Optimal Intervention in a Random-Matching Model of Money

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Wallace [2014] conjectures that in pure-currency economies—a class of economies with no monitoring, discounting, a large number of agents, some background absence-of-double-coincidence, and no durable objects other than money—there generically exists an inflation-financed transfer scheme that improves welfare over no intervention. As no taxes are allowed consistent with the underlying environment, it follows that positive inflation is an optimal feature in this class of economy according to this conjecture. The conjecture applies to generic pure-currency economies that satisfy two conditions: (1) economic states affect period payoff through trades, and trades affect next period economic states, and (2) under no intervention, money can have value but cannot achieve the first-best. Wallace [2014] discusses two examples of pure-currency economy, Kehoe et al. [1992] and Shi [1995] and Trejos and Wright [1995], but only presents results for the former. We are going to present results for the latter, the Shi-Trejos-Wright model, with a somewhat rich set of individual money holdings $\{0, 1, ..., B\}$ for selected magnitudes of the upper bound on money holdings B.

Obviously, the smaller is B, the more restrictive is the set of policies that can be studied. Unfortunately, our choice of B is restricted to for $B = 2$ and $B = 3$, due to the curse of dimentionality: the number of variables in the optimum problem grows with B^3. Why are such limited settings interesting? First, $B = 2$ is the smallest upper bound which gives scope to any intervention. It is also the smallest upper bound with which the environment satisfies the second part of the first assumption for the conjecture that trades affect the distribution of money holdings, which is the economic state. However, it is too small to give scope for policies that reward people who already have some money with the promise of a higher return on any extra money acquired in a trade. That can never apply to people who hold $B - 1$ units, because if they acquire a unit in trade, they are at the upper bound and, therefore, cannot look forward to having any additional money acquired in trade further enhanced by a transfer. The smallest B which gives possible scope to such a policy is $B = 3$.

For each magnitude of the upper bound B, optima are computed for 55 different parameter sets. Our first result is that no intervention emerged at optima for both $B = 2$ and $B = 3$. On these results, Wallace [2014] guesses that no intervention emerges as optimum because the policy space is limited by the upper bound on money holdings. If the guess is correct, then we should find that, as the upper bound on money holdings increases from 2 to 3, the number of parameter sets under which money creation emerges at optimum increases. We find such an increase indeed: the number of parameter sets under which some intervention emerges at optimum is 2 for $B = 2$, and 21 for $B = 3$. We also document the type of optimal transfers related to discounting rate and risk aversion.