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The environmental and macroeconomic effects of socially responsible investment ☆

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ABSTRACT

We analyze the effects of socially responsible investment and public abatement on environmental quality and the economy in a continuous-time dynamic growth model featuring optimizing households and firms. Environmental quality is modeled as a renewable resource. Consumers can invest in government bonds or firm equity. Since investors feel partly responsible for environmental pollution when holding firm equity, they require a premium on the return to equity. We show that socially responsible investment behavior by households partially offsets the positive effects on environmental quality of public abatement policies.

1. Introduction

Standard finance theory suggests that when two portfolios yield identical returns, an investor will be indifferent between investing in either one. However, the notion that financial assets are perfect substitutes when their returns are identical has increasingly been challenged in recent years. For example, Fama and French (2007) suggest that there exists a *taste for assets*, demonstrating that investors select their portfolio based on characteristics other than financial returns alone. In particular, a growing number of mutual funds focuses on so-called socially responsible investing (SRI) — see for example Social Investment Forum (2006). SRI funds acknowledge that certain investors oppose to investing in, for example, alcohol companies, firms that are heavily polluting, or any other enterprises that are somehow perceived to behave "irresponsibly". The common practice for SRI funds is to simply screen out stocks of companies that behave

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"irresponsibly" according to some social performance measure — though more sophisticated portfolio selection methods exist.

Heinkel et al. (2001) argue that the consequential drop in demand for stock of companies that are perceived as irresponsible should lead to a premium in their returns. Empirical research supports this claim and shows that so-called "sin stocks" generate an abnormal return of about 2.5% annually (see Hong and Kacperczyk, 2009).

To a large extent SRI focuses on environmental issues, a practice sometimes also referred to as *green screening*. This paper relates to this type of SRI and focuses on the environmental and macroeconomic effects of environmental SRI behavior in the presence of pollution due to production. There is a large empirical literature studying the relation between corporate social performance and various financial performance measures (see for a survey Margolis and Walsh, 2001). A few theoretical studies have also incorporated SRI in static portfolio selection models (e.g. Heinkel et al., 2001; Beltratti, 2005). However, the dynamic and macroeconomic effects of SRI are not well understood. On the one hand, it is intuitive that the return premium induced by SRI can have real effects on both investment decisions for (polluting) physical capital and on the level of environmental quality. But there are also potential feedback effects from the level of environmental quality on the associated return premium via its effect on SRI behavior. Since prices adjust immediately, but environmental quality usually adjust slowly, it is not a priori clear what the dynamic effects are, for example, of an abatement shock on output, environmental quality, and financial returns.

To our knowledge, this paper is the first attempt to incorporate the price effects of SRI in a fully fledged macroeconomic general equilibrium model. We follow Turnovsky (1990) by explicitly modeling the household's portfolio investment decisions in a dynamically optimizing setup. We extend his analysis, however, by incorporating SRI behavior. We use the model to study how a traditional fiscal policy (such as a public abatement program) interacts with SRI. In particular, it is interesting to find out, first, whether public abatement policy and private SRI behavior are complements or substitutes for each other, and, second, whether socially responsible investment has an effect on the transitional effects triggered by fiscal policy. More precisely, we consider two shocks, namely, first, an increase in the level of public abatement and, second, a boost in social responsibility.

Our analysis relates to Kriström and Lundgren (2003) who present a partial equilibrium model in which profits are affected by *green goodwill*. However, their model is not explicitly on socially responsible investment, since their approach implies that green goodwill is channeled through the consumer goods market. In a related paper, Dam (in press) studies the role of socially responsible investment in a Diamond (1965)-type environmental overlapping generations model to capture the conflict between current and future generations.

The remainder of the paper is structured as follows. In Section 2, we present the model. Households feature a "warm-glow" environmental preservation motive in the sense that they feel partially responsible for the pollution caused by firms in which they hold shares (as in Andreoni, 1990). In order to induce the household-investor to hold shares, these "dirty" securities must yield a higher rate of return than "clean" government bonds. From the point of view of the representative firm, the warm-glow motive of investors acts as an implicit output tax. Through this channel, therefore, socially responsible investment affects the firm's output and capital accumulation decisions. In Section 3, we loglinearize the model and prove existence and saddle-point stability of the macroeconomic equilibrium. In Section 4, we use the loglinearized model to conduct comparative dynamic experiments. The first shock consists of an (unanticipated and permanent) increase in the level of public abatement. Interestingly, this shock weakens (and partially crowds out) the warm-glow motive of socially responsible investors. In the second experiment we study the effects of a permanent increase in the warm-glow parameter, i.e. a strengthening of investors' social responsibility. Finally, in Section 5 we offer some conclusions and possible extensions. All technical issues are found in Dam and Heijdra (2010) which is available upon request.

2. The model

2.1. Households

There exists a large (and fixed) number, H, of identical, infinitely lived household-investors. From the perspective of the planning period, t, the representative household possesses a lifetime utility function of the following form:

$$\Lambda(t) \equiv \int_t^{\infty} U(c(\tau),p(\tau),Q(\tau))e^{\rho(t-\tau)}\,d\tau, \tag{1}$$

where $c(\tau)$ is consumption, $p(\tau)$ is an index of the responsibility the household feels for the pollution caused by firms that it holds shares in, $Q(\tau)$ is the stock of environmental quality, and ρ is the pure rate of time preference. Consumers do not fully internalize the environmental externality; however, they do experience a *warm glow* from contributing to the public good, as in Andreoni (1990).[1] In Eq. (1), $Q(\tau)$ represents the traditional external effect on utility whilst $p(\tau)$ denotes the warm-glow effect. The warm glow is channeled through socially responsible investment — see below.

[1] Nyborg et al. (2006) provide a detailed discussion of the psychological motivation for this kind of behavior in the context of green consumption.