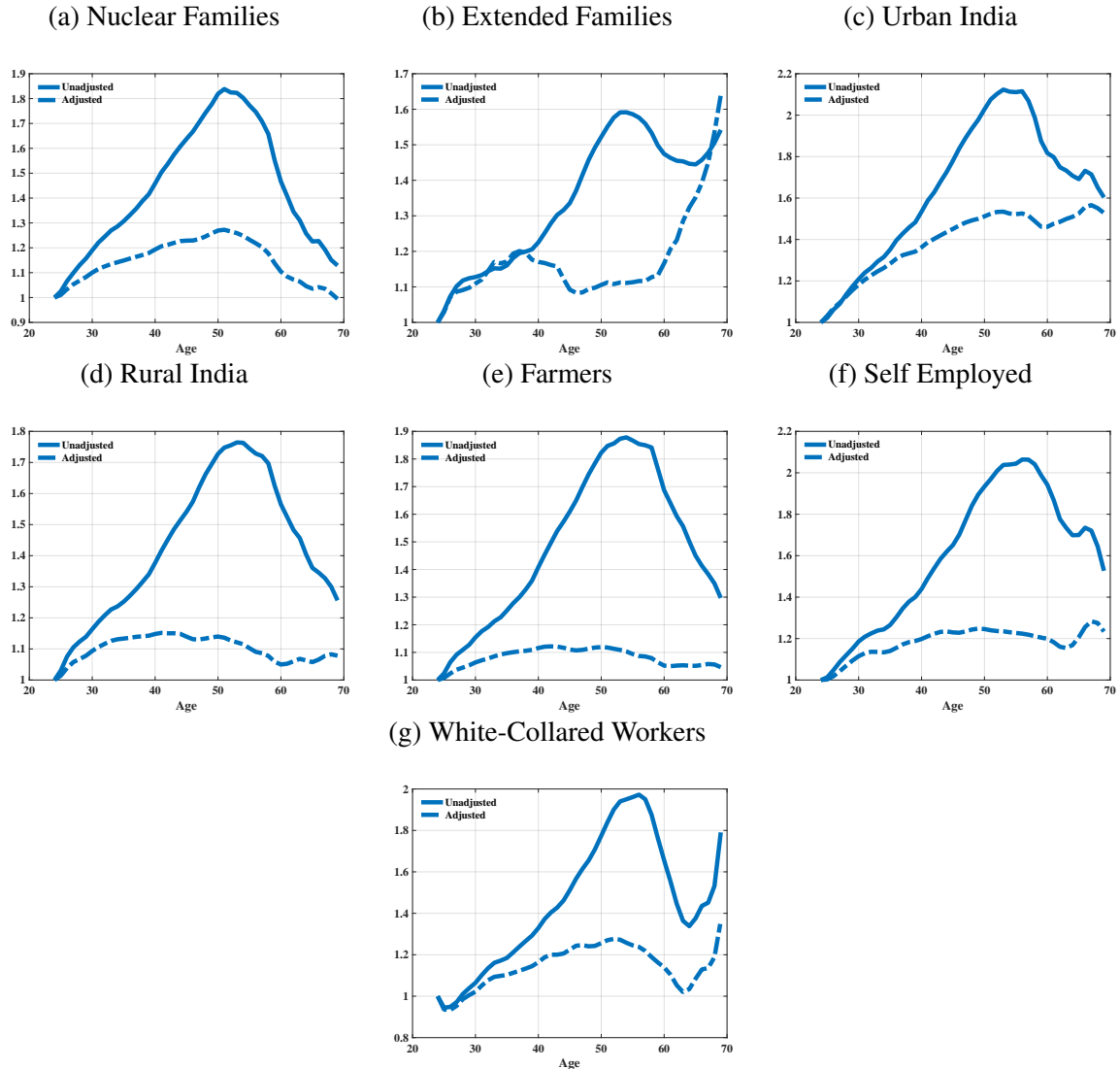by Age of Household Head

(a) Unadjusted

(b) Adjusted
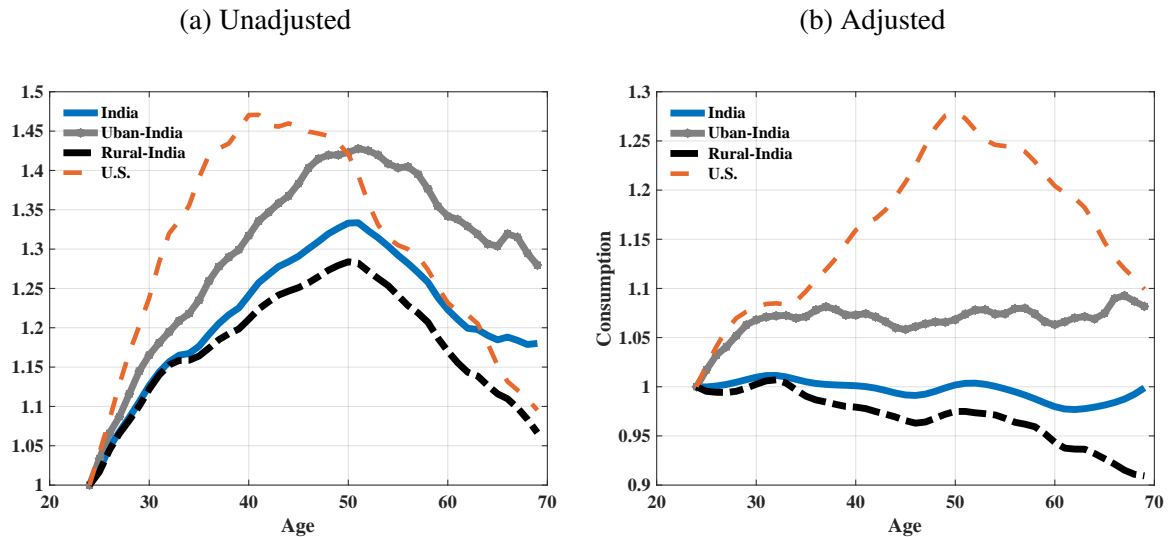
Notes: Consumption relative to age 24 (household head) is reported for both U.S. and India. Data for the U.S. comes from Panel Study of Income Dynamics. Expenditure categories include total expenditures on 1) food 2) transportation 3) childcare 4) clothing 5) household repairs and furnishing 6) trips and recreational activities 7) housing to related rent, utility, telephone and internet. Total household consumption in panel (b) is adjusted for family size by using a modified OECD scale which assigns a weight of one to household head, 0.3 to each children under/of the age of 16 and 0.5 to each adult over the age of 16.

