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## Analyzing the sources of older people's self-dependency and overall financial wellness in four Asian countries and the United States

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# ANALYZING THE SOURCES OF OLDER PEOPLE'S SELF- DEPENDENCY AND OVERALL FINANCIAL WELLNESS IN FOUR ASIAN COUNTRIES AND THE UNITED STATES

*Isaac Ehrlich and Zhiqiang Liu*

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## ABSTRACT

Our paper examines the financial preparedness of near-retirement individuals across five countries: the United States, Japan, and the Republic of Korea (developed economies) and the People's Republic of China and India (developing economies). It focuses on four channels of retirement support: intra-family transfers, self-managed assets, private pensions, and public pensions, with an emphasis on self-dependency and willingness to hold risky assets. We develop two measures of preparedness—wealth-based and consumption-based—which assess the resources available to individuals near retirement. We find that, while wealth-based and, generally, consumption-based preparedness tends to be significantly higher in the more developed countries, self-dependency measures are higher in the developing countries, particularly in rural areas, where public pensions play a smaller role. Our regression analysis reveals that education, health, and prior wealth are key factors influencing individual preparedness through investments in risky assets. The paper concludes with policy recommendations for enhancing retirement preparedness in both developed and developing economies.

**Keywords:** later-life financial preparedness, public pensions, human capital, self-dependency, asset management

**JEL codes:** J14, J32, H55

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This analysis uses data or information from the United States' Health and Retirement Study (HRS), the Japanese Study of Aging and Retirement (JSTAR), the Korean Longitudinal Study of Aging (KLoSA), the China Health and Retirement Longitudinal Study (CHARLS), and the Longitudinal Aging Study in India (LASI). We would like to thank Yuchong Han for excellent research assistance.

## I. INTRODUCTION

In this study, we develop several alternative measures of the preparedness of near-retirement individuals to support their later-life financial needs in five economies: the United States (US), Japan, and the Republic of Korea (ROK) representing developed economies, and the People's Republic of China (PRC) and India representing two fast-growing developing economies. These measures incorporate incomes from four major sources of financial support during the retirement phase: (i) intra-family income transfers to aging parents from mainly adult children, which we consider “self-insurance”; (ii) families' own contribution to the accumulated total portfolio of self-managed financial and real assets, which we equate to “self-protection”; (iii) retirement financial benefits acquired through enrollment in private pension plans, which we consider “market insurance”; and (iv) retirement benefits acquired via enrollment in public pension and health programs, which we consider “public insurance.” Following the terminology in Ehrlich and Becker (1972), these terms are used as a guidance for identifying the major channels through which both households and the government attempt to pursue financial preparedness and financial wellness in later life.

We begin by estimating each of these four components of postretirement income and compute the total resource available in present value terms at the start of retirement over the expected retirement life. The larger the resource, the better the household's level of financial preparedness in later life. This can be used to compare the level of household financial self-preparedness across different countries, assuming there is a common desired level of income or consumption during retirement life. The share of private contributions to the total financial resources available at retirement, as summarized in items (i) through (iii), indicates the extent to which households can support all of their later-life welfare-contributing objects, including own consumption spending, as well as spending on altruistic objectives such as bequests to offspring, through their own means—that is, without public pensions, or “social security” income. We call this share the “self-dependency ratio” (SDR); one minus this ratio is then defined as the “public dependency ratio” (PBDR), which is the share of public pension in the total available resources (TAR) for later-life support. It should be noted at the outset that a high SDR, while suggesting households are more self-reliant in terms of later-life support, may also indicate an underfunded public pension system.

To measure preparedness against some more specific benchmarks, we develop a consumption-based preparedness measure. At the individual level, the index indicates whether postretirement incomes from the four sources are adequate to maintain preretirement per capita consumption spending throughout the expected retirement life. Retirement life is defined as the difference in years between country-specific and age-specific life expectancy and the retirement age. The country-specific preparedness index is then defined as the percent of the sample's individuals who are deemed to have adequate income to maintain their level of preretirement consumption throughout the

retirement period. This consumption protection measure is specific to the individual because it is defined relative to the actual level of consumption prior to retirement, so it also indicates whether there is any worsening in the individual's consumption spending over the retirement period. We call this measure the "personal consumption protection index." At the aggregate level, we record this index as the percent of individuals with adequate postretirement income to maintain their preretirement per capita consumption spending throughout the retirement phase of their lives, on the assumption that there is no change in public pension policy and individual saving or investment strategies.

To construct these alternative measures, we use the harmonized US Health and Retirement Study (HRS) type of data we analyzed in the two other studies of our overall project on later-life preparedness of four Asian economies—two developed economies (Japan and the ROK) and two fast-growing developing economies (the PRC and India)—as well as the US. We include the US in this analysis to assess how the four Asian economies' self- and public financial preparedness, as well as individual consumption protection measures, stack against those of the most developed economy in the world.

Although there is a large body of literature on the economics of aging, studies on later-life financial preparedness or readiness for retirement are relatively few. Most of them appear in publications outside the field of economics. Generally, existing studies focus on the concept and measurement of replacement ratios, by which they mean how much income individuals entering their retirement phase will need to maintain their preretirement lifestyle. The ratio most commonly cited is 70%–85% of preretirement income. For example, in Disney and Johnson (2001), the replacement rate is pension income as a share of preretirement income, which measures the adequacy of pension for later-life support. The authors use this index to compare pension adequacy across Organisation for Economic Co-operation and Development (OECD) countries.

However, pension is only one of the four potential sources of income for later-life support, as we noted earlier. Other studies, such as Munnell, Webb, and Delorme (2006), include annuitized wealth and retirement income in addition to pension income in constructing the income-based replacement rate. Chybalski and Marcinkiewicz (2015) argue that the income-based replacement rate may not be a good indicator of how well one can maintain a specific consumption level. To account for the consumption dimension of later-life support, a targeted replacement rate is usually defined relative to a specific predetermined consumption level, and this is used as the benchmark to gauge preparedness for later-life consumption needs. Specifically, preparedness status is computed by determining if one's replacement ratio is greater than the targeted replacement rate.

However, there is no consensus in the literature on the level of the targeted replacement rate. Biggs and Springstead (2008) note that a common rule of thumb figure is 70%, whereas Greninger et al. (2000) report that four-fifths of financial planners and educators

consider a replacement rate of 70%–89% as appropriate. Aon Consulting and Georgia State University (2004) recommend an average replacement rate of about 75% of final earnings. Biggs and Springstead (2008) also point out that, although the concept of replacement ratio is widely used, there is no common agreement on how to measure replacement rates—what is included in the numerator and denominator ratio may lead to very different measures.

The Mandatory Provident Fund Schemes Authority (2010) develops targeted replacement rates based on the material needs of pensioners, which reflect the income needed to maintain the same standard of living as during the preretirement years. It also develops a targeted rate based on the expected expenses of pensioners during retirement. Along a similar line, Mutchler et al. (2015) develop the so-called Elder Economic Security Standard Index. This is based mainly on the expenditure associated with necessities for old people. If retirement income, including both social security income and wealth-based income, is more than the expenditure for necessities, the individual is considered financially secure in later life. There are also studies that use different replacement ratios for different income groups and household types to account for the possibility of diminishing income propensity to consume. Munnell, Webb, and Delorme (2006), for example, set the targeted replacement rates at 85% for the low-income group and 65% for the high-income group. It is not clear, however, how these figures are derived.

Jackson, Howe, and Peter (2013) develop a so-called Global Aging Preparedness Index, which accounts for both fiscal sustainability and income adequacy. The income adequacy measure is similar to the replacement ratio, measuring the older people's total income relative to the younger cohort's total income. The Global Aging Preparedness Index focuses on comparisons across different countries, but it does not provide a criterion by which to determine whether the older people in any country are financially prepared for retirement, or what proportion of the older people can be deemed to be prepared for their later-life needs. The motivation for our study is to develop and implement a novel and more general approach to determine later-life preparedness indexes based on actual ability of households in different countries to generate wealth or income levels, or to support their actual consumption spending at preretirement age levels.

The innovations in our approach include the following. (i) Our alternative preparedness/replacement rates are based on individual preretirement accumulated wealth and on preretirement consumption level. (ii) We explicitly estimate individual postretirement income from each of the four sources of support available to a typical household, which include what we call self-insurance (including family transfers from adult children or relatives that extant studies completely overlook); self-management of individual portfolios of assets, which we call self-protection; enrollment in private pension plans, which we call market insurance; and public pension funds, such as social security benefits, which we call public insurance. Using this comprehensive approach, we can evaluate the relative contribution of different incomes for later-life financial preparedness.

(iii) We identify the important individual characteristics that can serve as good predictors for individual preparedness. Note that our second innovation enables us also to determine the degree to which household later-life preparedness is based on households' self-preparedness, or self-dependency, as opposed to their dependency on public/government income support.

We proceed as follows. In Section II, we provide a description of the five datasets that we rely on in this study. In Section III, we construct the households' total financial preparedness measure, and break it down into its components to provide some insight into the contribution of the different private sources to households' self-dependent retirement income across the five economies. In Section IV, we present the consumption-based preparedness index as well as our estimated resulting index by country and survey year. In Section V, part A, we first derive the estimated country-specific preparedness based on targeted levels of consumption and in part B, we conduct a regression analysis concerning the estimated effects of the determinants of individual retirement wellness represented by both our consumption-based and wealth-based measures of preparedness and our asset management model. In Section VI, we conclude our study with a discussion of our findings, the limitations of our preparedness measures, and the main policy implications of our study.

## **II. SAMPLE AND KEY VARIABLES**

### **A. The Data Sources We Use**

The data used in this report come from five longitudinal studies that share a common questionnaire design: the Health and Retirement Study (HRS) in the US, the Japanese Study of Aging and Retirement (JSTAR) in Japan, the Korean Longitudinal Study of Aging (KLoSA) in the ROK, the China Health and Retirement Longitudinal Study (CHARLS) in the PRC, and the Longitudinal Aging Study in India (LASI).

