Erasmus School of Economics

A thesis submitted in partial fulfillment of the requirements for getting the degree of

MASTER OF SCIENCE

In Economics and Business Economics

Prosocial Behaviour Between The Rich and The Poor: An Evidence Using A Rosca-Mimicking Game

Rani Hanida

470684

Thesis supervisor:

Jan T. R. Stoop

Rotterdam,

30 August 2018

Abstract

In the past ten years, the world's income inequality increased to its peak. One of the determinant factors causing such disparity is the lack of access to financial resources for the poor. In the history of financial inclusion, Rotating Saving and Credit Association (Rosca) is the earliest concept that inspires experts to build a bridge between the rich and the poor through the world of microfinance. Since in the microfinance world, community-based lending and financing plays an important role, and that some people may have the tendency to free-ride, it is essential to understand what might drive such behaviour. Therefore, this study aim is to examine how group formation from a self-assigned method may trigger prosocial behaviour. Besides, the debate over who may show higher prosocial behaviour – the rich or the poor, remains. Inspired by Rosca success stories from across nations, this study uses a group game mimicking-Rosca through an online survey tool. In the Rosca game, the participant was asked to decide whether to pay the contribution for each round or exit the game and take the endowment fund plus the number of tokens they have won from the game. 380 samples obtained was then analysed using the non-parametric tests – using Binomial, Chi-squared, Mann-Whitney, Fisher Exact, and Kruskal-Wallis test, and parametric tests of OLS and ordinal probit analysis as the robustness check. This report concludes that being in a non-anonymous group and being in a group with the rich influences people's behaviour – indicating prosocial behaviour. Additionally, male and white ethnicity also tend to behave more selfish compared to other ethnicities. However, the use of Rosca is minimal in prosocial behaviour related studies. Therefore, the findings from this study are expected to be useful as a base for further research, especially for a real-life Rosca field setting.

Keywords: prosocial behaviour, Rosca, economic group game, self-assigned group formation, socio-economic status

Contents

Figures

Prosocial Behaviour Between The Rich and The Poor:
An Evidence Using A Rosca-Mimicking Game

1. Introduction

One most important goal in a human's life is to live to prosper. What people often forgot, wealth is not the essential meaning of life; but virtue is. That is why there is no religion ever told its adherents to do evil to anyone. Data shows that income inequality level in the world has reached its highest for the recent decade (OECD, 2017) and that the world is divided into two primary socioeconomic status: *the rich* and *the poor*. A study found that an enlarged gap between these groups might consequently bring up the homicide and criminality rate while shifting the world peace away (Kennedy, Kawachi, Prothrow-Stith, Lochner, & Gupta, 1998). Therefore, it is essential to understand better what might influence people's prosocial behaviour to one another.

Looking into what might be the cause of income inequality, the global financial inclusion data from *The Global Findex Database* (The World Bank, 2018) stated that lack of access to the financial services one of the most critical determinant cause. Data showed that by the end of 2017, around 1.7 billion adults across countries in the world remain unbanked. Consequently, unbanked people must deal with risky and inefficient cash management which caused them to stay poor (The World Bank, 2018).

Long before the idea of microfinance and digital financial become popular, there was a traditional "financial institution" built based on community, trust, loyalty, and mutual needs of financial access, called Rotating Savings and Credit Association (Rosca) (Geertz, 1962). Rosca is a famous local microfinance structure among poor people in developing countries. Besides, it is also familiar amongst minority ethnics in developed countries. The basic idea of Rosca works upon a group of people who agree to "save" a certain amount of money as a goal, collected/paid decided amount frequently, and each participant will get one-time chance to get the pot in a rotation as a "credit" (Ardener, 1964). For example, four people agree to form a Rosca group, which pot worth 20 EUR. This group member then must have four times payment of 5 EUR in each round, and everyone will get only one time to win 20 EUR from the pot. In the Rosca-mimicking game, each participant would get endowment fund and may decide whether to play, continue to stay in the game, or quit. If any participant decides to quit, the game will stop instantaneously.