Figure A.4: Life-Cycle Consumption
by Age and Education Status of Household Head
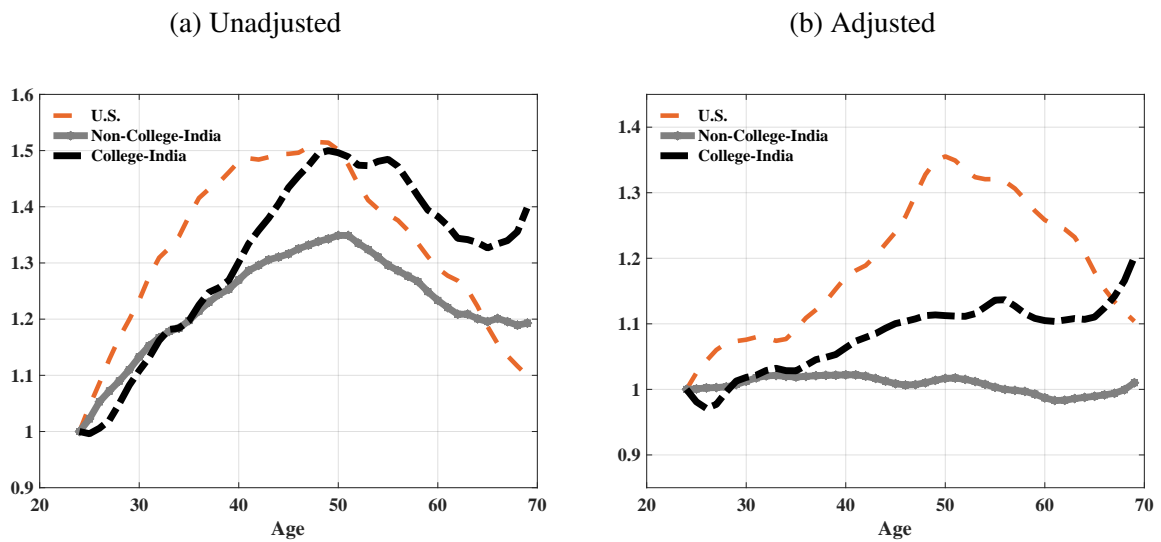
(a) Unadjusted   (b) Adjusted

Notes: Household consumption relative to age 24 (household head) is reported for both U.S. and India. Data for the U.S. comes from Panel Study of Income Dynamics. Adjusted refers to total household consumption divided by family size using a modified OECD scale which assigns a weight of one to household head, 0.3 to each children under/of the age of 16 and 0.5 to each adult over the age of 16. Expenditure categories include total expenditures on 1) food 2) transportation 3) education 4) childcare 5) health care 6) clothing 7) household repairs and furnishing 8) trips and recreational activities 9) housing to related rent, utility, telephone and internet. College refers to those with graduate or post-graduate degrees (including doctorate and MPhil degrees). Non-college includes those without any formal education.

Figure A.5: Life-Cycle Income
by Age of Household Head, Family Type, Region and Occupation

(a) Nuclear Families   (b) Extended Families   (c) Urban India

(d) Rural India   (e) Farmers   (f) Self Employed

### (g) White-Collared Workers

Notes: Adjusted income reports estimates of total household income divided by number of earning members. Total household income relative to age 24 (household head) is reported for each region and family size type. Family income for India includes income from all sources including private/public transfers, profits, lotteries, wages, overtime, bonus, interest payments, dividends and insurance payments.

Figure A.7: Life-Cycle Income
by Age and Education Status of Household Head
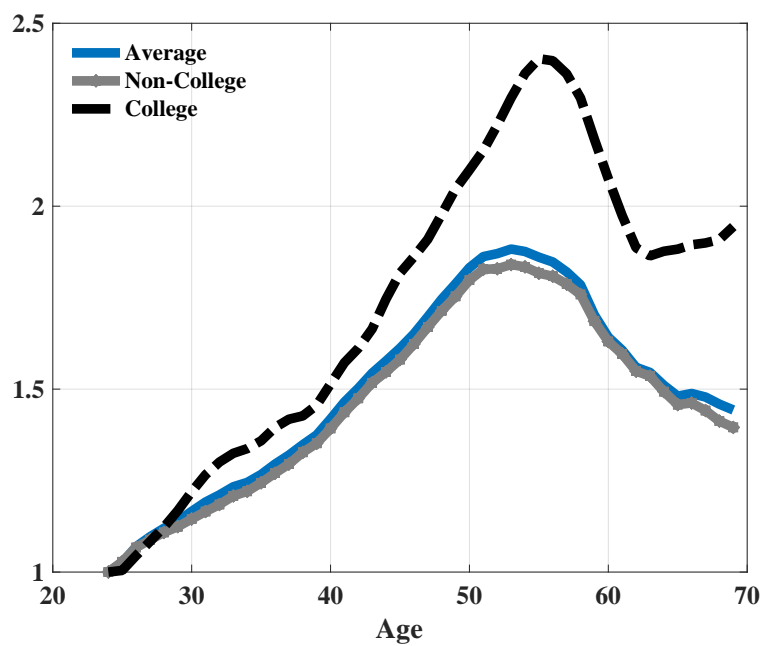
Notes: Total household income relative to age 24 (household head) is reported. Family income for India includes income from all sources including private/public transfers, profits, lotteries, wages, overtime, bonus, interest payments, dividends and insurance payments. College refers to those with graduate or post-graduate degrees (including doctorate and MPhil degrees). Non-college includes those without any formal education.