**The United States sample.** The HRS is the seminal longitudinal household survey dataset for studying retirement and health issues concerning older age groups in the US (Juster and Suzman 1995). The original survey was conducted in 1992, covering heads of households who were aged 50–60 at the time. The original households have been followed every 2 years since then. A separate survey of the “oldest old” (Asset and Health Dynamics Among the Oldest Old [AHEAD]) was later merged with the original HRS. To maintain a continuing dynamic survey of the older population, a new cohort of households aged 50 and 55 has been added to the longitudinal survey every 6 years. Such refresher samples were added in 1998, 2004, 2010, and 2016.

The 2015 RAND HRS file version O, which we use in this study, is the result of several data developments that aim to provide a user-friendly version of the HRS.<sup>1</sup> It includes final data files from 12 waves (1992–2010). These longitudinal data contain only a subset of variables from the original HRS, but subsequent survey reports included cleaned and processed variables with consistent and intuitive naming conventions and model-based imputations. Most importantly, these reports added a large number of individual variables, including demographics, job status and history, and health, as well as imputed income and assets. In this study, we use three waves of the HRS, as we did in Ehrlich and Liu (2022). These are surveys conducted in 2006, 2008, and 2010.

**The Japanese sample.** JSTAR is a panel survey of people aged 50 or older, conducted by the Research Institute of Economy, Trade and Industry (RIETI), Hitotsubashi University, and the University of Tokyo (Ichimura, Shimizutani, and Hashimoto 2009). The survey is designed to ensure, to the extent possible, comparability with the HRS; the English Longitudinal Study of Aging; and the Survey of Health, Ageing and Retirement in Europe. To facilitate cross-country comparisons, RIETI also created harmonized JSTAR data, to be as compatible as possible with the procedures and imputation methods employed in generating the RAND HRS. The JSTAR version we use is version B.

JSTAR surveyed people between the ages of 50 and 75, along with their partners. The first wave was conducted in 2007 with five municipalities. These households were followed up in wave 2 in 2009. Two more municipalities were also added into the study in wave 2. All households were included in the follow-up wave 3 in 2011, along with three new municipalities added to the survey. The unit of analysis in JSTAR is the household, with survey weights at the household level provided for analysis. This differs from the HRS, where both personal- and household-level survey weights are provided. In this study, we use the same three waves of JSTAR as we did in Ehrlich and Liu (2022)—the surveys of 2007, 2009, and 2011.

**The Republic of Korea sample.** KLoSA is a panel survey in the ROK conducted initially by the Korea Institute of Labor. KLoSA held the first wave in 2006 for households with at least one person 45 years of age and older. The respondents were then surveyed every 2 years. Starting in wave 3, the data were collected by the Korea Employment Information Service. There were no refresher samples in waves 2 through 4.<sup>2</sup> This difference may cause a downward bias when we aggregate individual data to form the household-level data. The data we use come from the harmonized KLoSA version C. We obtained the original wave data from the Korea Employment Information Service, and then used a Stata program provided by the Gateway to Global Aging to generate the harmonized version C data.

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<sup>1</sup> [http://hrsonline.isr.umich.edu/modules/meta/rand/randhrso/randhrs\\_O.pdf](http://hrsonline.isr.umich.edu/modules/meta/rand/randhrso/randhrs_O.pdf)

<sup>2</sup> One notable difference in KLoSA is that it does not interview spouses or partners who are younger than 45 years old, a deviation from the treatment in the HRS and JSTAR.

For comparison purposes, we used only waves 8, 9, and 10 from the RAND HRS, and waves 1, 2, and 3 from the harmonized JSTAR and KLoSA. We note that the KLoSA data were collected in the same year as the corresponding HRS, while the JSTAR data were collected a year later. (Table 2 contains details, which include the total number of units with non-zero survey weights in each wave.) In this context, we note that the HRS added a fresh cohort in 2010, which led to a larger number of units compared with in the previous two waves. For KLoSA, the number of units kept falling because of attrition, and this is also true for wave 9 of the HRS when compared with wave 8. In contrast, JSTAR added more municipalities in both the second and third waves, so the number of units in JSTAR has risen throughout the three waves. To achieve greater consistency among all three datasets concerning financial variables, we also conduct the analysis at the household level. However, to capture individual characteristics like age and education, we also use information on heads of households. In this study, we use the same three waves of KLoSA as we did in Ehrlich and Liu (2022)—the surveys from 2006, 2008, and 2010.

We need to point out briefly some differences that we observe in these three micro datasets of developed economies when using the 2006–2007 wave. First, the heads of households in the HRS and JSTAR have similar average ages, with the HRS exhibiting a slightly higher average. This is because of the introduction of a new cohort of individuals aged 50 and 59 into the survey in 2004, which was the first wave of JSTAR. KLoSA reports a much lower average age because, in the first wave of that survey, the age eligibility is 45—that is, 10 years younger than the early pensionable age of 55 at the time. Throughout all waves, KLoSA contains much younger households, but the gap with the HRS fell modestly in 2010 when a new cohort was added to the HRS. Average age stayed almost the same between waves 1 and 2 for JSTAR even though there were more municipalities introduced in the second wave. However, the average age in the JSTAR sample became older in wave 3, when more municipalities were included.

We should also note that, even though we use the harmonized version of three micro datasets, these data have their own limitations. For example, JSTAR does not use a national probabilistic sample. Further, the micro datasets are not entirely equivalent. For example, the US HRS data distinguish between ownership of homes and second homes, but this is not the case in Japan or the ROK. Consequently, the data comparisons we report below should be viewed with caution, subject to this caveat.

**The sample from the People’s Republic of China.** The data for the PRC are drawn from CHARLS, a nationally representative longitudinal survey of people aged 45 and over and their partners living in private households in the PRC. The study is modeled after the HRS and is conducted by the China Center for Economic Research at Peking University. The original national baseline survey was conducted between June 2011 and March 2012, covering about 10,000 households and more than 17,000 individuals from 150 counties. The original households were followed up in 2013, 2015, and 2018. The main survey questionnaire includes information on basic demographics, family status, health

status, healthcare, and employment, as well as income, consumption, and wealth at the household level. The longitudinal nature of the data allows us to examine changes in later-life financial preparedness over time. In this study, we use the same four waves of CHARLS that we pursued in Ehrlich and Liu (2022)—2011, 2013, 2015, and 2018.

**The sample from India.** The data for India are drawn from LASI. LASI is designed to be nationally representative of people aged 45 and above in India. The information collected is comparable with that collected by the HRS and its sister surveys in Asia, Europe, Mexico, and elsewhere. Aside from the pilot wave, there is only one wave of LASI, which was held between 2017 and 2019, covering most of India's states and union territories. The sample covers 72,262 individuals from 42,951 households. In this study, we pursue the only available wave of LASI. Therefore, we cannot compare India with other sample countries in terms of trends in financial preparedness across age cohorts.

## **B. The Main and Auxiliary Samples Used in the Analyses**

The goal of this study is to evaluate the level of later-life financial preparedness of near-retirement populations and their needs for financial support. It is difficult to evaluate how well prepared financially for retirement younger generations of workers are, since they have many years to address this. However, for those who are near retirement age, there is less opportunity and time to accumulate additional wealth. We can thus use the accumulated wealth position of individuals who are close to retirement age as a good approximation of the total private resources that are available to them for later-life support during the retirement phase. Ideally, we would want to select the age group that is as close as possible to the retirement age. However, doing so will substantially reduce the sample size that we can use, which would reduce the statistical power of estimates of preparedness we derive through any statistical analysis. Considering this tradeoff, we decided to select from our five datasets only individuals who will reach their country-specific retirement age within 5 years from their retirement age in each country.<sup>3</sup>

Our measures of preparedness, although computed based on samples of individuals from a specific age group, can be interpreted as the preparedness level of the general population under the assumption that wealth, income, and consumption patterns of younger cohorts follow similar paths as do those of the near-retirement individuals who are included in our main samples.

For the near-retirement individuals included in our main samples, annual intra-family income transfers, private pension income, and public pension income during retirement are not observable. We estimate each of these expected postretirement incomes by using a sample of retirees for each of the five economies. The key selection criterion is that

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<sup>3</sup> However, we tested the sensitivity of the results to an alternative selection criterion for the main samples to include individuals who are due to retire within 3 years and obtained similar results.

individuals must be aged between the retirement age and the country-specific life expectancy at the retirement age. We call these samples auxiliary samples. The estimation is done in two steps. In the first step, we establish the functional relationship between each postretirement income per annum and a set of individual and household characteristics by using the auxiliary sample of retirees for whom we have the actual incomes received from the three sources. We estimate the following regression model by the ordinary least squares (OLS) method:

$$Y(i) = a + b \text{ edu}(i) + c \text{ health}(i) + d \text{ gender}(i) + c \text{ married}(i) + d \text{ nchild}(i) + e(i) \quad (1)$$

where  $Y$  is the transfer income or private pension income or public pension income received by individual  $i$ ,  $\text{edu}$  is a series of binary variables indicating educational attainment,  $\text{health}$  is self-rated health status (1 for good and very good, 0 otherwise),  $\text{gender}$  is 1 for male and 0 for female,  $\text{married}$  is 1 for coupled household and 0 for all others,  $\text{nchild}$  is number of living children, and  $e$  is the random error. We estimate equation (1) by country and survey year and separately for annual transfer income, private pension income, and public pension income to obtain the parameter estimates. In case of the PRC and India, the regression model is estimated separately for the rural and urban samples.

In the second step, we use equation (1) and the corresponding characteristics of individuals included in our main samples to generate the predicted values of respective annual incomes that are the expected postretirement incomes of individuals in our main samples—that is, those due to retire within 5 years. The reported net wealth of the group plus the present value of their expected income streams constitutes the total value of their available financial resources over the retirement period. We use a discount rate of 2% to compute the present values of the expected incomes.

### **C. Key Variables Used**

To ensure comparability of variables in monetary terms, we first convert their values in local currency into nominal US dollars using purchasing power parity exchange rates (OECD nd), and then convert them into 2010 constant US dollars by using the annual US consumer price index available from the Bureau of Labor Statistics.

