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# Self-insurance in a life-cycle model of labour supply and savings

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## Abstract

This paper analyses the incentives to work and to save over the life cycle in the presence of incomplete markets. In a calibrated, partial equilibrium model, flexibility in hours worked changes asset age-profiles: borrowing when young is greater and saving when middle-aged is greater than when labour supply is fixed. Uncertainty causes individuals to work longer hours and to consume less when young. With flexibility over hours, accumulating precautionary assets incurs less of a utility cost and so the level of saving is greater. Further, allowing for flexibility and uncertainty means simulated hours of work and consumption more closely match the age profiles in the data.

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## 1. Introduction

This paper analyses the effect on precautionary saving and consumption of allowing individuals to vary their labour supply. There is now an extensive literature discussing the way that individuals self-insure against idiosyncratic uncertainty when markets are

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incomplete. In particular, Deaton (1991) and others show the impact that uncertainty has on consumption paths and on saving assuming labour supply is fixed. This paper shows how allowing for flexibility over labour supply affects these results: first, flexibility allows individuals to work harder before shocks are realized, and thus have more income available to self-insure; second, flexibility allows individuals to react to shocks to wages by changing hours of work, and thus reducing the cost of uncertainty. The main aim of the paper is to show how these effects change the standard results on the extent of precautionary saving and consumption smoothing. A second aim is to show that allowing for precautionary motives in labour supply can give simulated profiles that mimic the data.

Attanasio and Weber (1995) and Blundell et al. (1994) have shown that ignoring labour supply leads to inconsistent estimates both of the elasticity of intertemporal substitution in consumption and of the effects of uncertainty on consumption. Further, Browning and Meghir (1991) have found non-separabilities between consumption and leisure. Even without non-separabilities, flexibility in labour supply can change the amount of income available for smoothing. These results suggest that analysing consumption behaviour ignoring labour supply gives misleading results: choices about labour supply affect the amount of consumption smoothing and saving. This paper shows the extent to which the results are misleading and explicitly shows the effect on consumption and saving.

Evidence for the intertemporal substitution model of labour supply is mixed: labour supply tends to be high early in life when wages are low, but low later in life when wages are high and this is hard to reconcile with intertemporal substitution unless individuals are very patient. We show that uncertainty over wages can explain why individuals work long hours when young despite low wages.

The paper simulates a model of intertemporal choice under uncertainty when individuals choose hours of work and consumption in each period. We calibrate the model to average hours worked over the life cycle and to median asset holdings. First, in the absence of uncertainty, we show the extent that hours of work will track wages over the life cycle, and consumption will track income (as in Heckman, 1974). This path for hours of work leads to asset life-cycle profiles that differ according to whether labour supply is flexible or not: with flexibility, young individuals borrow more, and the middle-aged save more, than when labour supply is constant. Second, introducing uncertainty holding preference parameters constant, induces individuals to work longer hours and consume less when young relative to the certainty case. Working more when young leads to saving which can act as a buffer against future wage shocks. When individuals are older, and uncertainty is resolved, the accumulated assets allow individuals to reduce labour supply, despite higher wages. The third result is to show the effect of a flexible labour supply (relative to a fixed and constant labour supply) on age profiles when wages are uncertain. Flexibility again generates greater borrowing among the young and greater accumulation in middle age. The level of asset holdings for a given discount rate also differs: when labour supply is flexible, individuals have greater asset holdings. This arises because flexibility reduces the cost of accumulating assets before the uncertainty is resolved, leading to greater saving. The benefit of saving is lower because of the ability to react to wage shocks *ex post*, but this offsetting effect is dominated. Flexibility also generates a more concave path for log consumption.

The paper carries out sensitivity analysis changing the structure of preferences, changing the intertemporal elasticity of substitution and changing the elasticity of substitution

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