Figure A.8: Life-Cycle Savings Rate
by Age and Education Status of Household Head
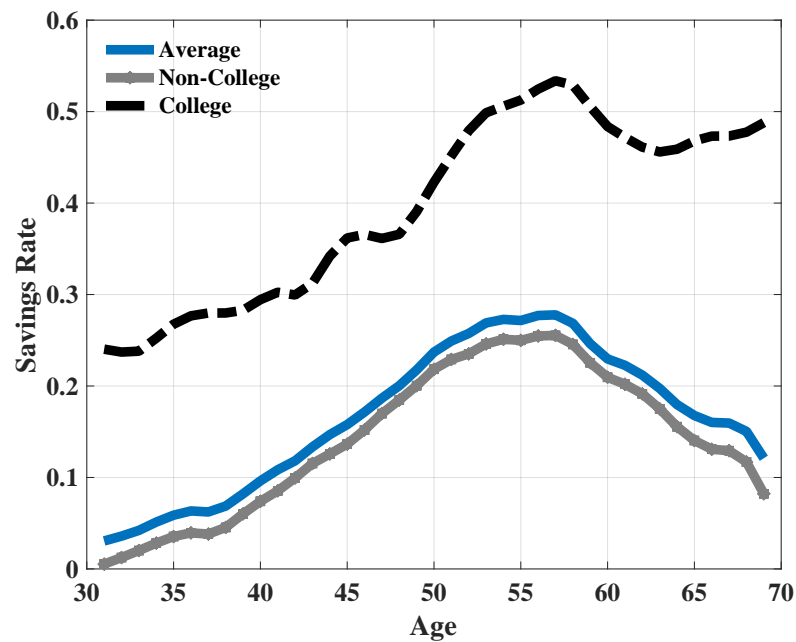
Notes: Savings rate is computed as total household income net of total non-durable consumption as a fraction of total household income. College refers to those with graduate or post-graduate degrees (including doctorate and MPhil degrees). Non-college includes those without any formal education.
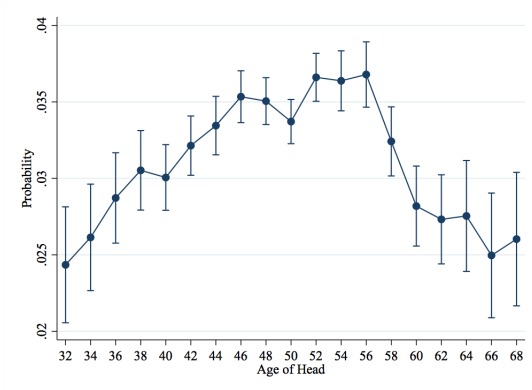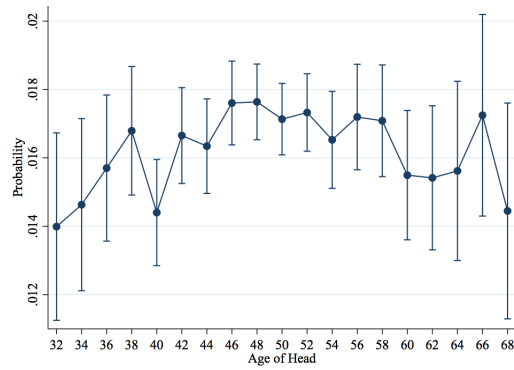
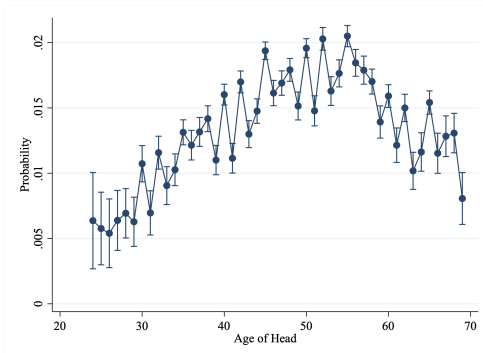## Figure A.9: Borrowing For Home and Durable Purchases

(a) Probability of Borrowing for House By Region

(b) Probability of Borrowing for Consumer Durables By Region

(c) Probability of Making an Installment Payment for House

(d) Probability of Making an Installment Payment for Durables
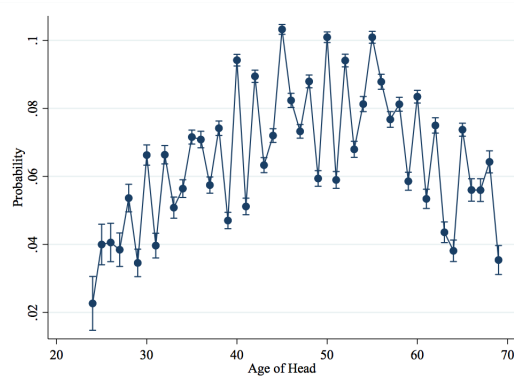
Notes: Probability of borrowing for house or consumer durables reflects the fraction of households who have reported any outstanding borrowing to finance house or consumer durable purchases which include refrigerators, air-conditioners, pump-sets, television, mobile phones, computers, music systems, musical instruments, sports gear, cooking range, furnishings, etc. Installment payments refer to "equal monthly installments" (EMI) for house and for durables respectively.

Figure A.10: Accumulation of Durable Goods Over the Life Cycle of Household Head
By Region, Family Type and Occupation
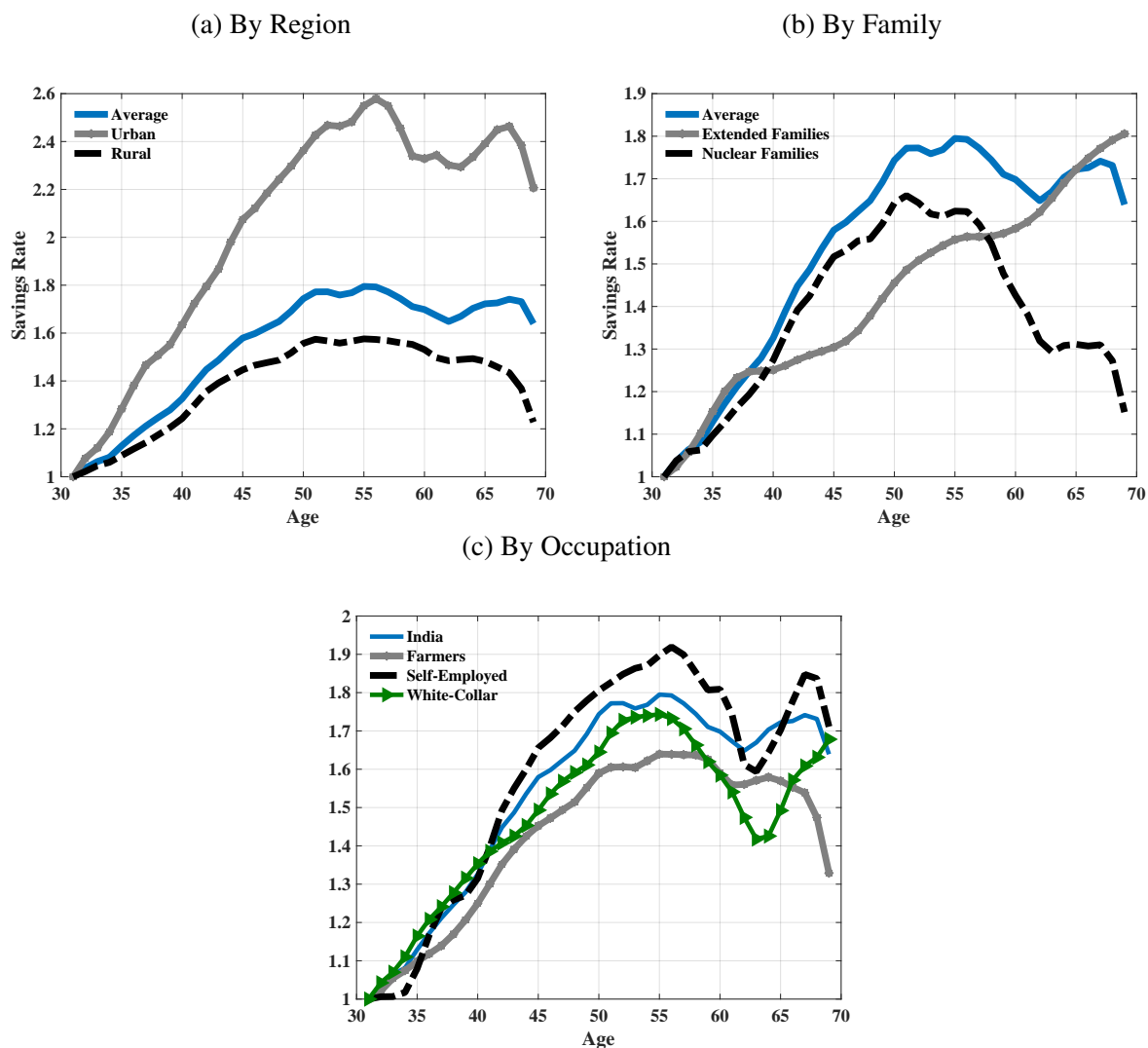
(a) By Region

(b) By Family

(c) By Occupation

Notes: Household asset index relative to age 31 (household head) is reported. Asset index is constructed using information on the possession of major and minor durable goods like television, cattle, tractor, refrigerator, house, car, two-wheeler, electric generator, washing machine and so on.