Table 1 presents the summary statistics of the key variables we use in this study, by country and survey year. They include per capita household wealth, market value of owner-occupied home, per capita income, and per capita consumption for the main sample; and intra-family transfer income, private pension income, public pension income, and out-of-pocket medical expenses (all in per capita terms) for the auxiliary samples (consisting of retirees). Per capita consumption is derived by dividing the household's reported consumption values by the household size. Also included in both samples are six individual characteristics: education, health, age, gender, marital status, and number

of living children. Table 1a and Table 1b report the statistics for the main and auxiliary samples.

**Net wealth [Wealth].** We construct this variable as the sum of the net financial and nonfinancial assets, as well as real estate, of the households. The former includes stocks, bonds, and other banking accounts, whereas the latter includes home, other real estate assets (including business assets), vehicles, and other assets. The household wealth is assumed to be at the disposal of the head of household and his/her spouse. Therefore, per capita wealth is the household net wealth divided by 2 for those who are married and by 1 for those who are single. Per capita wealth is highest in the US and is followed, in descending order, by Japan, the ROK, the PRC, and India.

**Market value of home [Home].** Home includes the household main residence. Respondents report its market value to the survey. We use home values to estimate the implicit rents that homeowners incur for housing services at 5% of the market value of the home of primary residence. Implicit rents, after adjusting for household size, are included as part of the consumption spendings of homeowners. The ranking of countries by home value is similar to the ranking by wealth, except that the ROK overtakes Japan toward the end of the sample period.

**Income [Income].** The income reported in the HRS type of data for all five economies is the total household disposable income. Except for in the US, for which household incomes are pre-tax, household incomes in other countries are after tax. Per capita income is household income divided by household size. The ranking by per capita income is the same as that by wealth.

**Consumption [Consumption].** Household consumption information is available for the PRC and India but not for three developed economies: the US, Japan, and the ROK. For these three economies, we derive household consumption from household income and a country-specific average propensity to consume that is constructed based on data from consumer surveys of the respective country. Some of the household consumption figures include expenditures on housing; some exclude them. Accordingly, we adjust the household's consumption variable to include housing costs prior to deriving the household's per capita consumption figures.<sup>4</sup> We discuss the adjustment and computation of the consumption variable further in a later section. Overall, per capita consumption is higher the higher the per capita income, except for in India, where the average per capita consumption is \$3,270, comparable to the PRC's \$3,290 but more than its own average per capita income of \$1,791. We believe that the consumption data for India may have been reported with substantial error. This may contaminate the

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<sup>4</sup> The term "per capita" strictly applies only to consumption spending where the aggregate data are adjusted by the total household size. However, the wealth and income data are divided by 1 or 2 if the household includes just the head of household or both the head of household and a spouse, in which case we use the terms "per capita" or "per head of household" interchangeably.

estimation of the preparedness index for India. To mitigate this data problem, we also derive an alternative per capita consumption value by using reported household income and an average propensity-to-consume measure.

**Educational attainment [Education].** All the HRS-type surveys that we use in this study report the educational attainment categories of the respondents. These are coded from 0 up to 10, with 0 for no formal schooling and higher levels of attainment with higher numbers. In this study, we use the education variable solely for the purpose of predicting expected postretirement incomes, rather than to analyze the role of education in individual later-life preparedness. To enhance the fitness of the regression models used for prediction, we introduce education in the models as a series of dummy variables. This is because the education variable is measured differently across the sample economies and, therefore, is not comparable across economies. Specifically, the value of the education variable ranges from 1 to 5 for the US, from 0 to 7 for Japan, from 1 to 9 for the ROK, from 1 to 10 for the PRC, and from 0 to 9 for India.

**Health status [Health].** The surveys use a five-point scale for self-reported health status (from poor to very good). Following the literature and our own earlier work, we convert this health status measure into a dummy variable, which assumes a value of 1 for people whose self-reported status is good and very good, and 0 otherwise. The average values of this variable vary considerably across the sample countries. Whether the differences owe to technical issues like reporting method or how people assess their health status remains a question.

**Gender, married, and number of living children [Gender, Married, Nchild].** Gender is a dummy variable, equaling 1 for male and 0 for female. Married is 1 for those who are married and living with a spouse. Married is 0 for those who were never married or are living without a spouse. Number of living children includes all children who are alive regardless of their living arrangement, cohabiting with the respondents or not.

**Transfer income, private pension income, public pension income, and out-of-pocket medical expenditures.** Most of the surveys we use in this study report information on these variables for retirees who are included in the auxiliary samples. However, income transfers within the family are not reported in the US sample, and out-of-pocket medical expenditures are not available for Japan and the ROK's 2006 survey. Therefore, they are assumed to be zero. As Table 1b shows, there are sizable cross-country differences in these postretirement incomes. Among the three developed economies, (i) average public pension income is comparable in the US and Japan, and higher than in the ROK; (ii) average private pension income in the US is almost five times that in the ROK and eight times that in Japan; (iii) average intra-family transfer income is higher in the ROK than in Japan (this variable is not available for the US); and (iv) average out-of-pocket medical expenditure is about four times higher in the US than in the ROK (this variable is not available for Japan). For the two developing economies, average

public pension income and family transfer income are lower in the PRC than in India; the reverse is true for average private pension income and out-of-pocket medical expenses.

### **III. DERIVING AN INCOME-BASED MEASURE OF LATER-LIFE FINANCIAL PREPAREDNESS**

Our analysis accounts for the role of four major income sources of later-life support, or total available resources (TAR): (i) intra-family transfers, especially from adult children; (ii) family-accumulated wealth through ordinary savings plans and investments in financial and real estate markets throughout the preretirement period; (iii) ownership of private pension plans; and (iv) reliance on public pension plans. A natural way to assess a household's preparedness is via the level of the household's net wealth accumulated prior to retirement. "Wealth" represents the major private source of retirement income since, in principle, it can be liquidated in whole upon retirement and held in risk-free assets to cover at least a part of its overall spending capacity, including any donations or bequests to offspring. The greater the individual household's net wealth, the better its ability to meet all its financial needs over its expected retirement phase.

Net wealth prior to retirement, however, does not exhaust the total private resources that are available to the household in the postretirement phase. The latter also includes intra-family income transfers and private pensions income. Adding the present values of these other resources to accumulated household net wealth prior to retirement provides a measure of the household's expected private financial preparedness, or financial private self-dependency (PSD), measuring the extent to which the household can rely on its own income to support its later-life financial needs.<sup>5</sup> Adding the present value of the expected public pension income in the postretirement period, or public financial dependency (Pbfd), to the expected PSD results in a measure of the TAR to households in their postretirement period, or their financial retirement preparedness.

We can now define the household's self-dependency ratio (SDR) as the share of expected total financial resources that is funded by the household's private resources or  $SDR = (PSD/TAR)$ . The greater the SDR, the higher the household's degree of financial independence. The public dependency ratio (PBDR) would then be defined by  $PBDR = 1-SDR$ , indicating the extent to which the household depends on public pension income for later-life support. Table 2 presents the averages of the four sources of retirement income: net wealth, present values of estimated intra-family transfer, private pension, and public pension; and their shares in the TAR as a measure of the household's financial retirement preparedness and wellness.

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<sup>5</sup> A caveat in our derivation of SDRs across the five economies included in our analysis relates to the assumption that the financial markets for especially risky financial assets, like stocks and "investment" (or commercial) real estate assets, are equally liquid across the five countries. Generally, these markets tend to be more liquid in the more developed economies, which may understate the relative values of SDRs in these countries.

It is apparent that financial wellness is highly correlated with level of economic development. Among the three developed economies, the near-retirement US population has the highest average household's level of TAR and potential financial wellness in retirement, as expected, although the values decline from \$737,037 in 2006 to \$639,074 in 2010, reflecting the consequences of the 2008 financial recession in the US. Japan has the second highest measure of average household's TAR; it is about 60% of that of the US, and it also declines, from \$467,467 to \$419,324, over the sample period. The ROK has the lowest level of average TAR, which fluctuates from \$218,827 in 2006 to \$245,213 in 2010.

However, the near-retirement households of the PRC and India are in a much different position regarding their potential financial wellness in retirement. In the PRC, the average TAR is just \$56,801 in 2011, well below the levels of the US and the developed Asian economies. However, average TAR rises to \$129,102 in 2018, thus more than doubling over a period of 7 years. Also, the average Chinese household living in urban areas is much better prepared relative to its rural counterpart; the average TAR level of the former is two to three times higher than that of the latter.<sup>6</sup> Near-retirement average households in India, in turn, have a lower level of TAR than their counterparts in the PRC. In 2018, for which data are available for both the PRC and India, India has an average TAR of \$62,818 compared with the PRC's \$129,102. As in the PRC, there is a large gap in the potential financial wellness measure between the urban and rural populations in India; the rural population's average TAR is less than 40% of that of its urban peer.

As expected, households in the two developing economies—the PRC and India—are still well behind their counterparts in the more developed Asian economies. But the PRC has made significant progress over recent decades. For example, the PRC's average TAR in 2011 was only about 23% of the ROK's \$245,130 in 2010. By 2018, however, it had risen to \$129,102, which is 53% of that of the ROK's. The corresponding figures for the Chinese urban population are 43% and 79% of the ROK's levels in 2010.

The SDR, which measures the share of total available financial means that is derived from private sources (wealth, transfers, and private pension), varies considerably not just between developed and developing economies but also across the developing economies included in this study. The SDR is very stable for the US, standing at 0.60 over the sample period, higher than Japan's SDR, which declined from 0.48 in 2007 to 0.38 in 2011. Thus, Japanese retirees have become less independent in terms of their ability to self-support their total later-life financial needs from private sources. The decline in accumulated net wealth is the main factor accounting for this decline. Put differently,

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<sup>6</sup> The abnormally higher value of the TAR for the rural sample in 2015 is driven largely by the high average net wealth in that year. We checked the original data and found that a few individuals reported extremely high net wealth holdings, in the order of \$4 million–\$9 million. While these are high by Chinese standards, they are not entirely implausible. However, the sharp increase in the net wealth among the rural population is a puzzle.