Given that the participant(s) dropout, the overall expected earnings are equal to zero (0). Given this condition, the first rational decision is not to play the game in the first place. However, if people decide to play the game, Rosca unique arrangement may influence two rational-and-selfish decisions to happen. First, the first-in-row or the last-in-row person of the group to exit before the full game rotation because they enjoy the joy of winning the pot too much so that they may "take" others money by quitting the game. Second, the last-in-row person may exit because they feel that there is no point to keep contributing until the last round, since paying, e.g. four times in a row and get all their money back at the fourth times seems pointless (Biggart, 2001). A possible explanation for this is that people may have changing preference overtime towards their payoff so that he/she prefers whatever they have now instead of waiting to have a higher payoff. This phenomenon is known as people being impatient (Rohde, 2005). Since this study focuses on examining people's prosocial behaviour and most of the samples obtained decided to play the game, the second rational decision in Rosca will be discussed further and become the focus in this research.

Although based on neoclassical economic theory, a rational person will maximize their profit by playing, win a round, then exit Rosca immediately – causing the group to default, studies consistently found that Rosca's default rate is low throughout the years (Biggart, 2001) (Biggart, 2004) (Guha &

Gupta, 2005). This low default rate determined mostly by a communal-based trust (Biggart, 2001), strong social collateral within group members (Besley & Coate, 1995), and saliency of achieving personal/group goal in Rosca (Geertz, 1962).

However, there is a chance that some people may behave selfishly by gaining from Rosca group. While examining who might display most selfish behaviour, psychologist and economist have a mixed argument about who exhibit higher prosocial behaviour between the rich and the poor. First, psychologist hypothesised that having all difficulties and limited resources will cause the poor to have a lower prosocial behaviour compared to the rich in helping, trusting, and giving others in need (Piff, Kraus, Cote, Cheng, & Keltner, 2010). However, the study found that poor people are less likely to break the law while driving, lie in a negotiation, or cheat in a game where they have a chance to gain more money. Besides, earlier studies in psychology field also found that poor people possess a higher empathy towards other less fortunate people so that it triggers their prosocial behaviour (Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012).

On one hand, using several field-experiment designs, economist found that the rich are more likely to return strangers money in a misdelivered envelope field settings (Andreoini, Nikiforakis, & Stoop, 2017), slightly more concern, willing to contribute for a pro-environmental project (Fairbrother, 2012), and are more generous to give to less-fortunate people (Smeets, Bauer, & Gneezy, 2015). Moreover, a study using a public goods game setting showed that poor people behave prosocially towards the same peer-group (Martinangeli, 2017). The study uses a public goods game and participants knows about the group identity information.

Martinangeli (2017) findings are aligned with a study using the public goods game setting which found that around 50% of people shows prosocial behaviour by contributing some money into the public goods game pot (Fischbacher, Gächter, & Fehr, 2001). This evidence contradicts what neoclassical economic theory which says that people are rational and selfish (Scott, 2000). Examining deeper over how to and what may triggers prosocial behaviour, Martinangeli (2017) interesting findings can be explained by the fact that assigning person into a social group labels (i.e. specific social, economic status) is proven to bring up a person's sense of belonging, trust, the feeling of camaraderie, and favouritism within the group (Tajfel, 2010) (Chen & Li, 2009). Additionally, a previous study using public goods game showed that prosocial behaviour could be amplified further by disclosing players anonymity (Andreoni & Petrie, 2004). Interested in learning more about how anonymity and group formation may influence people's behaviour in a group setting, this study will adopt a group game setting.

Unable to conduct a Rosca field research experiment due to limited resources and budget, an experimental laboratory setting using a Rosca-mimicking game is performed in this study. Therefore, Rosca-mimicking game is designed and used in this study to give a little contribution to the remaining debates about prosocial behaviour between the rich and the poor, and how group formation and sense of belonging within group affect prosocial behaviour. Specifically, this study is dedicated for answering the following research question:

Which group of people will exhibit a higher prosocial behaviour in a Rosca game setting?
The rich or the poor?