Figure A.11: Age Distribution of Head at the Time of Major Durable Purchase

(a) House
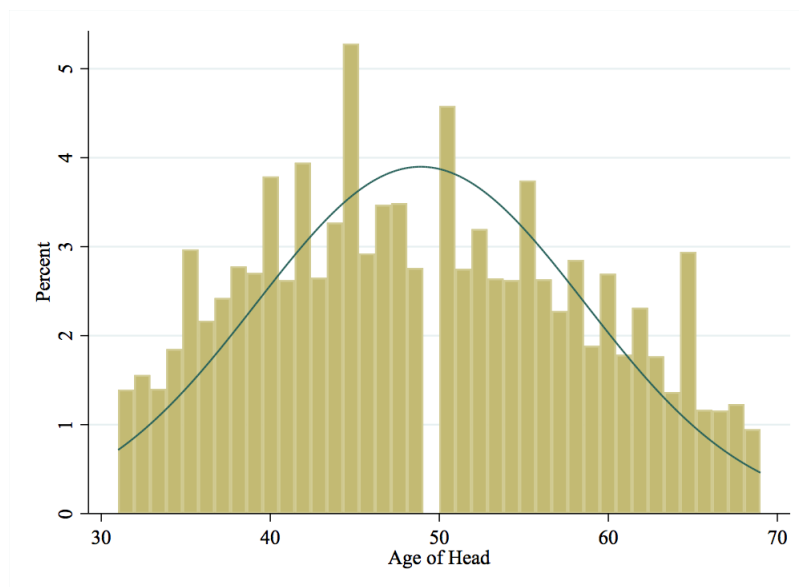
(b) Car
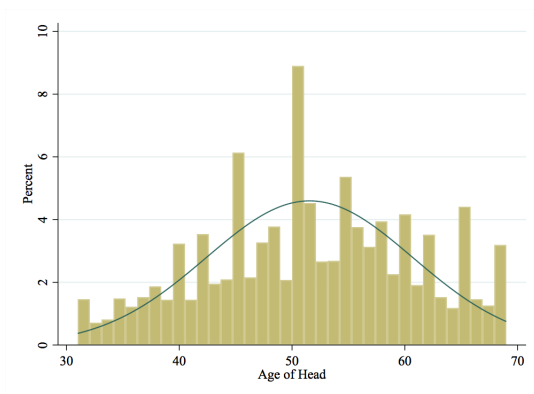
(c) Two-Wheeler

(d) Tractor
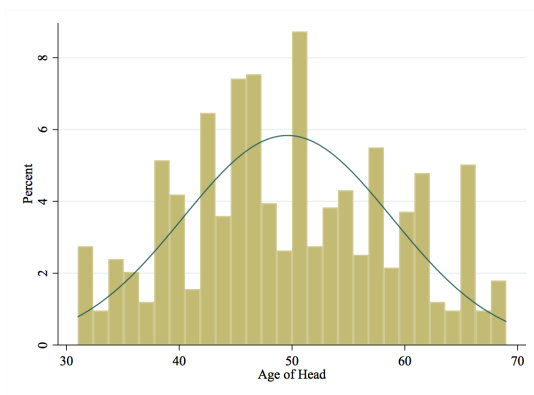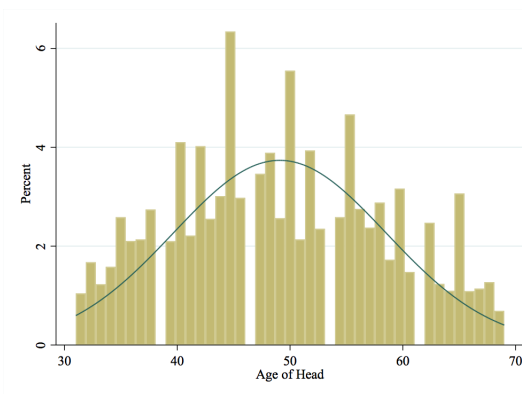
(e) Cattle
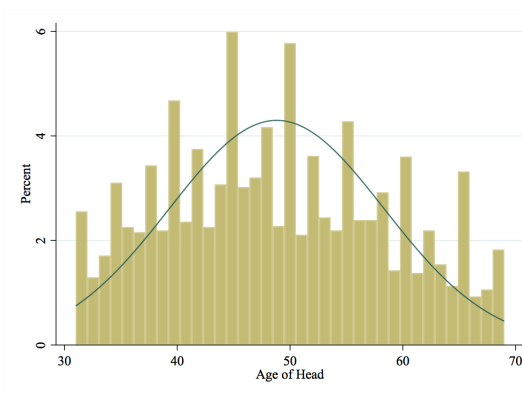
Notes: The graph reports the age distribution (household head) conditional on observing a major durable buying event at that age.

Figure A.12: Durable Purchases Over the Life-Cycle

(a) All Durables
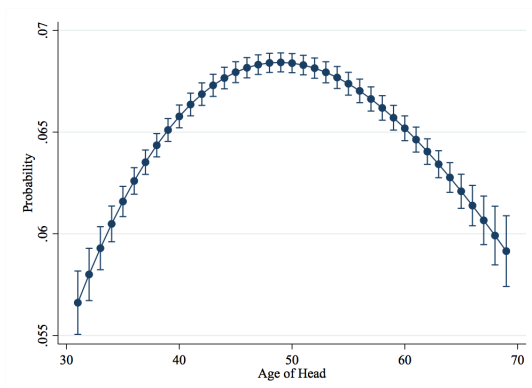
(b) Major Durables
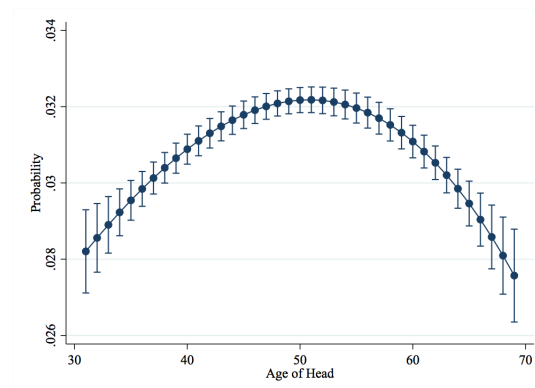
Notes: Major durables include house, car, tractor, cattle and two-wheeler. All durables include in addition to these, television, refrigerator, computer, washing machine cooler and electric generator.

