

Informal Insurance and Income Inequality

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March 15, 2007

Abstract

This paper examines the effects of income inequality in a risk sharing model with limited commitment, that is, when insurance agreements have to be self-enforcing. We extend the model of Ligon, Thomas and Worrall (2002) by introducing income inequality. Numerical dynamic programming is used to examine three different questions. First, we consider heterogeneity in mean income, and study the welfare effects when inequality together with aggregate income increases. Second, we introduce subsistence consumption to see how it affects consumption smoothing. Finally, we endogenize income by allowing households to choose between two production technologies, to look at the importance of consumption insurance for income smoothing.

Examining informal risk sharing in the context of developing countries is important for two main reasons. On the one hand, people living in low-income, rural areas often face a huge amount of risk. Revenue from agricultural production is usually low and volatile, further, outside job opportunities are often lacking. On the other hand, financial instruments, or formal, legally enforceable insurance contracts are often not available to smooth consumption inter-temporally or across states of nature. The question is then, how can people in these kinds of environments somehow mitigate the effects of risk they face. Growing empirical evidence suggests that households enter into informal risk sharing agreements, and achieve something better than autarky, but not quite perfect risk sharing (see the seminal paper by Townsend (1994), among many others).

We model informal insurance by supposing that contracts have to be self-enforcing, because often no authority exists to enforce insurance agreements in poor villages in developing countries, while informational problems are less important. This approach yields partial insurance, which is consistent with empirical evidence. The model has a

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wide range of interpretations. In addition to thinking about households in a village, we may consider members of a family (Mazzocco, in press), an employee and an employer (Thomas and Worrall, 1988), or countries (Kehoe and Perri, 2002).

We consider an infinite-time model with risk-averse agents, whose income follows some exogenous, discrete stochastic process that is common knowledge. We concentrate on insurance across states of nature, and we ignore savings, or storage. We look for a constrained-efficient solution, maximizing a utilitarian social welfare function subject to resource constraints and enforcement constraints. That is, we require that, for each agent at every period and every state of the world, it is better to stay in the informal risk sharing contract than to revert to autarky. Supposing that income follows a Markov-process, we have the following important property characterizing the solution: the current ratio of marginal utilities, and therefore the consumption allocation, depends only on current income realizations and the ratio of marginal utilities in the previous period. In addition, unlike in the perfect risk sharing case, the allocation in the limited commitment solution depends not only on aggregate income, but also on its distribution. This is because individual income determines the utility a household may get were she in autarky, that is, her threatpoint, or bargaining power.

In the context of this model we examine the interaction of income inequality and self-enforcing risk sharing contracts. To do this, we perform three types of simulation exercises. In all cases we assume that only two agents populate the economy, and that individual income may take only two values, for clarity and computational ease.

- We consider a “poor” agent interacting with a “rich” one. The agents have the same constant-relative-risk-aversion (CRRA) utility function, and they differ in their mean income, while they face the same amount of risk in the sense that the relative standard deviation of their income process is the same. We perform a comparative statics exercise: while keeping the income process of the poor the same, we increase mean income for the rich, thereby increasing inequality together with aggregate and per-capita income. Notice that we do not expect this type of inequality to have any adverse effects, since what happens is just that in each state of the world we give more income to the rich, while leaving the income of the poor unchanged. Interestingly, we find that, for some reasonable parameter values, the poor is worse off when inequality together with per-capita income increases. This is in contrast with Genicot (2006), who emphasizes the possible positive effects of inequality, keeping aggregate income constant. Note further that she considers a static contract, which has been shown not to be constrained-efficient in the dynamic setting. The intuition behind our result is that the poor agent’s relative bargaining power decreases vis-a-vis the rich, thus she can secure smaller net transfers in the limited commitment solution. Another way of putting it is that the poor can provide less insurance to the rich as the latter’s income increases, thus the rich does not value the contract much. The result warns of

the possible adverse consequences of inequality for the poor even when per-capita income increases in the community, the reason being that the poor is more and more excluded from informal insurance arrangements.

- Now, we consider the above setting again, we take just one pair of income processes, but we add “subsistence consumption”, or, in other words, we suppose decreasing relative risk aversion (Ogaki and Zhang, 2001). We examine the effects of changing the subsistence level. Increasing the subsistence level makes insurance more valuable for both agents. We see a discrete upward jump in the poor household’s expected lifetime utility, when perfect insurance becomes self-enforcing. Furthermore, here it is interesting to look at the consumption allocation, since we do not change income. The consumption of the poor becomes less volatile as we increase the subsistence level (or, in other words, when the poor is just above the subsistence level), but the poor has to sacrifice mean consumption to compensate the rich for the insurance she provides.
- In the last example economy, we introduce the possibility to choose between two production technologies, to examine the consequences of lack of insurance on income smoothing (Morduch, 1995). A technology is described by the income process it generates. As in our first example, households have standard CRRA utility functions, but now they may differ in their coefficient of relative risk aversion. Further, households may choose between two technologies, an “old”, safer technology with lower expected values, and a “new”, riskier, but more profitable technology. While the complete solution of this model is an interesting task for future research, here we only look at an example where switching between the two technologies would only occur at the time of reverting to autarky. In our example we get the following result: in autarky, both agents choose the old technology, while if they enter into an informal risk sharing agreement, the less risk-averse household chooses the new technology, but the more risk-averse household sticks with the old technology. This result illustrates the importance of consumption insurance for production efficiency, and the negative consequences high risk aversion may have on expected profits, for example when households living near the subsistence level are willing to bear very little risk.

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