2. Literature Review

This section will review literature related to prosocial behaviour in a group setting, i.e. public goods game and Rosca. Besides, literature about social group formation and prosocial behaviour of the rich and the poor will also be reviewed. Since there is an enormous amount of literature related to these topics, only the most relevant to this study will be mentioned.

This section contains three parts. In the first part, the theory of altruism/prosocial behaviour and the underlying economic model of Rosca will be elaborated. This section will cover both the general argument about prosocial behaviour and a more specific prosocial behaviour in a group setting, i.e. public goods game and Rosca. The second part will discuss social group formation, which then used to form the primary research question of this study. This section also covered an explanation about what social group categorisation used in this study and why. Lastly, the third part will contain previous studies and debates about who behave more prosocial: the rich or the poor.

2.1 Altruism and prosocial behaviour general theory

The neoclassical economic theory argues that a rational economic agent will try to maximise their utility despite others utility (Scott, 2000). This theory suggests that people are in general trying to gain as much as possible. Any behaviour that is conflicting with the idea of maximising self-utility was considered irrational. Thus, in the real world, human show prosocial behaviour (Fehr & Fischbacher, 2003). Evolutionary psychology study explains that as a social creature, human need to live socially in small groups. It happened because, during the evolution, human needs to live hand in hand by managing cooperation, conformity, loyalty, and trust within the group (Brewer & Caporael, 1990).

Aligned with this theory, economists try to model a complementary study to the neoclassical theory which suggests that people's preference not only depending on self-pay-out but also others pay-out (Charness & Rabin, 2002). In a simple model involving only two-person, A and B, Charness and Rabin (2002) explain that the B's utility (UB) is influenced by A's utility (UA). This social preference behaviour is then known as altruistic behaviour or altruism[1].

However, in economic group-based settings, determining the actual cost and rewards of altruism behaviour could be tricky since it is difficult to determine an exact altruistic behaviour or a basic unselfish behaviour. That is why, *this study will use prosocial behaviour* terms in referring to any kinds of behaviour that result in benefiting the group in the game (Swap, 1991).

2.1.1 Public goods game vs Rosca

Even though this study will specifically use a game mimicking Rosca, previous studies on public goods game are relevant since Rosca in its nature has some similarity to a sequential public goods game. Besides, the public goods game is one of the most widely used economic group game setting in literature. Considering the similarity between Rosca and the public goods game setting, one similarity

[1] Based on the Oxford Dictionary, altruism behaviour is defined as disinterested and selfless concern behaviour for the well-being of others (Oxford Living Dictionaries, 2018).

between these settings is that each participant is asked whether to contribute to 'the middle pot'. Moreover, in both games, each participant will get something in return from the pot.

The main difference is that in Rosca, each participant has a free option to exit the game whenever they wanted to. The exit of a participant will cause the game to stop. This option considered as an extreme anti-prosocial option since prematurely exiting the game in Rosca means 'taking from others'. Since economists conclude that people will behave more selfishly on maximising self-utility when there is an option to exit the game (List, 2007) (Bardsley, 2008), examining people's behaviour in Rosca becomes the interest of this study.

2.1.2 Public goods game and prosocial behaviour

Public goods game has been used in many studies to examine people's prosocial behaviour in a group setting. In a typical public goods game, each participant is asked to contribute some money to the pot. After that, the pot value would be doubled before being spread equally at the end of the game. Each participant's essential role is to decide whether to contribute and how much are they willing to contribute to the pot (Andreoni, 1988).

Given this condition, the neoclassical economic theory would expect that none of the participants will contribute to the pot. However, the research found that 50% of people will contribute around 33%-35% out of total endowment fund if they don't know the other group members; while people will contribute even more to about 54% of the total endowment fund if he/she was an un-anonymous group (Andreoni & Croson, 2008). Moreover, studies research that in a sequential game, the contribution will fall to 0% (Andreoni & Petrie, 2004). Since based on the neoclassical economic theory, rational person would not contribute to the pot, any contribution to the pot will consider as prosocial behaviour, and the amount of contribution shows the degree of prosocial behaviour (Fischbacher, Gächter, & Fehr, 2001).