Table A.7: Probit Estimates of Intentions to Purchase Durables on Actual Pruchases in Future

	(1) Bought House	(2) Bought Car	(3) Bought tractor	(4) Bought Cattle
Intend to Buy House in Previous Wave	0.693*** (25.02)			
Intend to Buy House 2 Waves Back	0.248*** (6.37)			
Intend to Buy Car in Previous Wave		0.535*** (19.12)		
Intend to Buy Car 2 Waves Back		0.464*** (15.23)		
Intend to Buy Tractor in Previous Wave			0.727*** (8.54)	
Intend to Buy Tractor 2 Waves Back			0.455*** (4.07)	
Intend to Buy Cattle in Previous Wave				0.657*** (23.12)
Intend to Buy Cattle 2 Waves Back				0.348*** (9.41)
Constant	-2.357*** (-797.14)	-2.693*** (-626.04)	-3.245*** (-360.56)	-2.571*** (-689.99)
Observations	1705700	1705700	1705700	1705700

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.8: OLS Estimates of Intentions to Purchase Durables on Savings Rate in Urban India

	(1)	(2)	(3)	(4)
Intend to Buy House=1	0.0922***	0.0837***	0.0837***	0.0314***
	(22.53)	(20.90)	(21.03)	(8.33)
Intend to By Car=1	0.120***	0.0997***	0.0972***	0.0318***
	(40.76)	(34.44)	(33.79)	(11.66)
Intend to Buy 2-Wheeler=1	0.0115***	0.00387	0.00273	0.00892***
	(4.27)	(1.47)	(1.04)	(3.59)
Intend to Buy Tractor=1	-0.0147	-0.0146	-0.0165*	-0.0268***
	(-1.76)	(-1.80)	(-2.04)	(-3.50)
Intend to Buy Cattle=1	-0.0255***	-0.0322***	-0.0317***	-0.00806
	(-5.27)	(-6.81)	(-6.73)	(-1.81)
Time Dummy		0.00557***	0.00323***	0.00307***
		(107.57)	(42.85)	(42.83)
Birth Cohort		-0.0313***	0.00103	0.00317***
		(-239.00)	(1.14)	(3.69)
Age of Head			-0.104***	-0.112***
			(-52.89)	(-60.05)
Age of Head $\times$ Age of Head			0.00258***	0.00272***
			(64.38)	(71.69)
Age of Head $\times$ Age of Head $\times$ Age of Head			-0.0000192***	-0.0000201***
			(-71.67)	(-79.02)
Asset Index				0.00231***
				(192.81)
Education				0.00883***
				(215.03)
Constant	0.312***	0.419***	1.453***	1.461***
	(1187.24)	(522.79)	(43.18)	(45.79)
Observations	1413340	1413340	1413340	1413340

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.9: OLS Estimates of Intentions to Purchase Durables on Savings Rate in Rural India

	(1)	(2)	(3)	(4)
Intend to Buy House=1	0.0769***	0.0674***	0.0658***	0.0491***
	(8.89)	(7.93)	(7.78)	(5.89)
Intend to By Car=1	0.0836***	0.0721***	0.0690***	-0.00204
	(12.91)	(11.31)	(10.87)	(-0.33)
Intend to Buy 2-Wheeler=1	0.0147***	0.0101*	0.0104**	0.0187***
	(3.66)	(2.54)	(2.64)	(4.83)
Intend to Buy Tractor=1	0.111***	0.100***	0.0983***	0.0752***
	(13.23)	(12.19)	(11.99)	(9.32)
Intend to Buy Cattle=1	0.0527***	0.0419***	0.0420***	0.0382***
	(11.84)	(9.56)	(9.63)	(8.89)
Time Dummy		0.00553***	0.00349***	0.00267***
		(68.66)	(29.41)	(22.70)
Birth Cohort		-0.0283***	-0.00109	-0.00000711
		(-140.30)	(-0.76)	(-0.00)
Age of Head			-0.126***	-0.123***
			(-41.29)	(-41.04)
Age of Head × Age of Head			0.00296***	0.00290***
			(47.47)	(47.25)
Age of Head × Age of Head × Age of Head			-0.0000214***	-0.0000210***
			(-51.24)	(-50.93)
Asset Index				0.00255***
				(110.80)
Education				0.00491***
				(60.63)
Constant	0.245***	0.338***	1.817***	1.713***
	(601.03)	(267.13)	(34.70)	(33.21)
Observations	659740	659740	659740	659740

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.10: OLS Estimates of Intentions to Purchase Durables on Savings Rate in Nuclear Families

	(1)	(2)	(3)	(4)
Intend to Buy House=1	0.0998***	0.0886***	0.0875***	0.0386***
	(23.39)	(21.19)	(21.05)	(9.70)
Intend to By Car=1	0.122***	0.101***	0.0980***	0.0227***
	(39.73)	(33.55)	(32.62)	(7.87)
Intend to Buy 2-Wheeler=1	0.0106***	0.00209	0.000915	0.00769**
	(4.14)	(0.83)	(0.37)	(3.22)
Intend to Buy Tractor=1	0.0388***	0.0328***	0.0307***	0.0219***
	(5.77)	(4.99)	(4.70)	(3.49)
Intend to Buy Cattle=1	0.00235	-0.00790*	-0.00770*	0.0128***
	(0.63)	(-2.18)	(-2.14)	(3.71)
Time Dummy		0.00642***	0.00413***	0.00378***
		(126.42)	(55.68)	(53.14)
Birth Cohort		-0.0316***	-0.0000618	0.00176*
		(-233.39)	(-0.07)	(2.06)
Age of Head			-0.120***	-0.116***
			(-60.79)	(-61.35)
Age of Head × Age of Head			0.00294***	0.00282***
			(72.16)	(72.34)
Age of Head × Age of Head × Age of Head			-0.0000219***	-0.0000209***
			(-79.43)	(-79.25)
Asset Index				0.00235***
				(187.63)
Education				0.00870***
				(210.71)
Constant	0.271***	0.382***	1.668***	1.512***
	(1051.67)	(444.35)	(49.74)	(47.13)
Observations	1556290	1556290	1556290	1556290

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.11: OLS Estimates of Intentions to Purchase Durables on Savings Rate in Extended Families

