

Trust, Altruism, Reciprocity and Economic Efficiency

Mehdi Chowdhury¹

Abstract:

The importance of behaviors such as trust, reciprocity, altruism etc. that are intrinsic in human nature are capable of facilitating monetary transactions which otherwise are not possible through formal contracts. The paper proposes a simple economic model to argue that though these behavioral elements can facilitate monetary transactions they may not always ensure economic efficiency. We then relate our analysis with various actual economic situations.

JEL Classification: D03, A10

Keyword: Efficiency, human behavior, contract

1. Introduction

Recent developments in behavioral and experimental economics have well established that the assumption of pure selfishness is not useful in explaining some economic transactions². The factors other than pure selfishness that can influence economic transactions for example can be ‘Trust’ that is as someone’s reliance on another person, ‘Altruism’ that is the increase of someone’s satisfaction with the increase of another person’s satisfaction and ‘Reciprocity’ that is returning good behavior with good and bad with bad (punishment). The importance of these behavioral elements were however well before recognised by the economists who were puzzled by question of transfers within a family³ and relied heavily on these non-selfish motives to provide explanations.

The main contribution of behavioral elements in actual economic transactions is to provide a mechanism that can substitute the need of a formal contract. Within a family, transactions take place between various members, for example, a father and a son or a migrant and the household. Explicit contracts are rarely observed and actually impossible in these situations. The importance of behavioral elements was also recognised by people dealing with rural credit markets. The well-known model of ‘Grameen Bank’ depends on (See e.g. Karlan and Goldberg, 2012, page 23) group lending where if any group member fails to repay the loans, the other members must repay for them or face losing access to future credit. The bond of the group in the model is achieved by forming groups where members are closely associated with each other. In addition it is also well known that transactions in illegal markets take place through trust, guarantee etc. with an aim to avoid the detection of law enforcing agencies.

The purpose of the paper is to ask a different question. The importance of behavioral elements is clearly observed in many economic transactions, but are they automatically ensuring ‘Efficiency’? That is can they create more wealth that market otherwise is unable to provide. One experimental example of this case is the

¹ Lecturer in Economics, Business School, Bournemouth University, UK,
email: mchowdhury@bournemouth.ac.uk

² See Fehr and Schmidt, 2006 for references

³ See Laferrère and Wolff, 2006 and Rapoport and Docquir, 2006 for a survey of literature and early developments.

experiment conducted by Berg et al. (1995). In the experiment a subject A transfers a fraction from his initial endowment of \$10 to another anonymous subject B. The amount transferred is multiplied by 3. B then transfer a fraction of that amount to A. Selfish behavior implies that subject A should not transfer any amount to B and if transferred then B should not transfer any amount to A. This attitude is however is not maximizing their joint wealth as if A transfers no amount to B then total wealth is only \$10 compared to possible maximum of \$30. The only way transactions are Pareto improving is where A trusts B and transfers some money and B reciprocate by returning the sum transferred by A.

The transactions as described above are obviously creating more wealth. We here want to analyse the question if all economic transactions based on behavioral motivation create more wealth. Our answer of the paper is 'No'. Actually some transactions can be even wealth reducing that is total wealth is higher if behavioral elements fail to initiate transactions in market. We analyse is by proposing a simple principle agent model, where the principle transfers money to the agent after receiving guarantee of a third party. The agent makes investment and returns money to the principle after realisation of profit. If the project cannot generate sufficient fund then the third party top-ups the fund to pay back the loan to the principle. We then sum up the wealth of each to calculate total wealth and see if the wealth created by transactions is higher than the initial wealth. We then relate our analysis to various actual economic situations.

The structure of the remaining sections of the paper is as follows. In the second section we describe the model that forms the basis of analysis. In the third section we analyse the conditions where transaction can be efficient or inefficient. In the fourth section we relate our analysis to various economic situations that are observed in real world. The final section concludes the paper.

2. The Model

The purpose of this section is to introduce the model which forms the basis of analysis in later parts of the paper. We assume that there are three players in the model:

- a. The Principle: who gives loan, say B(anker)
- b. The Agent: who receives loan, D(ebtor)
- c. The Guarantor: who works as a G(uarantor)

B gives loan amount l to D with an agreement that r will be repaid at the end of the pre-agreed period where $r > l$. If loan is not repaid G is regarded as liable and hence the mechanism solves both adverse selection and moral hazard problems.

The behavioral assumptions of the models are:

- a. We assume that G is altruistic. Altruism is defined as a mental condition as such G gets a psychological benefit from doing something good for D. G also reciprocal as he reciprocate to B by guaranteeing the repayment of the loan.
- b. D reciprocates the behavior of G. D aims to completely repay the loan so that G does not have to bear the burden of repayment of loan.

