Katholieke
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Faculteit der Economische en
Toegepaste Economische
Wetenschappen

# VOLUNTARY RECIPROCITY AS AN INFORMAL SOCIAL INSURANCE MECHANISM

## A GAME THEORETIC APPROACH

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door

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## ABSTRACT

Informal social insurance mechanisms known as gift giving, reciprocal transfer payments, mutual assistance and contingent credit are analysed as consumption smoothing mechanisms by means of reciprocal transfer payments without the use of a binding contract. The objective of this study is to provide an explanation for the following: the existence of reciprocal transfer payments without the use of a binding contract, the non-existence of full insurance when there are no informational problems, and the effect of the occurrence of common risks on the feasibility of the mechanism.

Based on the theory of decision making under uncertainty in a non-cooperative game with complete information, three new elements are introduced. They are: first, the decision to pay a transfer is made after current income is known; second, the equilibrium of the infinitely repeated game must be non-renegotiable even when each player can terminate the agreement unilaterally; and third, the players are confronted with idiosyncratic and common income risks.

The model shows that when the decision to pay a transfer is made after income uncertainty is revealed, co-operation is possible if the ratio between the gain from co-operating and the gain from not co-operating is sufficiently high. The transfer which maximises the expected payoff of the player who has to pay is the sustainable equilibrium. This equilibrium which is strictly lower than the level of transfer which yields full insurance is reached with delay if the bargaining process has low friction. The occurrence of both idiosyncratic and common risks does not impede co-operation if the agreement is dependent on the prevailing common state.

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# Introduction

In most developing economies, a state organised social insurance system for rural households and other poor, self-employed households in urban areas does not exist. [1] These households which constitute the majority of households in developing economies[2] have to rely on traditional social insurance mechanisms to overcome the volatility of their income flows. These mechanisms will be referred to as informal social insurance mechanisms. The term "informal" refers to the fact that these mechanisms do not rely on any contract. The mechanisms are embedded in social institutions, particularly in rural areas. They work neither through an insurance market nor through a state organised social insurance system.

[1] We consider social insurance as part of social security. While a social insurance system is concerned with the volatility of a household's (or individual's) income flow, a social security system is also meant to ensure that an individual's income flow does not fall below a certain level.

[2] According to the World Development Report 1995, for the year 1993, 72 per cent of the population of low-income economies live in rural areas. In middle-income economies, it is 60 per cent, whereas in high income economies it is 22 per cent (see Table 31 of World Development Report 1995).

The role of these informal social insurance mechanisms to smooth households' consumption is documented by, among others, Cox and Jimenez (1990). Not less than 30 per cent of households in El Salvador, India, Java (Indonesia), Malaysia and the Philippines participate in such mechanisms. Among the Javanese rural households, the average transfers paid amount to 8 per cent of household income. This amount increases a recipient's income by 10 per cent on average. The prevalence of these mechanisms however, is declining. According to the World Development Report 1995, urbanisation and the diminishing importance of the extended family are two factors which cause their decreasing importance.

This study is an attempt to enrich our understanding of some of the theoretical issues related to informal social insurance. Its primary concern is the behaviour of households in their attempt to smooth their consumption without the use of either an insurance market or a state organised social insurance system. The analysis is confined to reciprocal transfer payments among households within a village or a kin network. A mathematical model within a game theoretic approach is constructed to provide: (1) an explanation of the necessary and sufficient conditions for reciprocal transfer payments to exist, and (2) a prediction about the efficiency of such a mechanism to smooth consumption.

Before we proceed, we discuss some basic features of an agent's decision to buy insurance against an income loss (or an unexpected increase of expenditure) under the formal (market or state organised) and the informal schemes. Under a formal scheme, an agent buys insurance against a hazardous event which causes an income loss. The amount of the premium is determined by the expected amount of income loss. By paying a premium, the agent is

entitled to receive a specified amount of coverage when the specified hazardous event occurs. The information on his current income is relevant as far as it influences the expected loss.

Under an informal scheme, the hazard for which the insurance is provided is not always well specified. Neither is the amount of the premium a participant has to pay nor the coverage he will receive. An agent who does not lose his income transfers part of his income to another agent who suffers from a hazardous event. The agent's decision to pay a transfer has so far been considered as a state contingent decision, despite the fact that there is no contract which binds the agent to pay a transfer.

This study is based on the proposition that the information about an agent's current situation influences the agent's decision whether to participate or not in an informal insurance scheme. This is the new element brought into the analysis. The proposition applies for an environment where there is no binding contract upon which agents can rely and there are only few information problems. We propose to use the uncertain income state duration to analyse this insurance decision rather than the uncertain income distribution as traditionally applied in insurance analysis.

The study is organised as follows. We present a literature survey of the empirical and theoretical descriptions on voluntary reciprocity in Chapter 1. In Chapter 2 we develop a model of voluntary reciprocity as a non-cooperative game where players decide whether to participate or not after income uncertainty is revealed. We consider only idiosyncratic risks. In Chapter 3, a bargaining model is applied to predict the sustainable equilibrium level of transfer. In Chapter 4, we extend the model to consider also the occurrence of common risks.