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Default and efficient debt markets

Jayasri Dutta [a,*], Sandeep Kapur [b]

[a] *Department of Economics, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK*
[b] *Department of Economics, Birkbeck College, Birkbeck, UK*

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Abstract

We examine the nature of debt contracts when repayment of debt cannot be fully enforced. We study outcomes an infinite-horizon economy in which some individuals have access to a productive, intertemporal technology. Individuals without access to the technology must lend their savings to the rest. Borrowers can default on their debt at any time: lenders can capture a fraction of their investment incomes. Borrowers who default stand to lose the right to borrow in the future. These constitute the penalties of *capture* and *exclusion*.

We evaluate debt and repayment paths that can be sustained in this these penalties. The set of allocations that can be supported by default-free debt is fully characterized; this set is non-empty, convex, and contains a subset that is fully efficient.

We then evaluate the role of debt contracts in decentralizing constrained optima. Debt contracts that involve two-part pricing are shown to support efficient allocations subject to the no-default constraint. Efficiency is compatible with anonymous contracts.

JEL classification: C61; D92; E2

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1. Introduction

We consider the extent of debt, and the nature of debt contracts, in a world where borrowers can default on debts. Our main interest lies in characterizing debt markets that support efficient investment and consumption paths.

The economy, and all participants, have an infinite-horizon. Individuals differ in access to an intertemporal production technology. The need for borrowing and lending arises from

* Corresponding author. Tel.: +44-1214146656; fax: +44-1214147377. We would like to thank seminar participants at Cambridge and the LSE and an anonymous referee for helpful comments.
E-mail addresses: j.dutta@bham.ac.uk (J. Dutta), skapur@econ.bbk.ac.uk (S. Kapur).

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this: those who do not have direct access to production lend their savings to those who do. Borrowers can default their debts, and lenders cannot enforce full repayment directly. We assume that partial repayment can be directly enforced: lenders can capture a proportion λ of investment income. In addition, a borrower in default can be excluded from debt markets: he is then unable to borrow again. We evaluate the properties of consumption, investment, debt and repayment paths that can be sustained by the twin penalties of λ-*capture* and *exclusion*; characterize the set of efficient allocations that can be so sustained; and deduce the structure of one-period debt contracts that can support these constrained efficient allocations.

A debt plan, specifying a path of borrowing and repayments, can be sustained if borrowers do not default at any time and lenders do not capture their funds. For a debt plan to be default-free, the continued ability to borrow must generate a stream of rents for the borrower. For debt to be capture-free, lenders must earn enough from debt repayments. As default and capture are options available at every point of time, sustainable paths must promise sufficient future income to both sides at all times. Accordingly, sustainable debt plans must satisfy infinitely many inequality constraints. Theorem 1 characterizes debt plans that can be sustained.

In Theorem 2, we evaluate the implied restrictions on consumption allocations. The sequence of constraints on debt plans are equivalent to a single constraint on the path of aggregate consumption. The set of sustainable allocations is non-empty and convex. Any sustainable consumption allocation can be supported by at least one feasible and sustainable debt plan. This characterization is particularly useful in analyzing efficiency, as well as decentralization. We show, in Theorem 3, that a subset of fully efficient, or first-best allocations, can be sustained; and that the set of efficient, sustainable allocations is non-empty for each λ, monotonically increasing in λ, and coincides with the set of fully efficient allocations when $\lambda = 1$. Hence, any efficient allocation can be sustained for some λ.

Turning to decentralization, we show, in Theorem 4, that efficient and sustainable allocations can be achieved by trading in one-period debt contracts. These contracts involve *two-part pricing*. Lenders pay a fixed fee every period in order to participate in debt markets, and then earn a common marginal rate of return on their loans. At the margin, this rate of return equals the marginal productivity of capital. This last is, of course, a familiar characteristic of first-best paths. The fixed fee is paid to borrowers, and generates the rents that are necessary to prevent default. The marginal price is common to all debt contracts; the fixed fee is typically personalized. This is necessary if we want to implement all of the efficient solutions; an anonymous debt-contract achieves one of these efficient allocations. The allocation achieved by a competitive equilibrium can be reached if λ is large enough relative to the distribution of endowments. The associated debt contract involves a two-part tariff whenever $\lambda < 1$. Thus, in the absence of full enforcement, Walrasian allocations can be sustained only with non-Walrasian contracts.

The possibility that repeated trade may achieve superior outcomes in environments of limited enforcement has been a persistent theme in several papers, starting from Allen (1981, 1985), Green (1987), Bulow and Rogoff (1989). Many recent approaches, such as Kimball (1988), Atkeson and Lucas (1992), Kehoe and Levine (1993), Coate and Ravallion (1993), Thomas and Worrall (1994), Kocherlakota (1996), evaluate the role of exclusion as a threat in enforcing trade in exchange economies with individual endowment uncertainty. Typically, in these problems, individuals trade contracts, or securities for insurance purposes.