- c. B gives loan on the basis of trust of G. The trust can be formed on the basis of mutual long term business/social relationship or availability of collateral to support the loan repayment. B is not altruistic to G or D. B only cares about loan repayment and does not give any value to the source of repayment.

The timelines of the acts are as follows: B gives l to D with a written or non-written contract which is enforceable under any contingency. D invests in the project and puts effort. The outcome is obtained and r amount is repaid irrespective of the outcome of investment. The repayment may come from D or G or a combination of both. There is no uncertainty in repayment.

The investment l gives return $\theta(l)$ with probability p and 0 with probability $1 - p$. The probability of the return depends on the effort of D. Following the convention of notation, we denote effort level as e . The probability is given as $p(e)$ which is concave in effort as such $p' > 0$ and $p'' < 0$. As we will assume that the primary objective of D is ensure loan repayment and not his personal utility, we define cost of effort as not the disutility of effort but as a cost incurred by D in the project expressible in monetary term. Hence the effort itself is defined as the personal investment of D in the project expressed in monetary term. As $p(e)$ is concave the effort of D increases the probability of success of the project.

Expected pay off of the project is:

$$E = p(e) \times \theta + (1 - p(e)) \times 0 = p(e)\theta \quad (1)$$

Note that θ is here a function of l but we ignore it for convenience as the value of θ is determined ex ante given the ex ante determination of value of l . The income of D from the project minus repayment of loan is:

$$I = p(e)\theta - e - r \quad (2)$$

The project is viable if $I > 0$. To facilitate loan repayment the project needs to generate sufficient gross revenue so that following inequality is satisfied:

$$Q = p(e)\theta - r \geq 0 \quad (3)$$

It is needless to say that $p(e)\theta - e$ gives the net revenue of the project.

3. Economic Efficiency of the loan

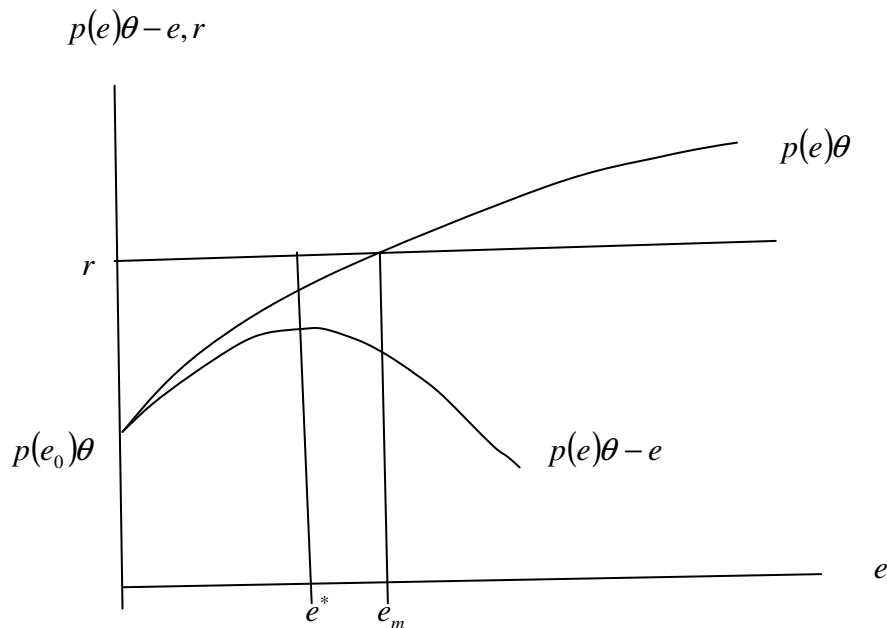
In this section we analyse the effort level that D utilises to ensure repayment of the loan. We also analyse if the loan is economically viable that is creating more wealth than that was initial available. We analyse it in following two cases:

Case 1: $Q = p(e_0)\theta - r < 0$

Here we analyse a situation where with no effort the expected income from the project is lower than the amount to be repaid. By assumption the function $p(e)\theta - e$ is concave in effort. Hence it has been drawn in Fig-1 as the concave line denoted by $p(e)\theta - e$. The project is not economically viable as $p(e)\theta - e$ is never greater than r . The optimum loan of the project should be therefore $l = 0$ and $e = 0$.