Although there is an extensive amount of studies in public goods game, very few of them examine the effect of social group formation and information on people's prosocial behaviour. As far as it can be searched, only one study done recently examining how social group formation based on social status influence people to be more prosocial (Martinangeli, 2017), and the results are intriguing. Before reviewing more literature about group formation and prosocial behaviour, Rosca concept is reviewed in the next section.

2.1.3 Rotating Savings and Credit Association (Rosca) and prosocial behaviour

The first officially documented Rosca tells about how Rosca was formed in a small village in Indonesia, where neighbours regularly get together for a "feast" at one of their houses and realised communal needs to save and borrow money to fulfil their daily needs. All kinds of Rosca consist of a group of people (N) who agreed on a certain amount of money they need to save (S) which then would be lent (C) to the other group members. Therefore, a fix contribution is paid to the "middle pot" (c) at a specific time. Since each member would get only one chance to win the pot in a rotation, there will be N round until the group reach its full rotation (Van den Brink & Chavas, 1997). In the case where a group member exits the game prematurely, the amount of net credit (L) would be negative for the next round which then causes the group to default.

Rosca model can be denoted as follows:

$$C_j = cN$$

$$S_j = cj$$

$$L_j = C_j - S_j = cN - cj$$

where:
N = number of members, that is, the total number of rounds
c = fixed periodical contribution per member
j = rank of recipient of fund in order of rotation
(numbers of times the 'middle pot' has won by a member)
C_j = gross credit extended to the winner up to period j
S_j = savings made up to period j
L_j = net credit extended to Rosca members up to period j

FIGURE 1: ROSCA ECONOMIC MODEL

Rewritten and adjusted from "The microeconomics of an indigenous African institution: the rotating savings and credit association", by R.Van den Brink and JP. Chavas, 1997, *Economic development and cultural change*, *45*(4), 745-772, page 747. Copyright 1997 by The University of Chicago.

There are two methods for determining "the winner" in Rosca: randomisation and bidding[2]. However (Besley, Coate, & Loury, 1993) when comparing with the credit market, only the random method Rosca is efficient in helping its participants to be better-off (Besley, Coate, & Loury, 1994). That is why this study uses Rosca with randomisation method.

The idea of Rosca is like a certain lottery with exclusive membership. For instance, four people in a group agree to save up €5 to a pot each round. So, there will be four rounds, wherein each round someone will "win" €20 as a credit from the other group members. In an ideal situation where everyone stays in the game prior to the full rotation, everyone will get the same payout of €20. However, this is not always the case. Some player may behave selfishly according to what neoclassical economic theory predicts by prematurely exit Rosca after winning a round (Biggart, 2001). Considering the previous example with €20 as the credit aim, every possible individual pay-out for different winning round could be elaborated in figure 2.

Total Wealth	**R1**	**R2**	**R3**	**R4**
If win in R1	35	15	15	15
If win in R2	30	30	10	10
If win in R3	25	25	25	5
If win in R4	20	20	20	20

FIGURE 2: ILLUSTRATION OF ROSCA MEMBER'S WEALTH BALANCE

[2] In randomized Rosca, the middle pot will be allocated for different member in a randomized order. Randomisation usually done by drawing a name for each round.
In a bidding type of Rosca, the allocation is done through a bidding process. The highest bidder will then be the first in row to win the pot (Besley, Coate, & Loury, 1993).

In general, given that participants may drop along the way, the first and most rational decision is to receive the endowment fund and decide not to play the game at all. However, participants may see that there is a chance on winning in one of the rounds, a chance to help other group members, or just wants to play the game. For whatever reasons a participant decided to play, as illustrated in figure 2, the maximum amount a participant could get is what they earn at their winning round, which shows by the yellow highlighted cell.

