

A NOTE ON AN OPTIMAL GARNISHING RULE *

P. DUBEY and M. SHUBIK

Yale University New Haven CT 06520-2125, USA

Received 16 December 1987

A low information, optimal bankruptcy rule is described and analyzed for an exchange economy with credit

In an exchange economy with many small agents which utilizes credit it is possible that individuals could borrow money which at the end they are unable to pay back. Shubik and Wilson (1977) and Dubey and Shubik (1979) explored models where the government or referee arbitrarily imposed an exogenous and not necessarily economic penalty on any defaulter

If the original utility function of i is $\phi_i(x'_1, \dots, x'_m)$, we construct a new function:

$$\phi_i = \phi_i(x'_1, \dots, x'_m) + \mu \min \left[\left\{ \sum_{j=1}^m p_j (a'_j - x'_j) - \rho s' \right\}, 0 \right], \quad (1)$$

where

μ = the per unit bankruptcy penalty, fixed exogenously,

p_j = the equilibrium prices,

ρ = the endogenous rate of interest,

s' = the amount of money borrowed by i .

If μ is high enough no one will elect strategic bankruptcy.

Rather than imposing an exogenous penalty to discourage bankruptcy we could consider an endogenous penalty inflicted by garnishing the goods of the bankrupt. There are two simple rules which might be applied, the forgiving rule and the no information rule.

Suppose an individual goes bankrupt for an amount A and obtains a final endowment of \bar{x} . The referee removes a vector of resources b such that

$$\max \phi_i(\bar{x}'_1 - b'_1, \bar{x}'_2 - b'_2, \dots, \bar{x}'_m - b'_i)$$

$$\text{subject to } \bar{p} \cdot b = A,$$

* This work relates to Department of the Navy Contract N00014-86-K0220 issued by the Office of Naval Research under Contract Authority NR 047-006. However, the content does not necessarily reflect the position or the policy of the Department of the Navy or the Government, and no official endorsement should be inferred.

The United States Government has at least a royalty-free, non-exclusive and irrevocable license throughout the world for Government purposes to publish, translate, reproduce, deliver, perform, dispose of, and to authorize others so to do, all or any portion of this work.

where \bar{p} are the equilibrium prices. This is the forgiving rule and is exactly the same as though the individual himself were required to adjust to a loss of income A . Thus he is indifferent between not defaulting or defaulting and being subject to this penalty.¹ Elsewhere [see Dubey and Shubik (1979)] we have shown that with such penalties the Nash equilibria of continuum strategic market games will be Walrasian.

The second rule has the important advantage that it requires no knowledge of the individual preferences by the referee. A number k is selected where $0 \leq k \leq 1$ such that

$$k\bar{p} \cdot \bar{x} = A \quad \text{for } k < 1, \quad \text{otherwise } k = 1.$$

If the referee is able to garnish assets before they have been dissipated this is at least as harsh as the first rule and is an easy economic rule which will discourage strategic bankruptcy. The resources obtained from a bankrupt go to the referee and could be used for redistribution.^{2,3,4}

References

- Dubey, P. and M. Shubik, 1979, Bankruptcy and optimality in a closed trading economy modelled as a noncooperative game, *Journal of Mathematical Economics* 6, 115–134.
 Shubik, M. and C. Wilson, 1977, The optimal bankruptcy rule in a trading economy using fiat money, *Zeitschrift für Nationalökonomie* 7, 334–354.

¹ But, this rule has the considerable inconvenience that it requires, for its implementation, the knowledge of agents' utility functions b .

² There is a third rule which we could call the punishing rule. It has the referee act to minimize payoff

$$\min \phi_i(\bar{x}_i - b_i^i, \dots, x_i^i - b_i^i)$$

$$\text{subject to } \bar{p} \cdot b = A$$

This is clearly harsh and could easily destroy the individual. However, as the lenient penalty is sufficient the harshness is unnecessary.

³ A more subtle rule may be required when there is exogenous uncertainty and incomplete markets. We have not yet resolved this problem.

⁴ One problem with our garnishing rule concerns indivisibilities, but fortunately we could modify our rule to 'select any random set of goods such that $\bar{p} \cdot b \geq A$ ' and this will be sufficiently harsh.