However given the ex ante situation that $l > 0$, the agent uses effort level e^* if he wishes to minimise the gap between r and the net revenue of the project. But a reciprocal individual cannot stop there. In order to repay the loan the project must generate sufficient fund. D being a reciprocal individual may ignore his cost and put effort up to the level where $p(e)\theta = r$. Such a point is defined by e_m . Otherwise D may reciprocate by putting effort up to e^* and then top-up the remaining amount from his personal fund.

Fig.-1

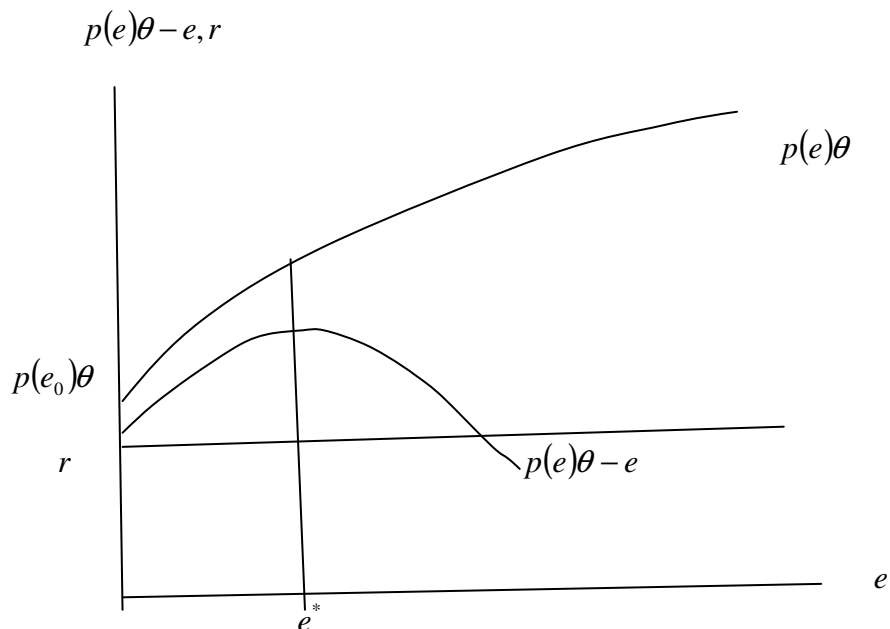


Meaning of the effort e of the agent here requires further analysis. e can be defined as D's own investment in the project. Given that marginal expected return of e is higher than e at the beginning, D should invest some effort in the project. It however imposes a limit as to what extent it can be done. If the own investment of D has an upper bound it may prohibit generation of sufficient fund from the project. If this is the case then the only way the loan can be repaid is through transfer the guarantor G's fund to B.

Case 2: If $Q = p(e_0)\theta - r \geq 0$

Here we are assuming that the project is viable as without any effort the D gets non-negative return from the project. Given that the $p(e)\theta - e$ is concave and first derivative is positive when $e=0$, the value of the function $I = p(e)\theta - e - r$ increases initially with the effort level and after some level it falls. It gives us optimum effort level of the project e^* . Hence the agent is willing to undertake the project with ex ante l and r . That is even before the loan is given to him through the guarantee of G.

Fig.-2



We are now ready to analyse the economic efficiency of the transactions what is if the transactions create more wealth. Our benchmark here is loan l that was transferred to D. If total wealth created is more than l then transactions involving B,G and D is wealth maximizing. G may transfer some money from his own fund to B, which gets cancelled in calculation. Therefore we only calculate the economic efficiency by taking the monetary benefit of the principle and the agent which are:

The Principle (B): $r - l$

The agent (D): $p(e)\theta - e - r$

The motive of the guarantor G is altruistic. We assume that it is non-expressible in monetary term. Therefore, in total the monetary benefit of society from the transaction is $r - l + p(e)\theta - e - r = p(e)\theta - e - l$. As $r > l$ with certainty, B is always willing to give loan to D irrespective of the outcome of the project and the transactions improve his wealth. The benefit of D can be negative or positive as observed in case 1 and case 2. However even if the benefit of the agent is negative there is a chance on margin that $p(e)\theta - e - l \geq 0$ as $r > l$. The wealth of the society increases when $p(e)\theta - e - l > 0$. This is not ensured with certainty as it is also possible to have $p(e)\theta - e - l \leq 0$. Therefore the transactions are not necessarily improving the wealth of society. As we discussed earlier, the basis transaction is formed by trust, reciprocity and altruism. In case 2 it is actually working as the transactions are creating more wealth than the initial wealth. But in case-1 the same transactions are taking place on the basis of trust, reciprocity and altruism but creating less wealth.