So, once a participant decides to play and wins, staying would not give additional benefit for them, while it will only cost them some tokens. Based on the neoclassical economic theory, a rational person who only cares about their utility will, therefore, choose to exit the game after winning (Scott, 2000). What is essential to keep in mind is that exiting the game before its full-rotation would mean "taking" others from the pot. Therefore, in a Rosca game, prosocial behaviour can be elicited by determining two things. First, the decision to play the game. Second, the amount of gain a participant has from the game. The gain data can be obtained by subtracting total endowment fund from the ending balance a person has at the end of the game.

Interestingly, the history of Rosca[3] showed that most people would stay until the full-rotation completion which indicates the prosocial behaviour of the members. This fact is aligned with what was found in a public goods game – that people are in general behave nicer within a group, for whatever reasons they might have (Fischbacher, Gächter, & Fehr, 2001). Since it is known that around 50% of participants in a public goods game contributed to the middle pot, it is compelling to know whether people will contribute higher in a Rosca game setting. Thus, the first hypothesis in this study is formed:

H1: *People will behave more prosocial in Rosca game compared to what was found in the public goods game.*

H1a: *There would be more than 50% of subjects decided to contribute playing the game, of which their contribution would be higher than 50%*

Furthermore, Rosca study stated that the last-in-row Rosca participant might decide to exit the game before its full rotation (Biggart, 2001). A possible reason for this is because the person may have a different preference towards a particular value of money at a different time which reflects the theory of hyperbolic discounting (Rohde, 2005) (Thaler & Shefrin, 1981). For example, a group member who would win at the last round may hold the hope high to win in the 1st or 2nd round. However, after playing two rounds, they may feel insecure that the game might stop soon so that he/she prefers to exit the game and receive the existing balance instead of paying (losing) 5 more tokens for playing

[3] Even though nowadays people have other options to save or get a loan from digital financial services, the application of Rosca are still popular as part of microfinance services. The reason is that people are motivated to buy an indivisible durable good, by benefiting from intertemporal activities within the group members which enable them to save or borrow the money they needed earlier than their financial capability (Besley et al., 1993; Gugerty, 2007). Geographically wise, Rosca is more popular among developing countries in Africa, South America, and South East Asia such as Kenya (Gugerty, 2007), Ethiopia (Kedir & Ibrahim, 2011), Bolivia (Adams & de Sahonero, 1989), Jamaica (Handa & Kirton, 1999), Bangladesh (Biggart, 2001), Indonesia (Geertz, 1962; Hospes, 1991), India (Smets, 2000). Besides, Rosca practice is also well known in more developed countries such as Taiwan (Besley & Levenson, 1996), Japan (Izumida, 1992), Korea (Light & Zhong, 1995), and amongst minority groups in the UK (Srinivasan, 1992).

more round(s). However, as stated in the introduction section, this topic of a personal preference towards time is beyond the scope of this study, but it may be very interesting for further study.

From section 2.1.1, 2.1.2, and 2.1.3, there are some takeaway key points. First, economists have studied that people, in general, show prosocial behaviour (Charness & Rabin, 2002). *This is conflicted with what the neoclassical economic theory predicts, which says that human is rational and selfish* (Scott, 2000). *Second, this prosocial theory has been proven valid in a group setting using public goods game. Third, Rosca success is very much alluring given the unique structure which allows a participant to profit from others in the game* (Biggart, 2001) (Geertz, 1962). *That is why, in this study, a Rosca-mimicking game is designed. Specifically, this study will examine how social group formation may affect prosocial behaviour within a group of people which bring us to the second part of the literature review.*

2.2 Group heterogeneity, social group formation, and prosocial behaviour

Learning from Rosca success stories from the field across different nations, social relation and trust among group participant is the key to its success (Geertz, 1962) (Dekle & Hamada, 2000). In line with this, economists have done an extensive study examining social factors that may trigger trust and cooperation building in a group. Heterogeneity i.e. gender, social capital, ethnicity, and socioeconomic status are the example of social factors proven to affect people's social behaviour (Alesina, Baqir, & Easterly, 1999) (Goldin & Katz, 1999) (Porta, de Silanes, Shleifer, & Vishny, 1999) (Markussen, 2011). However, as far as it can be searched, there is only one relevant study done by Martinangeli (2017) examine a more profound analysis about how a sense of belonging towards specific group may affect their prosocial behaviour within a group. From the study, it has become evident that social group formation influences poor people's behaviour to behave more prosocial towards their peers (Martinangeli, 2017).

