



Incomplete markets, labor supply and capital accumulation[☆]

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Abstract

Endogenous labor supply decisions are introduced in an equilibrium model of limited insurance against idiosyncratic shocks. Unlike in the standard case with exogenous labor (e.g. [Aiyagari, S.R., 1994. Uninsured idiosyncratic risk and aggregate saving. *Quarterly Journal of Economics* 109, 659–684; Huggett, M., 1997. The one-sector growth model with idiosyncratic shocks: steady states and dynamics. *Journal of Monetary Economics* 39, 385–403]), labor supply is likely to be lower than under complete markets. This is due to an ex post wealth effect on labor supply (rich productive agents work fewer hours) that runs counter the precautionary savings motive. As a result, equilibrium savings and output may be lower under incomplete markets. It is also found that long-run savings remain finite even when the interest rate equals the inverse of the discount factor.

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1. Introduction

The conventional wisdom in the precautionary savings literature is that capital market imperfections and the presence of uninsured idiosyncratic risk lead agents to save more than they would if there were no uncertainty.¹ The literature typically compares the optimal behavior of agents with *inelastic* labor supply who receive random labor productivity (or, equivalently, who receive random endowments) with the outcome that would obtain were they to receive with certainty the implied mean productivity. It concludes, with Aiyagari (1994) and Huggett (1997), that in production economies uninsurable uncertainty leads to higher individual savings, and thus to a higher long-run capital-labor ratio.² Since labor supply is inelastic, this translates into higher output. We dub this positive effect of employment uncertainty on aggregate output the *Aiyagari–Huggett effect*.

The conclusion that an economy with less developed financial markets will achieve a higher output is somewhat paradoxical. The development literature often finds an effect of the opposite sign.³ In any case, for most calibrations, the effect predicted by the models is quite small. This may question the usefulness of equilibrium models with uncertainty in studying the interaction between financial market development and growth.

We show that the Aiyagari–Huggett effect need not hold anymore when labor supply is endogenous. The reason is that, if leisure is a normal good, incomplete markets introduce an ex post wealth effect which reduces labor supply. The mechanism is simple and general: agents who end up employed are ex post richer and, therefore, they work less under incomplete markets than under complete markets because they could not and did not buy insurance against unemployment. If the ex post wealth effect that shrinks labor supply is large enough at the aggregate level to overcome the Aiyagari–Huggett effect, then aggregate capital and output are lower under incomplete markets.⁴ Numerical methods are used to investigate which effect dominates for various parameter sets, and to show that it is possible to construct plausibly calibrated economies in which the ex post wealth effect dominates the Aiyagari–Huggett effect. The lower output occurs when the elasticity of hours worked is large relative to the elasticity of consumption. In fact, for some parameter values that have been used extensively in the literature (a relative risk aversion equal to five) the effect can be very large: completing the markets doubles output.

A theoretical finding of our paper is that, by contrast with the exogenous-labor case, the accumulation of capital remains bounded from above at the individual level even if the return to assets equals the rate of time preference. This occurs because, when leisure is a normal good, the incentive to work decreases with the level of assets. Past an upper bound

¹See among others Leland (1968), Sandmo (1970), and more recently, Kimball (1990), Deaton (1991), Carroll (1994), and Huggett (1993).

²This is the so-called “precautionary savings” effect, which refers here to increased capital formation under uncertainty rather than to the convexity of marginal utility. See Huggett and Ospina (2001) for a discussion.

³For example, using data from a number of countries, Levine (1997) reports “there is a strong positive relationship between (...) financial indicators and (...) long run real per capita growth rates, capital accumulation and productivity growth” (p. 706).

⁴Baxter and Crucini (1995) describe a similar wealth effect under incomplete markets. They use it to explain the low consumption correlation across countries. Wealth effects on labor supply have also been explored by Hansen (1985), Benhabib et al. (1991), Kydland (1995), and the related quantitative literature about real business cycles. See also Abowd and Card (1989), Ríos-Rull (1994), Flodén (1998), Krusell and Smith (1998), Low (2002), Castañeda et al. (2003), and Obiols-Homs (2003) among others.

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