4. Lessons from the Analysis

The paper provided a simple economic model to show that trust, reciprocity and altruism may provide solution to the adverse selection and moral hazard problems but do not automatically guarantee economic efficiency. In the example of Fig.-2, the project is capable of generating sufficient fund, but the example in Fig.-1 shows the incapability of the project in generating sufficient fund for repayment of the loan.

The simple model we have used is relevant in many economic situations. One of the central assumption of our analyse is that $p(e)$ is unobservable ex ante. This assumption is similar to Melitz (2003) where the productivity of a firm is observed ex post of a sunk investment. Similar to this we assume that probability distribution become observable only after the investment in the project is made. If probability distribution is observed ex ante of investment and the projects gives a negative return as in equation (3), the loan would not be taken in the first place.

On top of that in many situations even θ is not observable ex ante. That is both potential outcomes and their probability distribution of a project can be unobservable. Only after certain a sunk investment both of them become observable. One example is international migration. Migrant often makes investment of go abroad and realize afterwards the income that is actually attainable from migration. Thus there can be a significant difference in actual expected income and forecasted expected income. Migration from poor developing countries often realize actual situation after migration and end up gaining negative equity.

The motive of B here is to make positive profit and he attaining exactly that objective. The reason is that even if the project is incapable of generating enough fund, his investment is secured by G. B assumes a position where he is capable of recovering the loan amount from the guarantor irrespective of the outcome of the project. In a formal economy the B may assume the position of a Banker who disburse loan against collateral. In informal economy B may assume the position of a money lender who lends on the basis of trust, reputation, financial abilities and social power of G. B can have some mechanism in place to insure him against any default. The Microcredit system of 'Grameen Bank' is exactly doing the same. The guarantee of the loan of Microcredit institutions comes from the group. If one member defaults

then the other members of the groups are liable to repay the loan. The success of the mechanism is reflected in high repayment rates of Microcredit institutions.

The problem identified in the analysis is that even if the repayment of loan is ensured, it is not ensuring efficient use of resources. In this context the relationship between G and D needs to be analysed. Why G would give guarantee for D? in Microcredit system relationship between G and D is established by forming a group containing both G and D. But in a family the relationship between G and D can be that of parents (say father) and an offspring (say son). A father may give guarantee for a loan of the son. In Fig.-1 the project makes a negative profit. Given a priory realisation of this outcome, a father may even deter the son from taking a loan. But in a family it may not be the case all the time.

The relationship and hierarchy of a family can be such that parents may take actions without any consent of the offspring. Example of it is the schooling decision. It is not normally possible for a 10 year old boy or girl to make decision about the right educational institution. The parents may out of pure altruistic motive finance a high cost education of their child that at the end of day results in a negative equity. This situation as describes above is not just confined within a family. Now a day in some countries, students can take loan to finance university education through government schemes⁴. Though the motive of government (or the tax payers) can be altruistic, availability of cheap loan may induce students to take loan and pursue an education what otherwise would not have been taken.

Education is sometimes regarded as an investment that is capable of generating some monetary income for the family. But there are examples where pure altruistic relation between G and D may force a family to make a financial commitment without any monetary return. For example, in many societies marriage is regarded as an important occasion and to upheld family reputation, a family may resort to external financial sources. Say here G is the father and D here is the daughter. To upheld the family reputation. G would take loan and repay it back from his own resources. The relationship between the father and daughter here is altruistic but resulting in a negative monetary return.

5. Conclusions

In this paper we demonstrated using a simple economic model that the behaviors like trust, altruism, reciprocity etc. though are intrinsic in human nature are not necessarily wealth improving. We also provided a number of examples to support our claim. The recent literature of behavioral and experimental economics has well established that human being does not always act selfishly. In contrast we proposed that non-selfish behavior of human being is not all the time wealth improving and thereby may not even improve welfare or satisfaction. Actually in some situations the respective units are better off without the existence of the non-selfish elements.

The century old economic problem of how a nation's wealth can be increased therefore remains unanswered. Behavioral elements are useful when market mechanism and pure selfish motives are incapable of improving wealth (e.g. in Berg et al., 1995). But in some cases lack of behavioral motives ensure efficient use of

⁴ The information about the scheme in UK is available at:
http://www.direct.gov.uk/en/EducationAndLearning/UniversityAndHigherEducation/StudentFinance/Typesoffinance/DG_171539

resources (as in Fig.-1 of the paper). The future economic models therefore need to reconcile these two positions together. One examples of this is Hart and Moore (2008) where past history that is good behavior of the parties is useful in negotiations of future contracts. This certainly opens up a field for a new and exciting research where the question of economic efficiency can be addressed taking the intrinsic characteristics of human being into consideration.

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