Japanese retirees are becoming increasingly dependent on public pension income. However, in the ROK, the SDR has been constant over the sample period at 0.85, the highest among the three developed economies. The high SDR for the ROK, relative to the US and Japan, is driven by a larger wealth share, mostly because of a much higher average level of intra-family income transfers. The latter accounts for about 20% of the total financial resources available for later-life support in the ROK. By contrast, the intra-family income transfer source constitutes a paltry 1%–2% in Japan. However, the comparison with the US may be distorted because intra-family income transfer data are not available for the US and are assumed to be zero (identified as n.a. in Table 2).

Somewhat surprisingly, household SDRs for the developing economies of the PRC and India are higher than those of the three developed economies, especially the US and Japan. In the PRC, the SDR for overall near-retirement households rose from 0.84 (comparable to the ROK) in 2011 to 0.88 in 2018, and the SDR is higher for urban households than for rural ones. A major contributing factor is the larger share of private pension income, which rose to 0.40–0.45 over the sample period, which is oddly higher than the share of private pensions in any of the three developed economies.<sup>7</sup> The intra-family income transfer share in the PRC falls between the shares for Japan and the ROK but is lower than India's 0.11 in 2018. Intra-family income transfers account for a larger share of TAR in rural areas than in urban areas in both the PRC and India.

We should point out that, while the higher SDR means a high degree of potential financial self-dependency in retirement, it may also be an indication of relatively low public pension support. Therefore, the high SDR for the PRC and India and, to some extent, for the ROK may suggest that the public pension system has not yet been fully developed in these countries relative to the more developed economies of Japan and the US.

#### **IV. DERIVING A CONSUMPTION-BASED MEASURE OF RETIREMENT FINANCIAL PREPAREDNESS**

The basic idea behind this measure of financial preparedness is the adequacy of expected postretirement incomes from all four sources—intra-family transfer, self-managed wealth, private pension, and public pension—for maintaining a targeted benchmark level of consumption spending over the expected retirement life of the head of household. By this measure, individuals are said to be financially prepared in later life if their expected annual income exceeds the target or benchmark annual consumption spending over the duration of the expected retirement life.

To derive the individual-specific consumption preparedness measure, we assume that households liquidate their wealth upon retirement, and invest the proceeds in a risk-free

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<sup>7</sup> It should be noted that “private” pensions are employer-funded programs. Most Chinese are employed by the state or state-owned enterprises. Therefore, the distinction between private and public pensions is not clearcut.

and equally liquid financial instrument that maintains the value of the investment in real terms. This assumption simplifies the estimation of income streams derived from household wealth. Another assumption we make is that retirees first use transfer and pension incomes to support consumption, and draw on wealth as the income source of last resort. Therefore, individuals who expect to have nonnegative net wealth at the end of expected life are deemed to be prepared for supporting their targeted personal consumption level. Mathematically, this amounts to comparing the number of years that the expected postretirement income can cover with the target level of consumption over the expected retirement years. For households deemed to be prepared in later life, the former measure would be greater or equal to the latter.

Let  $W(i)$  stands for the net wealth of individual  $i$  at retirement,  $C$  is the target consumption level per year,  $T(i)$  expected transfer income per year,  $PriP(i)$  expected annual private pension income, and  $PubP(i)$  expected annual public pension income, all in per capita terms.

The number of years that the expected postretirement incomes can support the consumption  $C$  for individual  $i$  is given by:

$$X(i) = W(i) / [C - T(i) - PriP(i) - PubP(i)] \quad (2)$$

and the preparedness indicator for individual  $i$ ,  $Prep(i)$ , is:

$$Prep(i) = 1, \text{ if } X(i) \geq Ae - Ar \text{ and } Prep(i) = 0, \text{ if } X(i) < Ae - Ar \quad (3)$$

where  $Ar$  is the official retirement age (such as the full social security age for people born in a given year in the US) and  $Ae$  is the life expectancy in years for individuals at age  $Ar$ .

The country- and year-specific preparedness index,  $0 < P \leq 1$ , is defined as the share of individuals with a preparedness indicator of 1.

$$P = \frac{1}{n} \sum_{i=0}^n Prep(i) \quad (4)$$

The greater the index, the greater the level of retirement preparedness of the age cohort. In this study, we focus on the cohort of individuals who will reach the retirement age within 5 years. For example, the cohort would be individuals aged 61–65 in the US, assuming that age 66 is the retirement age (the full social security age).

To compute the individual preparedness indicator, we need to assemble all the variables on the righthand side of equation (2). While the HRS-type surveys for all five economies (the US, Japan, the ROK, the PRC, and India) covered in this study contain information on household's wealth, only CHARLS of the PRC and LASI of India contain information on consumption. Therefore, for economies where consumption data are not available, we derive per capita consumption from reported household income by using a measure of average propensity to consume. The latter is estimated based on average income and

consumption expenditure data as published in the consumer surveys of respective countries.<sup>8</sup> Average propensity to consume is the ratio of average consumption expenditure to average income. The average income used to compute propensity to consume is pre-tax income for the US and disposable income for Japan and the ROK. This distinction is made because the household income reported is pre-tax income in the HRS study and disposable income in JSTAR and KLoSA. The average propensities to consume we use are 79% for the US, 73% for Japan, and 62% for the ROK.

We also make two adjustments to the preretirement consumption measure to account for implicit rental values of owner-occupied home and expected out-of-pocket medical expenses during the period of retirement. The implicit rent for housing is assumed to be 5% of the market value of home of primary residence, and is added to household consumption for homeowners before deriving the per capita consumption measure. No such adjustment is made for renters since rent payments are included in the consumption spending data for non-homeowner households. We estimate the expected out-of-pocket medical expenses for each of the sample individuals near retirement age via a similar regression specification to that we used in equation (1). We add predicted expected medical expenses and deduct current medical expenses from preretirement per capita consumption values so the adjustment reflects the expected increase in out-of-pocket medical expenses in retirement relative to the preretirement level.

The three remaining components of equation (2)—expected intra-family transfer income, private pension income, and public pension income during the retirement phase—are estimated following the procedure described in Section II.B.

With these estimated expected postretirement incomes along with reported wealth ( $W$ ) and a benchmark consumption spending ( $C$ ), which is reported for the PRC and India and estimated for the US, Japan, and the ROK, we derive the individual preparedness indicators via equation (3) and then compute the preparedness index using equation (4). It should be noted that net wealth, predicted postretirement income, and preretirement consumption are all converted from the household aggregates to per capita or per head of household terms prior to computing the index.

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<sup>8</sup> US: Bureau of Labor Statistics Consumer Expenditures, [www.bls.gov/cex/csxann10.pdf](http://www.bls.gov/cex/csxann10.pdf); Japan: Statistics Bureau of Japan, [www.stat.go.jp/english/data/sousetai/9.html](http://www.stat.go.jp/english/data/sousetai/9.html); and ROK: Statistics Korea, <https://kostat.go.kr/board.es?mid=a20106020000&bid=11736>.

## **V. ESTIMATED COUNTRY-SPECIFIC PREPAREDNESS BASED ON TARGETED LEVELS OF CONSUMPTION AND THE DETERMINANTS OF INDIVIDUAL LEVELS OF CONSUMPTION AND INCOME PREPAREDNESS**

### **A. Estimated Consumption-Based Preparedness Index for Each Country**

Table 3 presents the estimated consumption-based preparedness index for each country and survey year covered in our sample, using actual consumption of individuals in the developing economies (and estimated consumption of individuals in the three developed economies) near their retirement age during the survey year. Table 3 also presents conditional life expectancy at the retirement age and the retirement age used for each country and survey year. The estimated index is reported in column (1).

The consumption-based preparedness index for the US is 0.82 in 2010, a 1 percentage point increase from 0.81 in 2006. This means that 81%–82% of near-retirement Americans have sufficient income to support their preretirement levels of consumption throughout their expected retirement life. Depending on the year, 86%–89% of Japanese are in the same position. It is somewhat surprising that a larger proportion of Japanese than Americans are able to maintain their preretirement living standard, given that the Japanese have higher life expectancy, lower wealth, and comparable public pension support. A closer inspection of the consumption data suggests that the main reason for the higher preparedness index for Japan is the low level of per capita consumption spending in Japan relative to the US. For example, in 2011, per capita consumption spending in Japan, \$12,926, is about half of that in the US, \$25,183, in 2010. The preparedness index for the ROK rose from 0.50 in 2006 to 0.58 in 2010. However, the index for the ROK is the lowest among the three developed economies.

The consumption-based preparedness index for the PRC ranges between 0.62 and 0.73 over the period 2013–2018. By this measure, the overall level of preparedness of Chinese households is higher than that in the ROK, but lower relative to that in the US and Japan. However, urban consumers in the PRC have a level of preparedness comparable to that of their counterparts in the US and Japan, and a higher level of preparedness than their rural counterparts, whose level of preparedness shows a steady decline from 0.62 in 2011 to 0.44 in 2018.

The consumption-based preparedness index for India is 0.39, the lowest among all five economies included in this study. As in the PRC, urban households in India are better prepared for financing their later-life consumption needs than their rural counterparts: 0.57 versus 0.31. However, as noted earlier, the household consumption data reported in LASI seem to be problematic since the average consumption level is almost twice the average income level. To address this data issue, we also report in parentheses a set of alternative estimates for India using a computed per capita consumption variable, which is the product of reported household income and average propensity to consume (0.68),

adjusted for household size. We compute the alternative estimates from two online publications of the World Bank, one reporting India's net income<sup>9</sup> and the other India's final consumption expenditures for households and nonprofit institutions serving households.<sup>10</sup> These estimates are much higher than the estimates that are based on the reported consumption data, which make India's level of preparedness comparable to that of the PRC.

The consumption-based preparedness index measures how well the near-retirement population is prepared in later life in terms of adequacy of postretirement incomes in covering individual own preretirement consumption spending. Therefore, it is not based on a common level of consumption or quality of life. In this regard, an estimated higher level of consumption preparedness of Japanese households relative to that of Americans does not necessarily mean that the quality of retirement life in Japan is higher. One way to incorporate "quality of life" into the index is to use a common level of consumption spending as the benchmark.

