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Optimal credit fluctuations ☆

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ABSTRACT

Under which conditions are extrinsic credit fluctuations socially optimal? In order to answer this question we characterize constrained-efficient allocations in an infinite horizon, two-good economy with limited commitment for two market structures, random pairwise meetings and centralized meetings. If agents meet bilaterally, then constrained-efficient allocations specify the highest stationary output level that is incentive feasible, and it is implemented with take-it-or-leave-it offers and "not-too-tight" solvency constraints. If agents meet in a centralized location, constrained-efficient allocations can be non-stationary, in which case they feature a credit boom followed by stagnation due to "too-tight" solvency constraints. We also characterize constrained-efficient allocations under partial commitment by the planner. If commitment is low, the economy experiences rare but pronounced credit crunches. If commitment is high, the economy experiences infrequent but large credit booms.

1. Introduction

Most financial crises are preceded by a large build-up in private agents' debt followed by a credit contraction and a prolonged period of stagnation with low economic activity.[1] These fluctuations in the use and availability of credit are typically viewed as socially inefficient as they create excess volatility relative to economic fundamentals. In this paper we challenge this view and provide a simple environment where endogenous credit fluctuations can occur in equilibrium and are socially desirable ex ante.

The environment we consider is an infinite-horizon, two-good economy similar to the one in Gu et al. (2013b), GMMW thereafter. In the presence of idiosyncratic shocks, this economy features a role for intertemporal trades interpreted as

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[1] Rogoff (2016) argues for the existence of debt supercycles characterized by credit booms and credit crunches. Lo and Rogoff (2015) argue that sluggish economic growth after the onset of the financial crisis is due to significant pockets of private, external and public debt overhang.

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unsecured credit arrangements (e.g. consumption of one good in exchange for promises of another good). Since agents lack commitment, those trades are sustained through public monitoring.[2] Using an equilibrium approach, GMMW show that this economy can generate credit cycles due to a pecuniary externality according to which endogenous debt limits affect the relative price of goods (hence, the importance of having two goods). In brief, high debt limits in the future generate high (relative) prices of goods consumed on credit that reduce the private gains from having access to credit in the future. As a result, the punishment from being excluded from credit is reduced, which generates a low debt limit in the current period.

Debt limits in GMMW are obtained by imposing the "not-too-tight" solvency constraints of Alvarez and Jermann (2000), AJ thereafter, according to which in every period agents can issue the maximum amount of debt that is incentive-compatible with no default. While these constraints implement constrained-efficient allocations in the AJ one-good economy, it is not necessarily the case in an economy with multiple goods, as pointed out by Kehoe and Levine (1993). Therefore, instead of taking as primitives arbitrary solvency constraints, we derive them from a mechanism design approach which characterizes incentive-feasible allocations that maximize ex-ante welfare (see Wallace, 2010 for a survey of this approach in monetary economics). In contrast to most of this literature, with the noticeable exception of Cavalcanti and Erosa (2008), we do not restrict the set of allocations to stationary ones and characterize instead the dynamic contracting problem between the planner and private agents. In doing so, we distinguish two market structures commonly used in the literature, pairwise meetings and large-group meetings, and we impose the corresponding core requirement.

We establish the following results. If agents are matched bilaterally then the constrained-efficient allocation corresponds to the incentive-feasible, stationary allocation with the highest output level. It is implemented with take-it-or-leave-it offers by borrowers and "not-too-tight" solvency constraints, which extends the AJ welfare theorem to economies with pairwise meetings. In such an economy, credit fluctuations would lower welfare, thereby capturing the common wisdom.

If all agents meet together in a centralized location, then the core requirement is equivalent to competitive pricing. Under strictly convex production costs, the price of credit goods increases with aggregate consumption and hence buyers' surpluses vary in a non-monotone fashion with aggregate borrowing. In turn, large borrowing is incentive-compatible if buyers can anticipate large surpluses in the future. Therefore, in order to extract large social gains from trade in the current period, the planner must promise low prices for future consumption, which requires lower aggregate consumption in the future. In other words, the planner faces a trade-off between contemporaneous and future output. If preferences are such that the temptation to renege on future promises is low (in a sense to be made precise below), then the constrained-efficient allocation is non-stationary. The initial period features an output level that is larger than the highest steady state, which we interpret as a credit boom. It is followed by a long-lasting stagnation where output is lower than the highest steady state due to solvency constraints that are overly tight (tighter than what is required to make repayment incentive-feasible).

The non-stationary constrained-efficient allocation is time inconsistent in that the planner would like to revise the allocation after the initial credit boom. Our result is robust to this time-inconsistency in the following sense. We introduce partial commitment according to which the planner can reoptimize infrequently when a sunspot state is realized. If the planner's commitment power is low, the economy experiences rare but pronounced credit crunches. If it is high, then the economy experiences infrequent but large credit booms.

1.1. Related literature

Seminal contributions on limited-commitment economies include Kehoe and Levine (1993), Kocherlakota (1996), and AJ. We differ from Kocherlakota (1996) and AJ in that we study a two-good production economy under alternative market arrangements. Our environment is a variant of the Lagos and Wright (2005) and Rocheteau and Wright (2005) frameworks, in that we use a two-stage structure and quasi-linear preferences, but we replace currency with a public record-keeping technology, as in Sanches and Williamson (2010, Section 4). Following GMMW, preferences are generalized to parametrize incentives to renege on obligations that span across multiple stages. Mechanism design was first applied to this environment with currency by Hu et al. (2009).[3] Our implementation results are related to the Second Welfare Theorem in AJ in that we provide a necessary and sufficient condition under which this theorem applies to our environment. Kehoe and Levine (1993, Section 7) conjectured that punishments based on partial exclusion might allow the implementation of socially desirable allocations.[4] This conjecture is verified in our economy with the caveat that the extent of exclusion has to vary over time. Gu et al. (2013a, Section 7) studies optimal dynamic contracts between a lender and a borrower in a similar environment with pairwise meetings. In contrast, we characterize the constrained-efficient allocation that maximizes ex-ante social welfare, and we consider both pairwise meetings and centralized meetings. Under centralized meetings the planner internalizes the

[2] In the absence of public record keeping, the environment corresponds to the New-Monetarist framework of Lagos and Wright (2005) with a few differences.

[3] Applications of mechanism design to monetary theory include Kocherlakota (1998) and Kocherlakota and Wallace (1998), Cavalcanti and Erosa (2008), Cavalcanti and Nosal (2011), Cavalcanti and Wallace (1999), and Hu and Rocheteau (2013, 2015), among others. Wallace (2010) provides a review of the literature.

[4] Azariadis and Kass (2013) relaxed the assumption of permanent autarky and assumed that agents are only temporarily excluded from credit markets. Gu et al. (2013a) and GMMW allow for partial monitoring, which is formally equivalent to partial exclusion, except that the parameter governing the monitoring intensity, π, is time-invariant. Kocherlakota and Wallace (1998) consider the case of an imperfect record-keeping technology where the public record of individual transactions is updated after a probabilistic lag.

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