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Nonlinear income variance profiles and consumption inequality over the life cycle[☆]

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ABSTRACT

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In contrast to many other countries, consumption inequalities in Japan are not constant over household age but increase from around middle age—a fact first highlighted by Ohtake and Saito [Ohtake, F., Saito, M., 1998. Population aging and consumption inequality in Japan. *Rev. Income Wealth* 44, 361–381]. Given this information, we examine whether this phenomenon is consistent with the standard precautionary saving model developed by Carroll [Carroll, C.D., 1997. Buffer-stock savings and the life cycle/permanent income hypothesis. *Quart. J. Econ.* 62, 1–56]. Specifically, we investigate: (1) the degree of age dependence of idiosyncratic income risks; and (2) the importance of age dependence for the evolution of inequalities in consumption predicted by the household model of Carroll (1997). We find a strong age dependence of income risks, which creates a nonlinear age–variance profile of income, and the standard precautionary saving model is consistent with the observed consumption inequalities as long as we take the nonlinearity in age–variance profiles of income into account. *J. Japanese Int. Economies* 23 (3) (2009) 344–366. Institute of Economic Research, Hitotsubashi University, 2-1 Naka, Kunitachi,

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1. Introduction

It is widely recognized that idiosyncratic labor market uncertainty is one of the most important determinants of household consumption and savings when insurance markets are incomplete. Under incomplete capital markets, as Deaton and Paxson (1994) demonstrated, both income and consumption variances grow as people get older. The gap between the two variances, for a particular age, depends on various characteristics of the economy, such as household preferences, the degree of market incompleteness, and the magnitude of the income risks. A growing number of studies regard this gap as a valuable source of information to investigate household behavior in the presence of incomplete capital markets. Blundell and Preston (1998), for instance, used the difference between consumption and income variances to identify the permanent income shocks faced by households, while Storesletten et al. (2004b) showed that, in the case of the United States, the difference can be accounted for in the standard precautionary saving model only when we consider the redistributive role of the social security system.

Another issue that has received attention is the age–variance profile of income, which Deaton and Paxson (1994) and Storesletten et al. (2004b) found to be close to linear. A natural interpretation of this linearity is that the variance of permanent income shocks in household income is constant over age. Previous empirical investigations of the income process in the United States support this interpretation. For example, using the Panel Study of Income Dynamics (PSID), Meghir and Pistaferri (2004) found that, other things being equal, older workers face the same degree of permanent income shocks as younger workers. Storesletten et al. (2001) reported that inequalities in work hours are approximately constant across age, suggesting that it is not necessary to treat the income shocks of elderly workers differently from those of younger workers. Regarding the income process, many empirical studies in labor economics suggest that the permanent income shocks faced by elderly workers are larger than those faced by younger workers. A likely explanation is the relationship between the accumulation of firm-specific skills and wage levels, a topic first examined in the seminal study by Topel (1991). Recent careful investigation by Abowd and Kang (2002) using US data, for example, showed that a worker with 10 years of tenure is paid about 6.9% more than a worker with one year of tenure. If tenure is an important determinant of the wage level, the risk of job loss will be more costly for elderly workers than for young workers. Along similar lines, Kawaguchi and Ohtake (2007) found that elderly workers in Japan face a higher probability of wage cuts and a lower probability of finding a new job, which suggests that elderly workers face greater risks to their permanent income. If the variance of permanent shocks in income depends on age, the age–variance profile of income takes a nonlinear form.¹ Using Japanese data, Ohtake and Saito (1998) demonstrated that the age–variance profile of income is convex rather than linear. This is illustrated in Fig. 1, in which we show the age–income variance profile for Japan. The convexity of the variance profile suggests that the income process faced by Japanese households contains permanent shocks whose variance increases with age. The age–consumption variance profile for Japan is depicted in Fig. 2, which highlights several noteworthy characteristics.² The consumption variance is constant up to an age of about 48, after which it begins to increase. The shape of the profiles is stable over time, suggesting that the pattern is not a by-product of cohort effects.

Against this background, the purpose of this paper is to investigate whether the observed pattern of age–variance profiles of consumption and income in Japan are consistent with the standard life cycle model with precautionary saving developed by Carroll (1997). More specifically, we investigate: (1) the degree of age dependence of idiosyncratic income risks; and (2) the importance of age dependence

¹ In Deaton and Paxson (1994), the slope of the age–variance profile coincides with the variance of the permanent shocks, which is constant across age as long as the variance of the permanent component does not vary.

² Please see the next section for details of the data.

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