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Capital market equilibrium with externalities, production and heterogeneous agents

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Abstract

The paper studies general equilibrium in an economy with externalities, production and heterogeneous agents. The model developed builds on Brock [Brock, W.A., 1982. Asset prices in a production economy. In: McCall, J.J. (Ed.), The Economics of Information and Uncertainty. University of Chicago Press, Chicago, pp. 1–43] and Merton [Merton, R.C., 1987. A simple model of capital market equilibrium with incomplete information. Journal of Finance 42, 483–510]; it involves both a stock market and a market for loans, together with negative externalities produced by a subset of firms. Importantly, the technological production structure of the firms is reflected in the properties of the shares traded in the stock market. Agents are heterogeneous in their financial choices, potentially discriminating against the firms producing a negative externality. The model sheds light on the utility costs of the discriminating behavior and on the impact on the price of the stock issued by the firm which is responsible for the externality. The model is used to study the factors which may magnify or reduce the impact of discrimination. A set of discriminated firms may be seriously affected only if the discriminating investors command a large portion of overall wealth and/or they do not represent important diversification instruments. The model can be applied to understanding the effects of socially responsible investment, whereby investors discriminate against companies belonging to some sectors which are perceived as socially dangerous or unethical.

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1. Introduction

This paper develops a two-period general equilibrium model combining the following features: uncertainty, production, externalities and heterogeneous agents. Agents are heterogeneous in their willingness to buy the financial assets issued by two classes of firms and as a consequence are themselves divided in two classes. Agents in one class discriminate against the financial assets issued by firms belonging to the externality-producing sector. They discriminate by not buying the assets issued by the firms. In so doing, they restrict their investment opportunity set and therefore their expected utility, given the level of production of the firms. However, in general equilibrium the production levels are not given, but optimally chosen by the firms. A change in the structure of relative prices of financial assets may affect the production decisions of the firms and the amount of externality generated in the economy. We assume that agents are atomistic, in the sense of believing each of them is too small to affect the general equilibrium of the economy. Discrimination is therefore not an individually rational choice, because it is decided by agents taking equilibrium prices and quantities as given. However, it might turn out to be ex post welfare-improving, if the effects on the demand for financial assets are relevant for modifying equilibrium prices and quantities.

We believe that the implications of the model may be relevant for studying various cases of restrictions imposed to some classes of institutional investors, for example restrictions associated with holdings small stocks, private equity, hedge funds. In these cases such financial organizations have to take into account external regulations presumably aimed at protecting the final individual stakeholders. The model may also be used to study the issue of socially responsible investment (SRI), which may be defined as a style of making portfolio choices which go beyond the analysis of the probability distribution of returns to also involve a study of the social impact of the production activities carried out by the firms having issued the financial assets. The typical case is that of a mutual or pension fund manager excluding tobacco stocks or polluting stocks a priori from his asset allocation. [1] This investment style is not externally imposed by regulations, but is chosen by the investor. It involves in general an expected utility loss to those using it, associated with the decrease in the investment opportunity set. Contrary to the case of institutional investors targeting firms for corporate governance reasons, socially responsible investors in general do

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[1] A good example dates from February 22, 2002, with the pension fund Calpers deciding to stop investing in Thailand, Indonesia, Malaysia and the Philippines because of violations of human and worker rights. Also typical is an index-producer such as Dow Jones excluding firms from a socially responsible index.

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