

Consumption externalities, production externalities, and efficient capital accumulation under time non-separable preferences

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Abstract

The effects of consumption and production externalities on economic performance under time non-separable preferences are examined both theoretically and numerically. We show that a consumption externality alone has long-run distortionary effects if and only if labor is supplied elastically. With fixed labor supply, it has only transitional distortionary effects. Production externalities always generate long-run distortions, irrespective of labor supply. The optimal tax structure to correct for the distortions is characterized. We compare the implications of this model with those obtained when the consumption externality is contemporaneous. While some of the long-run effects are robust, there are also important qualitative and quantitative differences, particularly along transitional paths.

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1. Introduction

Externalities have engaged the attention of economists over a long period of time. Broadly speaking, they can be categorized as (i) consumption externalities, and

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(ii) production externalities. Recently, the former have been extensively studied in the context models of “keeping up with the Joneses,” and their implications for a range of important issues investigated. These include: asset pricing (Abel, 1990; Constantinides, 1990; Gali, 1994; Campbell and Cochrane, 1999), short-run macroeconomic stabilization policy (Ljungqvist and Uhlig, 2000), consumption (Dupor and Liu, 2003), capital accumulation and growth (Fisher and Hof, 2000; Liu and Turnovsky, 2005). On the other hand, production externalities have been a key element in the recent endogenous growth literature. Empirical evidence on the importance of externalities is sparse, but several studies provide convincing support for the significance of consumption externalities (Easterlin 1995; Clark and Oswald, 1996; Frank 1997). Evidence on production externalities, though less conclusive, is still quite compelling (Caballero and Lyons 1990,1992; Benarroch, 1997).

A related and equally important issue concerns the specification of preferences themselves. The conventional intertemporal utility function is time-separable, with any consumption externality being introduced as *contemporaneous* economy-wide consumption, as in the references cited above. But a growing body of empirical evidence has confirmed the importance of *time non-separable* preferences, in which utility depends not only upon current consumption, but also on a benchmark or “habit” level of consumption determined from past behavior. In the case that this benchmark is defined in terms of the consumption of an external reference group it introduces a consumption externality (utility interdependence), but one that is tied to *past* consumptions. This formulation is often termed “*catching up with*”, rather than “*keeping up with*”, the Joneses.¹ Empirical evidence supporting time non-separable utility specifications are provided by Stadt et al. (1985), Osborn (1988) and more recently Fuhrer (2000).

In light of these bodies of evidence, the effect of consumption and production externalities on economic performance becomes important. To what extent do they introduce distortions into the process of capital accumulation, and if so, what are the appropriate corrective policy responses? Liu and Turnovsky (2005) have addressed this question employing a standard time separable utility function. But given the evidence supporting the time non-separability of utility, it is important to re-examine the issue for this more general, and arguably more realistic, specification of preferences.

To do so is the objective of the present paper. More specifically, we introduce time non-separable preferences, as originally specified by Abel (1990) in the context of asset pricing, into the “non-scale growth model” developed by Eicher and Turnovsky (1999). Previous applications of these preferences by Carroll et al. (1997) and others have typically imposed rigid production conditions of the simplest endogenous growth model.² But the interaction between preferences and production flexibility is important. This is shown by Alvarez-Cuadrado et al. (2004) who highlight the importance of combining more general preferences with the more flexible technology of the neoclassical growth model to replicate certain observed behavior.

¹In the present case, where the benchmark involves the consumption of an outside reference group, agents are sometimes referred to as being “outward looking”. In contrast, the benchmark may depend upon the agent’s *own* past consumption. In that case agents are said to be “inward looking” and there is no consumption externality; see e.g. Carroll et al. (1997).

²There are exceptions, however. One is the pioneering work by Ryder and Heal (1973) who introduced habit formation into the basic neoclassical growth model; a more recent example is Alonso-Carrera et al. (2005).

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