	(1)	(2)	(3)	(4)
Intend to Buy House=1	0.0907***	0.0891***	0.0909***	0.0339***
	(11.89)	(11.74)	(12.04)	(4.69)
Intend to By Car=1	0.131***	0.121***	0.119***	0.0553***
	(23.03)	(21.33)	(21.17)	(10.24)
Intend to Buy 2-Wheeler=1	0.0190***	0.0175***	0.0166***	0.0249***
	(4.18)	(3.86)	(3.69)	(5.78)
Intend to Buy Tractor=1	0.0222	0.0219	0.0207	0.0143
	(1.90)	(1.89)	(1.79)	(1.30)
Intend to Buy Cattle=1	0.00412	-0.000210	-0.000970	0.0143*
	(0.62)	(-0.03)	(-0.15)	(2.29)
Time Dummy		0.00179***	0.000336**	0.000243*
		(20.89)	(2.68)	(2.03)
Birth Cohort		-0.0173***	0.00168	0.00233
		(-79.68)	(1.10)	(1.60)
Age of Head			-0.0760***	-0.0773***
			(-22.56)	(-24.03)
Age of Head × Age of Head			0.00188***	0.00197***
			(27.93)	(30.57)
Age of Head × Age of Head × Age of Head			-0.0000140***	-0.0000149***
			(-31.71)	(-35.39)
Asset Index				0.00242***
				(119.42)
Education				0.00839***
				(114.65)
Constant	0.350***	0.405***	1.188***	1.051***
	(816.57)	(349.13)	(20.31)	(18.82)
Observations	516790	516790	516790	516790

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.12: OLS Estimates of Intentions to Purchase Durables on Savings Rate in Farming Households

	(1)	(2)	(3)	(4)
Intend to Buy House=1	0.0755***	0.0723***	0.0711***	0.0626***
	(10.70)	(10.50)	(10.39)	(9.21)
Intend to By Car=1	0.0610***	0.0441***	0.0414***	-0.0144*
	(9.99)	(7.41)	(6.99)	(-2.45)
Intend to Buy 2-Wheeler=1	0.0250***	0.0130***	0.0127***	0.0173***
	(7.40)	(3.94)	(3.85)	(5.30)
Intend to Buy Tractor=1	0.0930***	0.0775***	0.0742***	0.0533***
	(11.18)	(9.55)	(9.19)	(6.66)
Intent to Buy Cattle=1	0.0543***	0.0337***	0.0340***	0.0269***
	(12.63)	(8.02)	(8.13)	(6.50)
Time Dummy		0.00749***	0.00508***	0.00460***
		(106.09)	(49.12)	(44.43)
Birth Cohort		-0.0333***	-0.000385	0.000106
		(-180.80)	(-0.31)	(0.09)
Age of Head			-0.122***	-0.120***
			(-44.83)	(-44.31)
Age of Head × Age of Head			0.00295***	0.00290***
			(52.58)	(51.93)
Age of Head × Age of Head × Age of Head			-0.0000218***	-0.0000213***
			(-57.25)	(-56.50)
Asset Index				0.00251***
				(105.92)
Education				0.00122***
				(15.07)
Constant	0.225***	0.333***	1.657***	1.599***
	(624.97)	(284.45)	(35.84)	(34.87)
Observations	802561	802561	802561	802561

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.13: OLS Estimates of Intentions to Purchase Durables on Savings Rate in Self-Employed Households

	(1)	(2)	(3)	(4)
Intend to Buy House=1	0.0818***	0.0716***	0.0707***	0.0201**
	(11.22)	(10.05)	(9.97)	(2.96)
Intend to By Car=1	0.100***	0.0838***	0.0823***	0.0294***
	(20.33)	(17.35)	(17.12)	(6.38)
Intend to Buy 2-Wheeler=1	0.0170***	0.0123**	0.0117*	0.0117**
	(3.65)	(2.71)	(2.57)	(2.69)
Intend to Buy Tractor=1	0.0272*	0.0324*	0.0310*	0.0117
	(2.04)	(2.48)	(2.38)	(0.94)
Intend to Buy Cattle=1	-0.0163*	-0.0194**	-0.0168*	-0.000970
	(-2.18)	(-2.66)	(-2.31)	(-0.14)
Time Dummy		0.00435***	0.00204***	0.00300***
		(49.56)	(15.86)	(24.27)
Birth Cohort		-0.0341***	0.000505	0.00222
		(-142.25)	(0.33)	(1.50)
Age of Head			-0.160***	-0.161***
			(-45.18)	(-47.54)
Age of Head × Age of Head			0.00365***	0.00361***
			(50.06)	(51.85)
Age of Head × Age of Head × Age of Head			-0.0000258***	-0.0000253***
			(-52.41)	(-53.67)
Asset Index				0.00268***
				(135.66)
Education				0.00636***
				(84.21)
Constant	0.303***	0.444***	2.410***	2.336***
	(674.50)	(297.39)	(40.26)	(40.83)
Observations	459168	459168	459168	459168

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.14: OLS Estimates of Intentions to Purchase Durables on Savings Rate in White Collar Worker Households

	(1)	(2)	(3)	(4)
Intend to Buy House=1	0.0542***	0.0526***	0.0521***	0.0164*
	(6.64)	(6.53)	(6.50)	(2.10)
Intend to By Car=1	0.0450***	0.0430***	0.0417***	0.0257***
	(8.74)	(8.44)	(8.22)	(5.22)
Intend to Buy 2-Wheeler=1	-0.00272	-0.00191	-0.00233	-0.00789
	(-0.40)	(-0.29)	(-0.35)	(-1.23)
Intend to Buy Tractor=1	-0.0156	-0.0187	-0.0189	-0.0124
	(-0.87)	(-1.05)	(-1.07)	(-0.72)
Intend to Buy Cattle=1	-0.0554***	-0.0472***	-0.0457***	-0.0191
	(-4.66)	(-4.01)	(-3.90)	(-1.68)
Time Dummy		0.000205	-0.00110***	-0.000905***
		(1.75)	(-6.32)	(-5.33)
Birth Cohort		-0.0260***	0.00142	0.00211
		(-73.10)	(0.68)	(1.04)
Age of Head			-0.172***	-0.165***
			(-31.99)	(-31.61)
Age of Head × Age of Head			0.00392***	0.00376***
			(35.02)	(34.54)
Age of Head × Age of Head × Age of Head			-0.0000281***	-0.0000268***
			(-36.71)	(-36.06)
Asset Index				0.000856***
				(45.03)
Education				0.00795***
				(83.10)
Constant	0.470***	0.603***	2.811***	2.556***
	(788.41)	(282.16)	(31.57)	(29.52)
Observations	207518	207518	207518	207518

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.15: OLS Estimates of Intentions to Purchase Other Durables on Savings Rate in India

