



Contents lists available at ScienceDirect

Journal of Economics and Business



# Incomplete market participation, endogenous endowment risks and welfare

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## ARTICLE INFO

### Article history:

Received 13 December 2007

Received in revised form 19 February 2009

Accepted 19 February 2009

### JEL classification:

D11

E21

E44

G11

### Keywords:

Risk-sharing externalities

Incomplete market participation

Endogenous growth

Welfare analysis

## ABSTRACT

This paper investigates the equilibrium growth rate of capital stock and social welfare when risk-sharing externalities are incorporated into the infinite-horizon model where endowment risks are endogenized by the degree of incomplete market participation. There exist Nash equilibria depending on the degree of market participation. Under equilibrium with incomplete market participation, the endowment risks cannot be fully diversified as they induce precautionary savings and the over-accumulation of capital stocks while spillover effects on production technologies lead to the under-accumulation of capital stocks. This may have desirable effects on economic growth and improve social welfare.

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## 1. Introduction

The objective of this paper is to offer some theoretical rationale for the existence of incomplete market participation, reflecting hand-to-mouth consumption behavior, as proposed by Mankiw and Zeldes (1991). Many studies are based on the complete and full participation economy, where consumers are able to hedge their endowment risks using Arrow–Debrew securities. However, the underlying assumption that all consumers participate in full-integrated markets is rather implausible. There is indeed strong evidence to the contrary. Incomplete market participation is evident in virtually all countries and the proportion of non-market participants is rather significant. If consumers are assumed,

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more plausibly, to incur alternative types of endowment risk under incomplete market participation, they are not necessarily able to diversify their income risks. When income risks cannot be fully diversified away, there is a need to construct equilibrium models with endogenous income risk and incomplete market participation.

This study is an attempt to address the important issue of whether *risk-sharing externalities* can explain the conditions of incomplete market participation. The risk-sharing externalities, reflecting distinct groups of capital market participants and non-market participants, are incorporated into the infinite-horizon production economy where alternative groups provide consumers with risk-sharing opportunities against endowment risks. Our assumption is that within-group agents are able to pool their endowment risks, and as a consequence, within-group endowments risks are fully correlated. In particular, within-group endowment risks are assumed to be diversifiable when all consumers belong to the same group. However, if consumers fall into two distinct groups, then they cannot fully diversify the endowment risks because neither the group of market participants, nor that of non-market participants can fully offset endowment risks on its own. The existence of risk-sharing externalities can thus induce consumers not to participate in capital markets in order to avoid greater exposure to endowment risks. Under *endogenous* endowment risks and incomplete market participation, it is also possible to examine the equilibrium growth rate of capital stock and social welfare.

Part of the *raison d'être* of this paper is indeed to explain incomplete market participation. The contributions of the infinite-horizon production economy model used in this paper are threefold. First, in contrast to the existing literature, which often explains incomplete market participation in terms of transactions costs, the modeling approach developed in this paper demonstrates that incomplete market participation can be also explained by stochastic income flows, in the absence of transactions costs. Second, the model examines the relationship between incomplete market participation and welfare under endowment risks. It is shown that under the assumption of endogenous segmentation of the population into market participants and non-market participants, risk-sharing externalities can affect economic growth rates and welfare. The evidence suggests that incomplete market participation is not necessarily conducive to lower social welfare. It can improve social welfare when endogenous uninsured endowment risks provide incentives toward precautionary savings while spillover effects on production technologies lead to the under-accumulation of capital stocks. Finally, the paper sheds light on the new concept of *capital market participation risk premium*, which is not addressed in the literature on limited market participation.

The importance of limited-market participation in the explanation of consumption behavior and asset pricing puzzles was first discussed by Mankiw and Zeldes (1991), who estimated Euler equations for stockholders and non-stockholders using data from the Panel Study of Income Dynamics, and showed that stockholders represent only a small sample proportion 27.6% of consumers. The incomplete market participation can arguably, be explained by various economic reasons. Individuals may not be able to participate in asset markets in spite of their demand for transactions. This line of argument is discussed in the literature based on fixed-entry costs, transaction costs, and borrowing constraints, among others.<sup>1</sup> Alternatively, this paper proposes that agents do not participate in capital markets in order to avoid greater exposure to income risk. Our model is related to the early work by Weil (1992b) who investigated the effect of exogenous hand-to-mouth consumption behavior on asset prices. In contrast, the present study derives rational hand-to-mouth consumption behavior from dynamic optimization problems, and examines the effect of these consumers on economic growth and social welfare.

Some studies have suggested that *exogenous* uninsured income risks promote precautionary saving.<sup>2</sup> This work is closely related to Devereux and Smith (1994) and Angeletos and Calvet (2006). These studies characterized the closed-form solutions for the representative agent model with exogenous endowment risks and productivity shocks. In the present paper, however, the endowment risks

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<sup>1</sup> These studies examine participation constraints generated by transaction costs (Abel, 2001; Allen & Gale, 1994; Williamson, 1994), fixed entry costs (Weil, 1992b), borrowing constraints (Constantinides, Donaldson, & Mehra, 2002) and model uncertainty (Cao, Wang, & Zhang, 2005). The empirical studies include Vissing-Jorgensen (2002a,b), inter alia.

<sup>2</sup> The literature on uninsured idiosyncratic risks models include, inter alia, Aiyagari (1994), Angeletos and Calvet (2006), Devereux and Smith (1994), Huggett (1993), Mankiw (1986), Weil (1992a, 1994).

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