We present a set of consumption-based preparedness index estimates in column (2) of Table 3, using median per capita consumption spending in the US as the benchmark for the US, Japan, and the ROK. These index estimates elevate the level of consumption spending preparedness of the US households, and lower considerably the corresponding level of preparedness of the Japanese and ROK households. In Japan, the new index estimates range between 0.78 and 0.79, which are much lower than those reported in column (1). They are also lower than the corresponding indexes for the US. In the ROK, the new index estimates range from 0.12 to 0.23, which are also much lower than those in column (1). By the common consumption new index, American households, on average, are better prepared to support their later-life consumption needs than their Japanese and ROK counterparts over their expected retirement life.

For the PRC and India, we also compute the alternative consumption-based preparedness index, using median per capita consumption spending in the PRC as the common benchmark. The urban median is used to compute the index for urban households and the rural median to compute the index for the rural sample. As the estimates reported in column (2) show, the overall level of preparedness is higher in the PRC than in India for both rural and urban households.

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<sup>9</sup> <https://data.worldbank.org/indicator/NY.ADJ.NNTY.CD?locations=IN>

<sup>10</sup> <https://data.worldbank.org/indicator/NE.CON.PRVT.CD?locations=IN>

## B. Determinants of Individual Levels of Consumption and Income Preparedness

To understand the common determinants of consumption-based and income-based preparedness of individual households, we run a series of linear regressions of alternative preparedness measures on the reported characteristics of the head of household.

$$Y(i) = a + b \text{ edu}(i) + c \text{ gender}(i) + d \text{ married}(i) + c \text{ health}(i) + d \text{ nchild}(i) + e(i), \quad (5)$$

where the dependent variables denote our individual consumption-based preparedness or overall income preparedness measures, and the independent variables are education, gender, marital status, health, and number of children. Equation (5) can be viewed as a reduced form regression derived from a set of simultaneous equations where individual characteristics determine incomes from each of the four income sources for retirement support and total income determines the level of preparedness. As we show in the context of the asset management hypothesis in Ehrlich and Liu (2022, 2023), *ceteris paribus* (including the opportunity costs of asset management), better-educated individuals are generally more likely to hold stocks and commercial real estate in their overall portfolio of assets, which on average generate higher returns. This role of education is imbedded in the estimated effect of education in equation (5). To see if education has additional impact on the preparedness measure even beyond the impact it has on the individual's portfolio composition (the extensive margin), we also implement a regression specification that includes two binary variables, indicating if the households hold stocks and investment real estate in their portfolios, respectively.

We begin with the individual consumption-based preparedness measure as the dependent variable, which has the value of 1 for individuals whose total retirement income support (TAR) is sufficient to support their preretirement annual consumption for the duration of the retirement life and 0 otherwise. The estimation results based on equation (5) and an expanded version of equation (5) are reported in Table 4 for each of the five economies included in this study. These estimates suggest the following. (i) Men are significantly more likely to be self-prepared for consumption support, based on their preretirement consumption needs, than women in all five economies. (ii) College education exerts a positive contribution to self-preparedness in the ROK, the PRC, and India, especially with or without controlling for risky asset holdings. Surprisingly, education plays a negative role in the US and no role in Japan. (iii) Individuals with more children are more likely to be self-prepared, significantly so in the ROK, the PRC, and India, presumably because children in these countries are more likely to provide financial assistance to their aging parents. (iv) Individuals holding stocks and/or investment real estate in their portfolio of wealth are more likely to be classified as self-prepared. (v) While good health increases the likelihood of one's preparedness, being married reduces it.

We next repeat the regressions in Table 4 using an alternative consumption-based preparedness measure defined relative to a common consumption level. Specifically, the

median of per capita preretirement consumption of the US is used as the benchmark for the US, Japan, and the ROK, and the median consumption of the PRC is used as the benchmark for the PRC and India. While the common benchmark-based results in Table 5 are largely comparable to those in Table 4, the estimated effects of education, marriage, health, holdings of stocks, and investment real estate are more consistent across our sample economies. Specifically, near-retirement individuals who are male, college educated, not living with a partner, in good health, and holding stocks or investment real estate or both are more likely to be prepared to support their later-life consumption needs, albeit the education effect is not statistically significant for the PRC.

It is not surprising that the results are somewhat sensitive to the benchmark consumption level used in calculating the consumption-based preparedness measure. To avoid this problem, and present a similar analysis of the determinants of our overall income-based preparedness measure, we next repeat the regression using an income-based preparedness measure as the dependent variable, which is the log of total retirement income available at retirement. Since, for any given consumption benchmark, the larger the total retirement income available for later-life support, the more likely one is prepared in later life, factors that determine total retirement income support are also likely to be contributing factors for achieving higher levels of overall preparedness for later-life support. Indeed, the estimates reported in Table 6 warrant similar conclusions. Education, health, number of children, and the holding of stocks and investment real estate are contributing factors to overall preparedness, while having a living partner is a negative factor. Also, all else being the same, men amass more resources at retirement and, therefore, are better prepared to support their lifestyle than women in later life.

## **VI. DISCUSSION AND CONCLUSIONS**

The analysis in this paper offers a succinct summary of the main themes of the three studies that are covered in our investigation of later-life financial preparedness of households in four major Asian economies and the US, as well as implications concerning the financial wellness of older populations in developed and developing economies in general.

Although the extant literature concerning later-life financial support channels has focused mainly on the role of public later-life support schemes, such as social security schemes of mandated defined benefits or defined contribution or public pension plans, the main objective of our study has been to study the extent to which households' own wealth accumulation contributes to their later-life financial preparedness or wellness. To this end, we have used the harmonized household longitudinal surveys of two developed Asian economies (Japan and the ROK), with the US serving as a standard of comparison, as well two fast-developing Asian economies (the PRC and India), as described in Section II, to assess the own contributions of heads of households from three private support channels, and compare them with those received from the public channel. The four

channels assessed in terms of their contribution per head of household thus include (i) intra-family financial support provided by adult children, (ii) the financial and real estate assets that households accumulate prior to their retirement phase and the present value of the income they obtain from these assets during the retirement phase, (iii) the present value of income from private pension plans owned by the households, and (iv) the benefits from the later-life financial support channels that households obtain from public pension plans during retirement.

Below, we present the main inferences that we are able to derive from this analysis, based on two general measures of household retirement preparedness. One is an estimated income-based measure that represents the household's TAR incorporating all four channels of later-life support (private and public), and a measure that includes just the first three channels, covering the household's private income support, or self-dependency channels (PSD). This enables us to compute also the household's SDR ( $\text{SDR} = \text{PSD}/\text{TAR}$ ), based on the share of the private support channels in the total income support measure, relative to the PBDR based strictly on the share of public pensions in the total, or 1-SDR. The second general measure of total later-life financial preparedness is a consumption-based measure, which focuses on the ability of the head of household to fund specific targeted levels of consumption over specified postretirement periods. The complex methodology we use to produce these two general indexes is described in Sections III and IV. The results we obtain using the estimated income-based and consumption-based indexes of later-life financial preparedness are presented in Tables 2 and 3. Below, we briefly summarize the highlights of our finding based on these indexes.

#### **A. Comparing Private Financial Preparedness of Heads of Households Across Four Asian Economies and the United States Using the Income-Based Measure**

In the more developed economies—the US, Japan, and the ROK—we find a nonsymmetrical ranking of the countries' total level of household resources per capita (TAR) and the household's SDR over our sample periods. The US has the highest level of TAR (albeit falling from \$737,037 in 2006 to \$639,074 in 2010 because of the US financial recession over that period), with Japan ranking second (similarly falling from \$467,467 in 2007 to \$419,324 in 2011), and the ROK third (fluctuating between \$218,827 in 2006 and \$245,130 in 2010). However, the SDRs show a different pattern. In the US, the SDR is stable, at about 0.60, between 2006 and 2010. In Japan, it falls from 0.48 in 2007 to 0.38 in 2011. It is highest and stable in the ROK at about 0.85 between 2006 and 2010.

In the two developing economies—the PRC and India—we find that by 2018, the PRC has reached levels of per capita TAR and SDR that are higher than those in India, for which we have data only for that year. While the PRC's level of TAR per capita was just \$56,801 in 2011, it more than doubled in 2018, reaching \$129,102, while the level of per

capita TAR in India was just \$62,818 in 2018. Also, the SDR level in the PRC was 0.88 in 2018, which is slightly higher than that of India's 0.82. However, the SDR levels in both India and the PRC are much higher relative to those in the more developed Asian economies and the US, except for the ROK where the SDR level is about the same as in the PRC, and is much higher relative to the SDR levels in both Japan and the US.

The rationale is apparently mainly the much lower level of public pension contributions in both the PRC and India. Thus, SDRs are higher in the developing relative to the more developed Asian economies essentially not because of the accumulated values of net wealth among Chinese and Indian households, which are substantially lower than those in the US (in the PRC, net wealth is a tiny 7.6% of that in the US [\$23,603 in the PRC in 2011 relative to \$309,936 in the US in 2010], and India's net wealth per household head is \$45,319 versus \$79,502 in the PRC in 2018), but because the contributions of public pensions to the present value of total household resources in the PRC and India are much lower than in the more developed Asian economies and the US.

#### **B. Comparing Total Financial Preparedness of Heads of Households Across Four Asian Economies and the United States Using Alternative Targeted Consumption Levels in Selected Years**

The cross-country comparisons using these consumption-based measures of retirement preparedness differ from those summarized by the income-based measures since they are based on different criteria—the proportion of individuals in the harmonized samples in the different countries who have adequate income from all income sources prior to their retirement date to finance the targeted level of consumption over specified periods of retirement, which represent households' year of retirement relative to countries' life expectancy. Two versions of the consumption-based indexes are presented in Table 3: one where the targeted consumption level is based on the individual-specific level of consumption in the period just prior to retirement, and the other based on the median consumption level of the US as the targeted consumption level for the developed economies (the US, Japan, and the ROK); for the developing economies, the median consumption level in the PRC serves as the target consumption level.