	(1)	(2)	(3)	(4)
Intend to Buy Television=1	0.0550***	0.0446***	0.0443***	0.0230***
	(22.23)	(18.36)	(18.37)	(9.93)
Intend to Buy Refrigerator=1	0.00286	-0.00338	-0.00387	0.0103***
	(1.36)	(-1.64)	(-1.89)	(5.26)
Intend to Buy Cooler=1	0.0226***	0.0136***	0.0137***	0.0148***
	(9.21)	(5.66)	(5.72)	(6.45)
Intend to Buy Inverter=1	0.00553*	0.000193	-0.00129	-0.00723**
	(2.14)	(0.08)	(-0.51)	(-2.99)
Intend to Buy Washing Machine=1	0.0254***	0.0159***	0.0153***	0.0221***
	(14.15)	(9.01)	(8.70)	(13.15)
Intend to Buy Computer=1	0.0846***	0.0700***	0.0683***	0.0108***
	(34.11)	(28.74)	(28.23)	(4.65)
Time Dummy		0.00520***	0.00292***	0.00265***
		(117.63)	(45.53)	(43.02)
Birth Cohort		-0.0307***	0.000563	0.00211**
		(-277.48)	(0.73)	(2.86)
Age of Head			-0.111***	-0.115***
			(-66.61)	(-72.15)
Age of Head $\times$ Age of Head			0.00270***	0.00277***
			(79.68)	(85.29)
Age of Head $\times$ Age of Head $\times$ Age of Head			-0.0000200***	-0.0000203***
			(-87.88)	(-93.42)
Asset Index				0.00243***
				(227.29)
Education				0.00829***
				(231.27)
Constant	0.290***	0.398***	1.562***	1.524***
	(1293.05)	(583.78)	(54.81)	(55.88)
Observations	2073080	2073080	2073080	2073080

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.16: Average Age of Purchasing
Consumer Durables

	Avg.	Urban	Rural	Nuclear	Extended	Farmers	Self-Emplyed	White-Collar
House	48.9	48.9	48.8	47.1	53.9	48.2	47.4	47.7
Car	51.3	51.4	51.0	49.5	54.9	51.2	49.7	49.2
2-Wheeler	49.1	49.1	49.0	47.1	54.2	48.6	47.8	47.8
Cattle	48.8	49.0	48.8	46.6	54.1	48.5	46.9	47.3
Tractor	49.9	47.9	50.0	47.1	55.3	49.7	48.4	46.0

Figure A.14: Households With Heads as Primary Earning Members
by Age of Head

(a) All
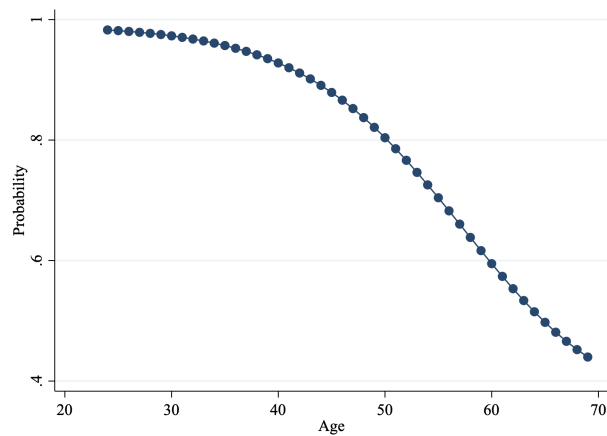
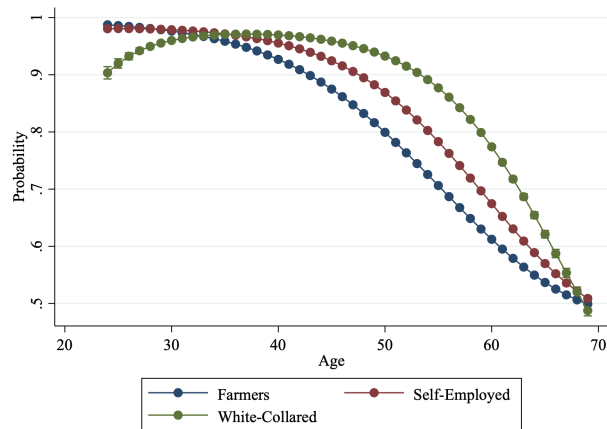(b) By Family Type
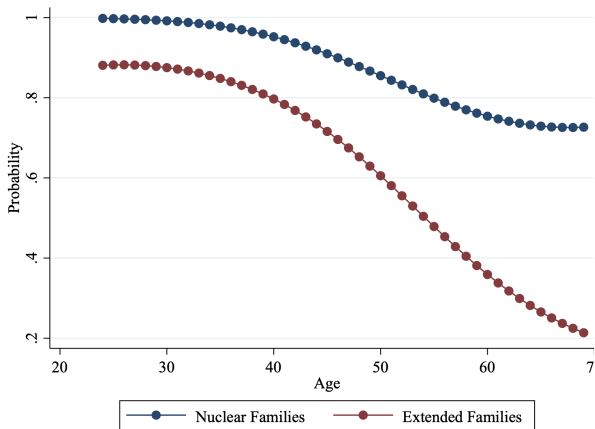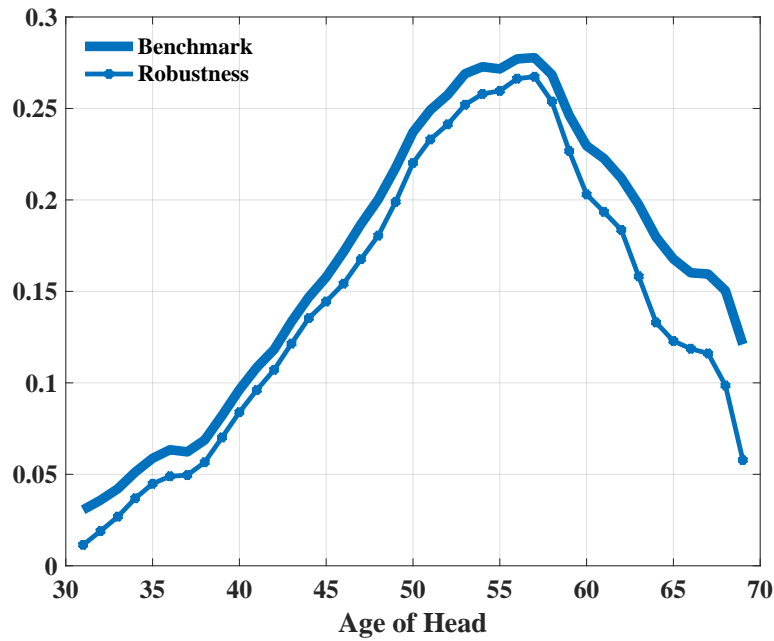

(c) By Region Type
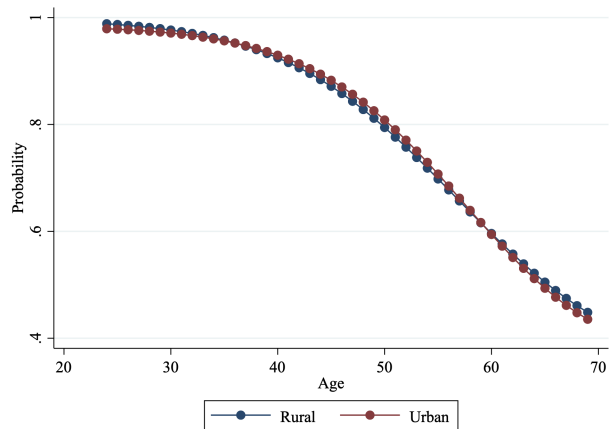
(d) By Occupation

Figure A.15: Head Robustness: Life-Cycle Savings Rate
by Age of Household Head

Notes: Savings rate is computed as income net of total non-durable consumption as a fraction of total income. This robustness exercise drops all households where head is not the primary earning member.

