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Risk sharing through financial markets with endogenous enforcement of trades

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Abstract

When people trade in financial markets, intermediaries provide costly enforcement for most trades and, hence, are an integral part of financial markets' organization. We assess the degree of risk sharing that can be achieved through financial markets when enforcement is based on the threat of exclusion from future trading as well as on costly enforcement intermediaries. Starting from constrained efficient allocations and taking into account the public good character of enforcement we study a Lindahl-equilibrium where people invest in asset portfolios and simultaneously choose to relax their borrowing limits by paying fees to an intermediary who finances the costs of enforcement. We show that financial markets always allow for optimal risk sharing as long as markets are complete, default is prevented in equilibrium and intermediaries provide costly enforcement competitively. In equilibrium, costly enforcement translates into *both* agent-specific borrowing limits *and* price schedules that include a separate default premium. Enforcement costs—or, equivalently, default premia—increase borrowing costs, while interest rates per se depend on the change in enforcement over time.

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1. Introduction

In modern economies people rely on financial markets to smooth their consumption through borrowing and lending and to share risk by trading financial assets. Most of these trades involve ex-post transfers between the parties involved and have to be enforced since a party obliged to make a transfer has necessarily an incentive to default. To enforce trades many institutions have been set up that assess the problem of default, specify penalties for default and carry out these penalties. One example is a bankruptcy procedure with its specific set of rules, its application through a court system and its enforcement by public authorities. Other examples are enforcement and financial intermediaries such as rating and collection agencies, clearinghouses or settlement banks.

Since these intermediaries provide costly enforcement for most transactions on financial markets, they form an integral part of financial markets' organization. The goal of this paper is first to assess the degree of risk sharing that can be achieved through financial markets when intermediaries provide costly enforcement of trades. We then investigate how default is prevented in equilibrium when intermediaries provide enforcement and how people bear the costs associated with enforcement when making their financial decisions.

The basic set-up for our analysis is a standard dynamic risk sharing problem where commitment to contracts is limited.¹ In our framework, however, when enforcing risk sharing people can rely not only on the threat of exclusion from future risk sharing, but also on a 'punishment technology'. While resources are required to operate this technology, it allows for enforcement by inflicting what is essentially a utility penalty on a person that violates the arrangement. Enforcement is thus treated as a decision variable, since the technology choice forms part of the risk sharing arrangement itself.²

After characterizing optimal risk sharing, we establish versions of the welfare theorems by introducing a profit-maximizing intermediary that is regulated to operate the punishment technology competitively. Since operating this technology acts as a threat to enforce financial trades, enforcing an obligation of someone does not preclude the use of this technology to enforce obligations of anybody else. Hence, this non-rivalry causes enforcement through the intermediary to be a public good.

To capture these characteristics we use the ideas of Lindahl-equilibrium³ when decentralizing optimal allocations. We assume that asset markets are complete and people are restricted in their trades by borrowing constraints. Following [Alvarez and Jermann \(2000\)](#) borrowing limits take the form of 'endogenous solvency constraints' that rule out default in equilibrium. Given equilibrium prices people can borrow up

¹Examples of this literature include Coate and Ravallion (1993), Kocherlakota (1996), Ligon et al. (2002) among others.

²For a detailed discussion of this approach see [Koepl \(2003\)](#).

³For an extensive review on general equilibrium theory with public goods and the concept of Lindahl-equilibrium, see [Milleron \(1972\)](#).

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