2.2.1 Socioeconomic status identity and formation

Social identity often defined as a self-concept of belief and belonging towards a specific group. Such belief has proven to influence a more positive behaviour within groups while it triggers less positive behaviour between groups (Tajfel, 1978) (Tajfel, 2010). The self-categorisation process argued to pass through three steps. First, the categorisation process in which people understand the terms and condition of the classifications. Second, self-assigned process into a group which they think fits best with self-characteristic. Third, engagement process when people start to build favouritism and a sense of belonging towards the group they self-assigned themselves into (Chen & Li, 2009).

Advocating the relationship between social identity and prosocial behaviour, a study conducted by Martinangeli (2017) used socioeconomic status as a social identity for each participant in a public goods game setting. The result shows that group social identity reinforcement only significantly increases prosocial behaviour of the poor, not the rich (Martinangeli, 2017). This finding shed some light about the relationship between group identity belonging and people's behaviour. Align with the first and second self-categorisation process in a group formation mentioned above; it is expected that people who have more information about their group will behave more prosocial. Based on this theory, the second hypothesis is formed:

H2: In general, people will behave more prosocial to the group if they know their group SSES

What is more, based on the third step of the self-categorisation process, favouritism and a sense of belonging will strengthen trust within peers (Chen & Li, 2009). This fact was also become evident in Martinangeli (2017) study, that poor people behave significantly nicer to their peers. Therefore, prosocial behaviour between people with the same socioeconomic status is expected to behave more prosocial. This leads to the hypothesis of 3a and 3b which formed as the following:

H3a: People will behave nicer to their peers compared to the others.

H3b: Poor people will behave more prosocial towards their peers (the poor) compared to the rich

However, to assign self-socioeconomic status, it is crucial to identify socioeconomic categories to be used further.

2.2.2 Subjective Socioeconomic Status (SSES)

Socioeconomic Status (SES) is a measure built to determine not only the level of a person's wealth, but also access to different kinds of other resources such as education, goods, and services (Oakes & Rossi, 2003). Regarding a good measure of SSES, there has been a debate whether the objective SES (OSES) or subjective SES (SSES) method could better measure the aspects in life which define SES (Kolenikov & Angeles, 2008). OSES measurement suggest to include economic indicator of a good life i.e. personal income (Friedman, 1957), expenditure (Deaton, 1992), consumption (Bouis, 1994), child health, education (Bollen, Glanville, & Stecklov, 2001), possession of durable goods (Kolenikov & Angeles, 2009), and so on.

While, SSES measurement argue that despite everything that a person achieves in life, everyone has their own perspective of belonging to particular social status. This feeling of belonging somehow reflects the current and past situation, future opportunities, access to resources, and how they perceive relation to their society, which reflects a broader range of human life (Singh-Manoux, Adler, & Marmot, 2003). Therefore, in examining one's behaviour towards others in a group setting, SSES is sufficient.

One of the most conventional ways to measure socioeconomic status were to use a questionnaire (Lindemann, 2007) which requires participants to understand how the class system works. Another reliable method is the MacArthur Scale of Subjective Social Status (SSES) which suggest the use of a visual test to measure SSES. MacArthur SSES measurement uses a ladder picture[4] consist of 10 scales in which one means low subjective SES and ten means high subjective SES. This method is so far proven to works best for different kinds of ethnicities, culture, and other personal characteristics (Adler, et al., 2008).

As mentioned before, since a study uses SES group formation concludes that poor people show a stronger sense of belonging towards their peers which reflects into a higher prosocial behaviour (Martinangeli, 2017), this study expects the same in a Rosca game setting.