According to Table 3, in the consumption-based preparedness index with individual-specific preretirement consumption as the benchmark, over 85% of near-retirement Japanese heads of households are expected to have enough postretirement income to support their preretirement consumption level. By contrast, 80% of Americans and 50%–58% of Koreans are expected to be in the same situation. The share of the Chinese population who are similarly prepared is between 62% and 73%, higher than India's 39% (column [2], Table 3).

The estimated preparedness indexes, with the median consumption level of the US serving as the benchmark, suggest that Americans are somewhat better prepared than

their Japanese counterparts, who, in turn, are better prepared than Korean would-be retirees (over 80% versus 78% versus 12%–23%, respectively). The PRC is still ahead of India, if the index estimates are based on the median per capita consumption of the PRC (column [2], Table 3).

### **C. The Determinants of Individual Preparedness**

We use the two versions of individual preparedness measures that we employed to construct the country-specific preparedness indexes reported in Table 3 as dependent variables to identify the determinants of preparedness at the individual level. One is with the individual preretirement consumption level as the benchmark, and the other is with the median preretirement consumption levels in the US and the PRC as the benchmarks for the developed and developing economies, respectively. While there are slight differences in the estimated effects of different individual characteristics, college education appears to be largely a key contributing factor. Consistent with the findings in Ehrlich and Liu (2022, 2023), which focus on the role of education in determining individual decisions to invest in risky assets that yield higher portfolio returns in the long term, individuals holding stocks and investment real estate are more likely to be prepared for their retirement phase.

These results are corroborated by a similar regression analysis using total retirement income available as an alternative income-based preparedness measure. Two noteworthy results are that (i) college education is positively associated with total income available at retirement, and the effect of education is larger in developing than in developed economies included in this study; and (ii) holding stocks and investment real estate contributes positively to TAR for retirement in all five economies, and the estimated effects of stocks and investment real estate assets in the regressions concerning the determinants of the income-based measure of TAR are larger for the PRC, India, and the ROK than for the US and Japan (Table 6).

### **D. The Role of the Economy's Level of Development**

Both Tables 2 and 3 present measures of the total level of preparedness in urban versus rural regions of the economy. Such distinctions are reported only in the harmonized samples of the PRC (CHARLS) and India (LASI). No such comparisons are available for the US, Japan, and the ROK. Table 2 also enables a comparison of the extent to which urban and rural households are able to support their financial preparedness from private sources that are available to the households, as indexed by our SDRs.

Not surprisingly, the ranking of total financial preparedness, based on the consumption criterion, is slightly different from that based in the income criterion. In the PRC, urban households are significantly better able to maintain the consumption-based indexes of financial preparedness than are their rural counterparts, and the same pattern is shown

in India. Moreover, these urban–rural differences in the PRC seem to be rising over time. In fact, the financial preparedness of urban families in the PRC is virtually tied with that of rural households in India in 2018.

A quite different pattern is observed when the income criterion is used to compute the level of financial self-dependency (SDR) in urban relative to rural families. Overall levels of SDRs in rural areas in both the PRC and India are higher than those in the US, Japan, and the ROK. Also, the differences between urban and rural households in India by the SDR index are very small.

## **E. Limitations of the Analysis and Policy Implications**

There are several limitations in our analysis of total preparedness and private preparedness by both the income and the consumption criteria.

The main limitation of the indexes of later-life or retirement preparedness using both the income and the consumption criteria is our assumption that household wealth does not generate any income from wealth over the retirement income. This is because none of the harmonized surveys report any income from financial assets, interest, and dividends, let alone capital gains. The absence of such income from capital may understate the contribution of wealth to postretirement consumption or income and, therefore, cause downward bias in the total and private preparedness estimates in both Tables 2 and 3 (footnote 5).<sup>11</sup>

Another limitation is that we need to use average propensity to consume in order to derive consumption spending from income data. The population's actual propensity to consume near retirement may be quite different from that corresponding to the general population. Finally, for simplicity, we assume there is no change in public pension policies over the sample periods in terms of retirement benefits and eligible age.

Notwithstanding these limitations, the findings we obtain in this study can serve as guidance for policymakers where there is room to enhance both total financial preparedness and especially private preparedness as measured by self-dependency, based especially on our analysis of the basic determinants of private portfolio management and self-preparedness (the equivalent of self-dependency in this study), which we have emphasized in our related ADB projects on the determinants of financial wellness in later life. The consistent findings in this study that education and holding risky assets, including stocks and investment real estate, are positively associated with individual consumption-based and income-based retirement preparedness offer important policy implications. They imply that policies that promote education, financial

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<sup>11</sup> Another limitation with similar consequences is our implicit assumption that the markets for risky financial and real estate assets are equally liquid, even though they are typically more efficient in the more developed economies.

literacy, and financial market development have the potential to improve the financial independence and wellbeing of the older population and, on average, reduce acute dependency on public support.

**Table 1a. Main Samples (individuals reaching retirement age within 5 years)**  
**—Means and Standard Deviations (in parentheses)**

Variable	US	US	US	Japan	Japan	Japan	ROK	ROK	ROK	PRC	PRC	PRC	PRC	India
Year	2006	2008	2010	2007	2009	2011	2006	2008	2010	2011	2013	2015	2018	2018
Wealth	418,405	406,354	309,936	216,750	207,152	158,251	144,922	190,591	168,010	23,603	36,497	98,652	79,502	45,319
	(1,116,170)	(1,219,680)	(461,507)	(204,799)	(226,790)	(181,520)	(244,788)	(443,872)	(272,202)	(37,295)	(107,128)	(589,565)	(361,394)	(517,015)
Home	266,021	259,552	222,585	187,003	144,822	110,777	167,050	191,882	173,549	30,236	51,469	166,170	70,381	48,305
	(315,833)	(631,741)	(234,566)	(136,489)	(173,015)	(137,395)	(250,315)	(234,364)	(196,973)	(40,162)	(203,027)	(1,177,965)	(381,384)	(526,286)
Income	47,094	44,764	44,192	17,196	16,620	16,397	10,180	9,699	9,487	2,483	2,210	2,253	5,413	1,791
	(123,594)	(99,950)	(58,595)	(11,181)	(23,066)	(13,188)	(13,673)	(10,489)	(9,616)	(6,720)	(3,518)	(4,383)	(14,519)	(10,627)
Consumption	28,934	27,167	25,183	14,019	13,723	12,916	10,294	10,260	9,706	1,357	2,188	4,607	3,290	3,270
	(60,748)	(66,611)	(29,177)	(8,189)	(15,664)	(9,551)	(11,980)	(9,930)	(8,799)	(1,898)	(3,442)	(21,628)	(6,521)	(2,1209)
Education	3.41	3.50	3.64	2.45	2.52	2.71	4.17	4.32	4.41	3.38	3.81	4.04	4.58	1.92
	(1.35)	(1.31)	(1.30)	(1.36)	(1.36)	(1.28)	(1.40)	(1.39)	(1.31)	(1.75)	(1.83)	(1.74)	(1.68)	(2.10)
Health	0.78	0.78	0.79	0.88	0.83	0.91	0.52	0.56	0.58	0.25	0.19	0.25	0.33	0.40
	(0.43)	(0.42)	(0.43)	(0.34)	(0.34)	(0.30)	(0.50)	(0.50)	(0.49)	(0.43)	(0.40)	(0.42)	(0.47)	(0.49)
Age	62.94	62.87	62.88	62.14	61.83	62.00	58.80	59.06	58.85	55.81	55.73	55.06	54.40	59.08
	(1.41)	(1.46)	(1.41)	(1.47)	(1.42)	(1.39)	(1.42)	(1.38)	(1.41)	(2.53)	(2.51)	(2.71)	(2.47)	(1.36)
Gender	0.49	0.48	0.46	0.49	0.56	0.46	0.52	0.51	0.50	0.68	0.71	0.59	0.40	0.63
	(0.49)	(0.49)	(0.49)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.47)	(0.45)	(0.49)	(0.50)	(0.50)
Married	0.74	0.74	0.75	0.98	0.68	0.88	0.76	0.77	0.75	0.85	0.85	0.83	0.90	0.81
	(0.42)	(0.42)	(0.44)	(0.32)	(0.42)	(0.32)	(0.39)	(0.38)	(0.38)	(0.35)	(0.36)	(0.39)	(0.32)	(0.48)
No. of children	3.02	2.87	2.73	2.05	2.02	1.83	2.68	2.54	2.34	2.21	2.20	2.28	1.92	3.71
	(2.03)	(1.93)	(1.92)	(0.82)	(0.99)	(0.96)	(1.07)	(1.00)	(0.90)	(1.12)	(1.11)	(1.06)	(0.92)	(2.07)
Urban	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.35	0.33	0.32	0.53	0.32
	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	(0.46)	(0.46)	(0.45)	(0.49)	(0.48)
Sample size	2,524	2,039	2,303	549	525	302	1,268	1,129	1,083	621	379	366	716	3,872

n.a. = not available, PRC = People's Republic of China, ROK = Republic of Korea, US = United States.

Notes: Wealth, market value of home, income, and consumption are in 2010 constant US dollars; and wealth, income, and consumption are in per capita terms. The education variable is an integer value that varies across the different countries, as described in Section II.

Source: Authors' calculations.