Figure A.16: Head Robustness: Life-Cycle Consumption
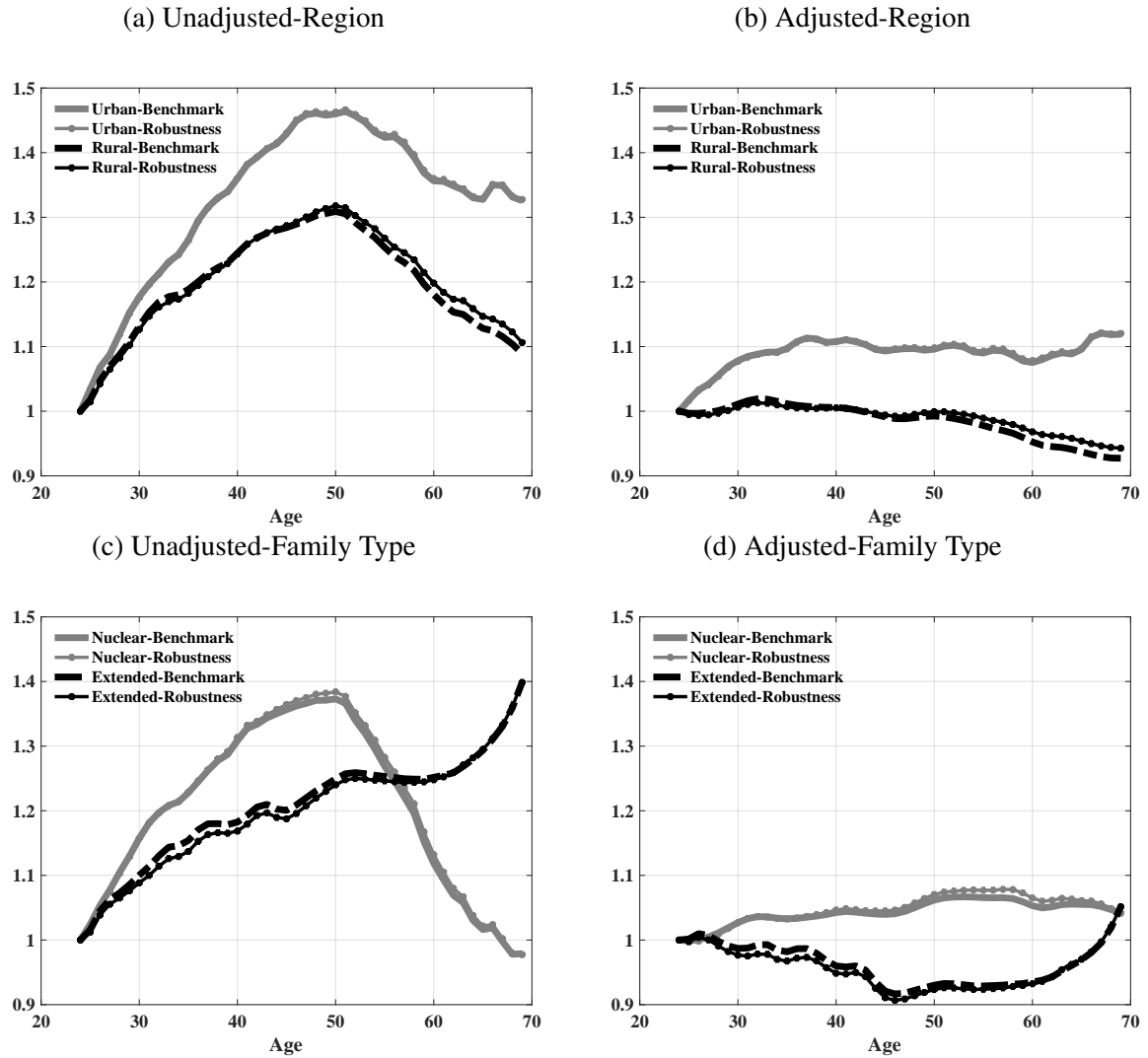by Age of Household Head for Extended Families

(a) Unadjusted   (b) Adjusted
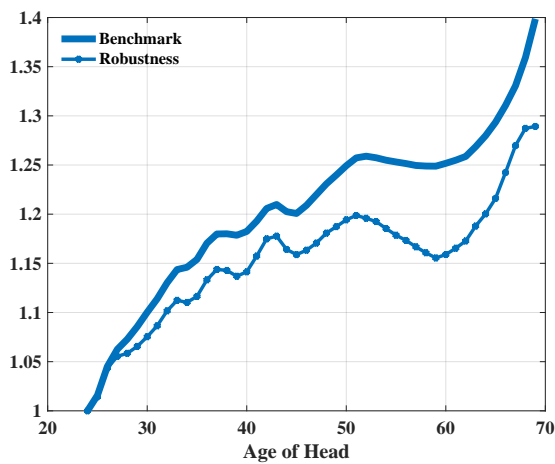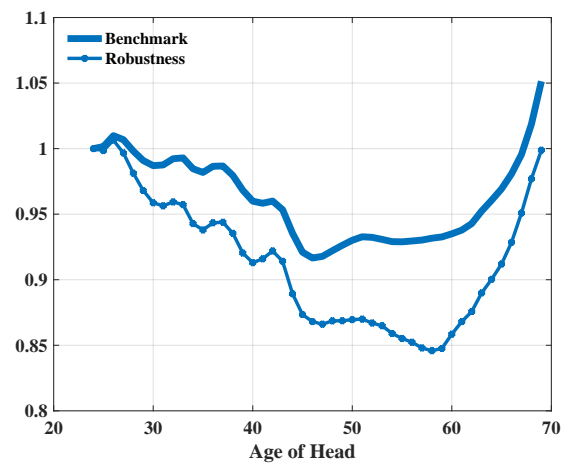
Notes: This robustness exercise drops all extended family households where the head is not the primary earning member.

Figure A.17: Home Production Robustness: Life-Cycle Consumption by Age of Household Head

(a) Unadjusted-Region

(b) Adjusted-Region

(c) Unadjusted-Family Type

(d) Adjusted-Family Type

Notes: This robustness exercise adds estimates of home production to household consumption expenditures.