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Can mortality risk explain the consumption hump?

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Abstract

A lifecycle consumption profile with a hump of roughly the same relative size and peak location as empirical consumption profiles can be obtained in a general equilibrium model where mortality risk is the only active mechanism that can account for the hump. Moreover, the key preference parameter, the elasticity of intertemporal substitution, is close to that estimated in a buffer-stock saving model by Gourinchas and Parker [Gourinchas, Pierre-Olivier, Parker, Jonathan A., 2002. Consumption over the life cycle. Econometrica 70, 47–89], where borrowing constraints primarily account for the consumption hump. Since borrowing is virtually eliminated in the model with mortality risk, mortality supplants the borrowing constraint as the explanation for the hump with these parameters. If a pay-as-you-go Social Security system is also incorporated in the model, mortality risk can no longer account for the observed properties of the hump. However, the set of intertemporal elasticities for which mortality risk disables the borrowing constraint in the neighborhood of peak consumption extends to any value greater than 1/3.

JEL classification: E21

Keywords: Consumption hump; Borrowing constraints; Mortality risk; Elasticity of intertemporal substitution; Social security

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0. Introduction

Macroeconomics essentially begins with an understanding of the tradeoff between consumption and investment, so it is rather troubling that the simplest and most widely used models of consumption are at odds with salient facts about lifecycle consumption. In the familiar additively separable model of consumption preferences with a constant discount rate, consumption should rise or fall monotonically over the lifecycle, depending on whether the rate of return on saving is larger or smaller than the discount rate. However, empirical consumption profiles are not monotonic. They are hump-shaped with a peak around age 50.[1]

Fortunately, there is no lack of explanations as to why consumption profiles should be hump-shaped.[2] The puzzle is not how the hump could possibly occur but rather which mechanism – or combination of mechanisms – can best account for the hump while also being consistent with other macroeconomic data. Of the candidate explanations, borrowing constraints and precautionary saving, usually studied in tandem, have received the most attention in the literature (Carroll, 1997; Carroll and Summers, 1991; Gourinchas and Parker, 2002; Hubbard et al., 1994; Nagatani, 1972; Thurow, 1969). Several other explanations have also been studied. Variations in household consumption might simply reflect variations in household size (Attanasio et al., 1999; Browning and Ejrnæs, 2002), although several researchers (Fernández-Villaverde and Krueger, 2002; Gourinchas and Parker, 2002) argue that the hump persists even after correcting for household size. If we add another good to the model, such as leisure, agents will not smooth consumption by itself but rather they will smooth out the utility derived from bundles of the two goods. If leisure and consumption are substitutes, agents will substitute away from consumption when productivity and the marginal cost of working are low and substitute towards it when the marginal cost is high (Becker and Ghez, 1975; Bullard and Feigenbaum, forthcoming; Heckman, 1974), so a hump-shaped wage profile can lead to a hump-shaped consumption profile. As a variation on the theme that market frictions can account for the hump, Fernández-Villaverde and Krueger (2001) have shown that, if consumer durables are used as collateral to secure loans, this can lead to a hump-shaped pattern of consumption in both durables and nondurables. The monotonicity result is also strongly dependent on the assumption of rationality, so time-inconsistent preferences can easily account for a hump in consumption (Caliendo and Aadland, 2004; Laibson, 1997).

Another very simple explanation for the consumption hump is a time-varying discount rate. If the discount rate increases over the lifecycle, the rate of consumption growth will decrease, and conceivably it could transition from positive to negative as is seen in the data. Rising mortality risk is a natural explanation for why the discount rate should increase with age. If we account for the uncertainty in an agent's lifespan, the effective discount rate becomes the sum of the intrinsic discount rate coming from preferences, which we may assume is constant, and the hazard rate of dying, which does indeed increase with age. While several researchers have considered the effects of mortality risk in the context of explaining why the elderly save more than would be expected in a basic lifecycle model (Davies, 1981; Hurd, 1989) or to study questions pertaining to Social Security

[1] This was first observed by Thurow (1969).

[2] Browning and Crossley (2001) provides a good review of this literature.