**Table 1b. Auxiliary Samples (retirees)—Means and Standard Deviations (in parentheses)**

Variable	US	US	US	Japan	Japan	Japan	ROK	ROK	ROK	PRC	PRC	PRC	PRC	India
Year	2006	2008	2010	2007	2009	2011	2006	2008	2010	2011	2013	2015	2018	2018
Age	73.62	73.43	73.46	70.36	70.97	71.22	69.22	69.55	69.80	66.92	67.03	67.16	67.24	68.22
	(5.27)	(5.16)	(5.02)	(2.78)	(3.53)	(3.57)	(5.42)	(5.50)	(5.67)	(6.63)	(6.44)	(6.26)	(6.53)	(4.93)
Gender	0.45	0.45	0.46	0.38	0.35	0.42	0.46	0.46	0.47	0.48	0.53	0.51	0.46	0.72
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.49)
Education	3.12	3.18	3.30	1.72	1.88	2.14	3.38	3.51	3.66	3.01	3.11	3.35	3.58	1.91
	(1.39)	(1.38)	(1.36)	(1.21)	(1.25)	(1.38)	(1.53)	(1.54)	(1.53)	(1.89)	(1.88)	(1.88)	(1.91)	(2.20)
Married	0.64	0.64	0.67	0.77	0.52	0.69	0.68	0.69	0.68	0.66	0.69	0.66	0.73	0.71
	(0.48)	(0.48)	(0.48)	(0.34)	(0.42)	(0.38)	(0.46)	(0.45)	(0.45)	(0.47)	(0.46)	(0.48)	(0.45)	(0.49)
Health	0.71	0.72	0.76	0.73	0.79	0.83	0.34	0.35	0.35	0.19	0.22	0.21	0.22	0.32
	(0.46)	(0.46)	(0.44)	(0.43)	(0.41)	(0.38)	(0.47)	(0.47)	(0.47)	(0.38)	(0.40)	(0.40)	(0.41)	(0.47)
No. of children	3.34	3.32	3.27	2.17	2.24	2.07	3.66	3.52	3.36	3.16	3.16	3.03	2.65	3.97
	(2.20)	(2.20)	(2.17)	(0.75)	(0.97)	(0.91)	(1.57)	(1.52)	(1.50)	(1.63)	(1.60)	(1.47)	(1.36)	(2.17)
Public pension	11,542	11,581	12,433	11,812	12,051	12,635	635	805	1,019	262	282	284	374	738
	(6,072)	(6,173)	(6,723)	(7,506)	(7,585)	(9,767)	(2,079)	(2,000)	(2,208)	(1,003)	(720)	(856)	(957)	(4,855)
Private pension	8014	7839	6702	472	1165	889	1116	1277	1319	1548	1467	1647	2327	369
	(23,544)	(30,061)	(62,868)	(1,653)	(3,519)	(2,800)	(5,772)	(5,974)	(6,123)	(2,884)	(2,795)	(3,370)	(3,240)	(1,685)
Transfers	n.a.	n.a.	n.a.	679	676	537	1,596	1,762	1,468	215	347	395	49	147
	n.a.	n.a.	n.a.	(2,602)	(2,139)	(2,204)	(7,648)	(5,853)	(5,128)	(2,005)	(2,782)	(2,087)	(3,173)	(889)
Medical expenses	3,647	2,966	3,602	n.a.	n.a.	n.a.	n.a.	999	991	425	676	803	813	668
	(9,713)	(10,632)	(9,971)	n.a.	n.a.	n.a.	n.a.	(2,208)	(2,153)	(2,145)	(3,336)	(5,099)	(3,282)	(3,135)
Urban	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.44	0.42	0.45	0.52	0.31
	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	(0.49)	(0.48)	(0.48)	(0.49)	(0.48)
Sample size	8,585	8,657	8,264	1,114	1,263	558	3,781	3,694	3,749	2,765	2,007	1,921	3,539	8,904

n.a. = not available, PRC = People's Republic of China, ROK = Republic of Korea, US = United States.

Notes: Public pension income, private pension income, intra-family transfer income, and out-of-pocket medical expenses are all per capita and in 2010 constant US dollars. The education variable is an integer value that varies across the different countries, as described in Section II.

Source: Authors' calculations.

**Table 2. Present Values of Estimated Retirement Income by Source, and Self-Dependency Ratio and Public Dependency Ratio**

Country	Year	Present Value of					Self-Dependency Ratio	Wealth Ratio	Transfer Ratio	Private Pension Ratio	Public Dependency Ratio
		Net Wealth	Transfer Income	Private Pension Income	Public Pension Income	Total Available Resources					
US	2006	418,405	n.a.	131,547	187,085	737,037	0.61	0.39	NA	0.22	0.39
US	2008	406,354	n.a.	135,127	187,122	728,603	0.60	0.38	NA	0.23	0.40
US	2010	309,936	n.a.	141,648	187,490	639,074	0.60	0.35	NA	0.25	0.40
Japan	2007	216,750	4,109	19,391	227,217	467,467	0.48	0.42	0.01	0.04	0.52
Japan	2009	207,152	9,019	20,509	248,396	485,077	0.42	0.35	0.02	0.05	0.58
Japan	2011	158,251	4,216	20,899	235,958	419,324	0.38	0.31	0.01	0.05	0.62
ROK	2006	144,922	26,241	16,770	30,894	218,827	0.86	0.53	0.22	0.12	0.14
ROK	2008	190,591	25,446	17,196	34,786	268,018	0.85	0.55	0.19	0.11	0.15
ROK	2010	168,010	25,577	17,704	33,838	245,130	0.85	0.55	0.19	0.12	0.15
PRC	2011	23,603	2,276	25,273	5,623	56,801	0.84	0.35	0.10	0.40	0.16
PRC	2013	36,497	1,512	30,124	5,441	73,574	0.86	0.37	0.08	0.41	0.14
PRC	2015	98,652	2,258	27,329	5,558	133,979	0.87	0.39	0.09	0.39	0.13
PRC	2018	79,502	-1,124	48,498	6,273	129,102	0.88	0.4	0.03	0.45	0.12
PRC urban	2011	41,384	-74	56,812	8,218	106,484	0.89	0.31	0.02	0.57	0.11
PRC urban	2013	52,619	-3,306	72,198	7,898	129,410	0.91	0.32	-0.02	0.62	0.09
PRC urban	2015	70,830	-1,412	63,046	8,464	141,249	0.92	0.35	0	0.57	0.08
PRC urban	2018	109,037	-4,318	81,354	8,017	194,296	0.92	0.35	-0.02	0.59	0.08
PRC rural	2011	14,037	3,535	8,370	4,233	30,176	0.81	0.37	0.14	0.30	0.19
PRC rural	2013	28,498	3,902	9,251	4,222	45,873	0.83	0.40	0.13	0.30	0.17
PRC rural	2015	111,710	3,965	10,715	4,207	130,597	0.85	0.42	0.13	0.30	0.15
PRC rural	2018	45,568	2,602	10,174	4,239	53,059	0.84	0.45	0.10	0.29	0.16
India	2018	45,319	2,087	3,732	12,158	62,818	0.82	0.55	0.11	0.16	0.18
India urban	2018	80,499	2,427	6,185	21,370	109,135	0.84	0.58	0.10	0.16	0.16
India rural	2018	28,973	1,931	2,602	7,916	41,488	0.82	0.54	0.12	0.16	0.18

n.a. = not available, PRC = People's Republic of China, ROK = Republic of Korea, US = United States.

Note: Samples used in these calculations include individuals who will reach the country-specific retirement age within 5 years. All values are in 2010 constant US dollars.

\* The discount rate of 2% is used in the calculation of present values.

Source: Authors' calculations.

**Table 3. Consumption-Based Preparedness Index by Country and Year of Survey  
(share of sample individuals who have adequate financial means [from all four income sources] to maintain level of consumption spendings prior to reaching retirement age)**

Country	Year	(1) Preparedness Index	(2) Preparedness Index*	(3) Retirement Age	(4) Life Expectancy
US	2006	0.81	0.82	66	84
US	2008	0.81	0.82	66	84
US	2010	0.82	0.87	66	84
Japan	2007	0.87	0.78	65	86
Japan	2009	0.89	0.78	65	86
Japan	2011	0.86	0.79	65	86
ROK	2006	0.50	0.12	62	83
ROK	2008	0.56	0.19	62	83
ROK	2010	0.58	0.23	62	83
PRC	2011	0.73	0.75	62	80
PRC	2013	0.65	0.64	60	81
PRC	2015	0.62	0.62	60	81
PRC	2018	0.64	0.72	60	81
PRC urban	2011	0.95	0.98	60	81
PRC urban	2013	0.88	0.93	60	81
PRC urban	2015	0.93	0.99	60	81
PRC urban	2018	0.82	0.96	60	81
PRC rural	2011	0.62	0.63	60	81
PRC rural	2013	0.54	0.49	60	81
PRC rural	2015	0.49	0.45	60	81
PRC rural	2018	0.44	0.44	60	81
India**	2018	0.39 (0.73)	0.49	62	80
India urban	2018	0.57 (0.79)	0.66	62	80
India rural	2018	0.31 (0.70)	0.41	62	80

PRC = People's Republic of China, ROK = Republic of Korea, US = United States.

Notes: Life expectancy is conditional life expectancy at retirement age. For the PRC, life expectancy for females at the retirement age of 55 is 82 and life expectancy for males at the retirement age of 60 is 79. We use 81 as the life expectancy for both females and males for the PRC. Samples used consist of individuals who will reach the country-specific retirement age within 5 years.

\* For the US, Japan, and the ROK, benchmark per capita consumption spending is the US median consumption level in respective years; for the PRC and India, benchmark per capita consumption is the PRC's median consumption level in respective years. Urban and rural median consumptions are used for the urban and rural samples, respectively.

\*\* Estimates in parentheses are computed using estimated per capita consumption, instead of reported consumption information.

Source: Authors' calculations.

**Table 4. Determinants of Individual Consumption Preparedness Defined Relative to Individual-Specific Preretirement Consumption Levels**

Variable	US		Japan		ROK		PRC		India	
(Intercept)	-0.12 (0.21)	-0.11 (0.21)	0.00 (0.42)	0.53 (0.44)	0.87 *** (0.33)	0.89 *** (0.33)	0.11 (0.41)	0.07 (0.41)	0.11 (0.32)	0.18 (0.32)
Age	0.01 *** (0.00)	0.01 *** (0.00)	0.01 ** (0.01)	0.01 (0.01)	0.00 (0.01)	0.00 (0.01)	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	0.00 (0.01)
Gender	0.11 *** (0.01)	0.11 *** (0.01)	0.05 ** (0.02)	0.06 *** (0.02)	0.02 (0.02)	0.03 * (0.02)	0.08 ** (0.04)	0.07 * (0.04)	0.05 *** (0.02)	0.04 ** (0.02)
College	-0.02 * (0.01)	-0.02 ** (0.01)	0.01 (0.02)	-0.01 (0.02)	0.18 *** (0.03)	0.16 *** (0.03)	0.18 *** (0.07)	0.15 ** (0.07)	0.43 *** (0.03)	0.42 *** (0.03)
Married	-0.06 *** (0.01)	-0.06 *** (0.01)	-0.04 (0.05)	-0.04 (0.05)	-0.37 *** (0.02)	-0.38 *** (0.02)	0.00 (0.03)	0.00 (0.03)	-0.14 *** (0.02)	-0.14 *** (0.02)
Health	-0.01 (0.01)	-0.01 (0.01)	-0.03 (0.03)	-0.07 ** (0.03)	0.04 ** (0.02)	0.03 * (0.02)	0.04 * (0.02)	0.04 (0.02)	0.08 *** (0.02)	0.07 *** (0.02)
No. of children	0.00 (0.00)	0.00 (0.00)	0.00 (0.01)	-0.01 (0.01)	0.05 *** (0.01)	0.04 *** (0.01)	0.03 *** (0.01)	0.03 *** (0.01)	0.01 *** (0.00)	0.01 *** (0.00)
Stocks		0.03 ** (0.01)		0.00 (0.03)		0.10 * (0.05)		0.05 (0.07)		
IRE		0.00 (0.01)		0.06 *** (0.02)		0.12 *** (0.02)		0.10 *** (0.03)		0.21 *** (0.02)
Wave 2	0.00 (0.01)	0.00 (0.01)	0.01 (0.05)	0.02 (0.05)	0.06 *** (0.02)	0.06 *** (0.02)	-0.07 ** (0.03)	-0.07 ** (0.03)		
Wave 3	0.01 (0.01)	0.02 (0.01)	-0.01 (0.06)	0.01 (0.05)	0.09 *** (0.02)	0.08 *** (0.02)	-0.08 ** (0.03)	-0.08 ** (0.03)		
Wave 4							-0.12 *** (0.03)	-0.14 *** (0.03)		
Urban							0.38 *** (0.02)	0.37 *** (0.02)	0.21 *** (0.02)	0.20 *** (0.02)
Sample size	6720	6720	1200	1125	3479	3479	1841	1841	3834	3834
R <sup>2</sup>	0.03	0.03	0.01	0.02	0.12	0.13	0.17	0.18	0.13	0.15

PRC = People's Republic of China, ROK = Republic of Korea, US = United States, IRE = investment real estate.

\*\*\* =  $p < 0.01$ , \*\* =  $p < 0.05$ , \* =  $p < 0.1$ .

Source: Authors' calculations.

**Table 5. Determinants of Individual Consumption Preparedness Defined Relative to a Common Preretirement Consumption Level**

Variable	US		Japan		ROK		PRC		India	
(Intercept)	0.19 (0.17)	0.23 (0.17)	2.66 *** (0.43)	2.51 *** (0.43)	0.12 (0.26)	0.15 (0.25)	0.24 (0.35)	0.19 (0.35)	0.25 (0.33)	0.31 (0.33)
Age	0.01 ** (0.00)	0.01 * (0.00)	-0.03 *** (0.01)	-0.03 *** (0.01)	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	0.00 (0.01)
Gender	0.20 *** (0.01)	0.20 *** (0.01)	0.34 *** (0.02)	0.36 *** (0.02)	-0.01 (0.01)	0.00 (0.01)	0.07 ** (0.03)	0.06 * (0.03)	0.01 (0.02)	0.00 (0.02)
College	0.18 *** (0.01)	0.14 *** (0.01)	0.13 *** (0.02)	0.10 *** (0.02)	0.40 *** (0.02)	0.36 *** (0.02)	0.02 (0.06)	0.00 (0.06)	0.45 *** (0.03)	0.45 *** (0.03)
Married	-0.04 *** (0.01)	-0.06 *** (0.01)	-0.19 *** (0.06)	-0.21 *** (0.05)	-0.13 *** (0.01)	-0.14 *** (0.01)	-0.15 *** (0.03)	-0.15 *** (0.03)	-0.07 *** (0.02)	-0.07 *** (0.02)
Health	0.21 *** (0.01)	0.19 *** (0.01)	0.11 *** (0.03)	0.08 *** (0.03)	0.06 *** (0.01)	0.05 *** (0.01)	0.16 *** (0.02)	0.15 *** (0.02)	0.06 *** (0.02)	0.05 *** (0.02)
No. of children	-0.03 *** (0.00)	-0.02 *** (0.00)	-0.01 (0.01)	0.00 (0.01)	0.01 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	-0.01 ** (0.00)	-0.01 ** (0.00)
Stocks		0.09 *** (0.01)		0.15 *** (0.02)		0.30 *** (0.04)		0.03 (0.06)		
IRE		0.10 *** (0.01)		0.08 *** (0.02)		0.17 *** (0.01)		0.10 *** (0.02)		0.20 *** (0.02)
Wave 2	-0.01 (0.01)	0.00 (0.01)	-0.09 (0.06)	-0.08 (0.06)	0.06 *** (0.02)	0.06 *** (0.01)	-0.10 *** (0.03)	-0.11 *** (0.03)		
Wave 3	0.03 *** (0.01)	0.04 *** (0.01)	-0.02 (0.07)	0.00 (0.06)	0.10 *** (0.02)	0.09 *** (0.01)	-0.10 *** (0.03)	-0.10 *** (0.03)		
Wave 4							-0.10 *** (0.02)	-0.11 *** (0.02)		
Urban							0.47 *** (0.02)	0.46 *** (0.02)	0.18 *** (0.02)	0.17 *** (0.02)
Sample size	6720	6720	1372	1259	3480	3480	2041	2041	3834	3834
R <sup>2</sup>	0.25	0.29	0.23	0.28	0.15	0.20	0.29	0.30	0.11	0.13

PRC = People's Republic of China, ROK = Republic of Korea, US = United States, IRE = investment real estate.

\*\*\* =  $p < 0.01$ , \*\* =  $p < 0.05$ , \* =  $p < 0.1$ ,

Note: The common consumption levels are US median consumption for the US, Japan, and the ROK, and the PRC's median consumption for the PRC and India.

Source: Authors' calculations.

**Table 6. Determinants of Individual Income-Based Measure of Retirement Preparedness (TAR)**

Variable	US		Japan		ROK		PRC		India	
(Intercept)	11.52 ***	11.69 ***	13.89 ***	13.72 ***	11.79 ***	11.88 ***	11.18 ***	10.86 ***	9.21 ***	9.40 ***
	(0.29)	(0.25)	(0.40)	(0.40)	(0.49)	(0.46)	(0.59)	(0.58)	(0.66)	(0.65)
Age	0.02 ***	0.02 ***	-0.02 **	-0.01 **	0.00	0.00	-0.02 **	-0.02	0.01	0.01
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Gender	0.26 ***	0.26 ***	0.29 ***	0.30 ***	0.09 ***	0.11 ***	0.35 ***	0.31 ***	0.00	-0.02
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.06)	(0.06)	(0.03)	(0.03)
College	0.54 ***	0.42 ***	0.19 ***	0.15 ***	0.87 ***	0.76 ***	0.97 ***	0.75 ***	1.54 ***	1.51 ***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.04)	(0.03)	(0.10)	(0.10)	(0.06)	(0.06)
Married	-0.10 ***	-0.20 ***	-0.31 ***	-0.33 ***	-0.34 ***	-0.39 ***	-0.22 ***	-0.23 ***	-0.41 ***	-0.41 ***
	(0.02)	(0.01)	(0.06)	(0.05)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Health	0.30 ***	0.22 ***	0.11 ***	0.10 ***	0.32 ***	0.30 ***	0.16 ***	0.13 ***	0.13 ***	0.12 ***
	(0.02)	(0.01)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
No. of children	-0.05 ***	-0.04 ***	0.03 **	0.04 ***	0.04 ***	0.02 *	0.04 **	0.04 ***	0.03 ***	0.03 ***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Stocks		0.38 ***		0.20 ***		0.67 ***		0.50 ***		
		(0.01)		(0.02)		(0.07)		(0.10)		
IRE		0.38 ***		0.15 ***		0.51 ***		0.40 ***		0.64 ***
		(0.01)		(0.02)		(0.03)		(0.04)		(0.05)
Wave 2	-0.04 **	-0.02	-0.11 *	-0.09 *	0.09 ***	0.07 **	0.19 ***	0.16 ***		
	(0.02)	(0.01)	(0.06)	(0.05)	(0.03)	(0.03)	(0.04)	(0.04)		
Wave 3	-0.11 ***	-0.09 ***	-0.16 **	-0.14 **	0.11 ***	0.07 **	0.31 ***	0.32 ***		
	(0.02)	(0.01)	(0.07)	(0.06)	(0.03)	(0.03)	(0.05)	(0.04)		
Wave 4							0.35 ***	0.27 ***		
							(0.04)	(0.04)		
Urban							1.31 ***	1.27 ***	0.82 ***	0.80 ***
							(0.03)	(0.03)	(0.03)	(0.03)
Sample size	6720	6720	1372	1259	3480	3480	2073	2073	3822	3822
R <sup>2</sup>	0.33	0.49	0.23	0.34	0.23	0.33	0.53	0.56	0.30	0.34

PRC = People's Republic of China, ROK = Republic of Korea, US = United States, IRE = investment real estate.

\*\*\* =  $p < 0.01$ , \*\* =  $p < 0.05$ , \* =  $p < 0.1$ .

Note: The dependent variable is the log of total retirement income support.

Source: Authors' calculations.

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## **Analyzing the Sources of Older People's Self-Dependency and Overall Financial Wellness in Four Asian Countries and the United States**

Using two key measures of individual preparedness for financial wellness in later life, the authors find significant cross-country differences. The United States (US) ranks highest in wealth, while the People's Republic of China (PRC), India, and the Republic of Korea show higher self-reliance, indicating less dependence on public support. Japan leads in consumption-based preparedness, with individuals near retirement expected to maintain their pre-retirement consumption, followed by the US, the PRC, the Republic of Korea, and India. Key determinants of preparedness include education and risky asset holdings, suggesting that policies promoting financial literacy and financial market development could significantly improve older people's financial independence.

### **About the Asian Development Bank**

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 69 members—49 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