[4] See example of MacArthur Scale of Subjective Social Status at appendix 1

2.3 The prosocial behaviour of the rich vs the poor

Regarding different SSES and prosocial behaviour, there has been an inconclusive debate about the relationship between socioeconomic status and prosocial behaviour. In other words, the debate remains whether the rich or the poor behave more prosocial to others. Given that the poor faced many constraints such as limited economic resources as well as less access to good education (Oakes & Rossi, 2003) and financial services (World Inequality Lab, 2018), study hypothesized that the poor will act less prosocial compared to the rich (Piff, Kraus, Cote, Cheng, & Keltner, 2010).

However, Piff et al. (2010) found that people with a lower SES have a higher generosity in a dictator game and trust game, higher willingness to participate in a charitable donation, and display helpful behaviour in economic games settings. In favour of this, other studies reveal that people with lower SES less likely to be greedy and dishonest (Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012), disloyal (Lammers, Galinsky, Dubois, & Rucker, 2015), and selfish (Piff, Kraus, Cote, Cheng, & Keltner, 2010). Besides, in laboratory-based public goods game settings, people with lower initial income tend to over contribute while people with higher income tend to under contribute (Chan K. S., Mestelman, Moir, & Muller, 1996) (Chan K. S., Mestelman, Moir, & Muller, 1999).

On the other hand, other studies advocate a positive relation between SES and charitable, voluntary, trusting, and helping behaviour (Trautmann, van de Kuilen, & Zeckhauser, 2013) (Korndörfer, Egloff, & Schmukle, 2015), which means that rich people will behave nicer compared to the poor. Additionally, a current field-based experiment found that the rich behave more prosocial when exposed to misdelivered envelopes containing money in field-based research (Andreoini, Nikiforakis, & Stoop, 2017).

Based on section 2.2.1, 2.2.2, and 2.2.3, it is expected that poor people will display a higher prosocial behaviour towards in general on top of their peers (H3). So, as an addition to the third hypothesis, the fourth hypothesis is formed:

H4: Poor people will behave more prosocial in general compared to rich people

3. Research Methodology

This section contains a detail explanation about the experimental design which used to answer all hypotheses stated in section 2; this section is divided into three sections. First, in the experimental design section (3.1), Rosca Game flow, control and treatment setups, and the five precepts assumptions need to hold in controlled experimental economics are elaborated. Second, the descriptive statistic section (3.2) consists of subjects' characteristics of the whole sample summarised. Third, in the statistical model section (3.3), a brief statistic descriptive of overall sample prosocial behaviour explained. Moreover, each model formed to test each hypothesis formulated in this study, explained next in this section. From this point onwards, the participants will be referred to as *subject*s.

3.1 Experimental design

To examine prosocial behaviour influenced by social group formation, a Rosca-mimicking game is designed. Due to the limited budget and resources, Rosca game is created in a computer-based using

Qualtrics online software, and a random lottery incentive was applied. To see the effect of social group formation and how group sense of belonging affect people's prosocial behaviour towards the peers, between subject design with three treatment conditions are defined on top of the control group. For each of the group, at least 90 sample was obtained semi-randomly. In total, 380 observations were collected and used in this study.

To reach the total samples needed, an anonymous link which leads directly to the Rosca game was distributed through the online and offline channel. The online channel includes posting the link into reachable Facebook groups. While, to balance the randomness of the samples, random approach to people all over the Erasmus University campus was done. The data collection held within three weeks from May 17th to June 7th, 2018. Before participating in the game, none of the subjects informed about the experiment or what the Rosca game is. Besides, the online system set to forbid double participation by the same subject.

3.1.1 Rosca base game

To mimic Rosca actual condition in the field, each subject was situated in a group of four and was given an endowment fund of 20 tokens. The value for each token is equal to 1 EUR. Since there were four members in a group, four rounds were played. If a subject decided to play the next round, they are obliged to pay five tokens; otherwise, the game was stopped, and the remaining tokens were submitted automatically for the lottery draw.

The value for the lottery was based on how many tokens one's submitted (1 token=1 EUR), so that subject's saliency towards the value of each token is ensured. During the Rosca game, each subject got only one chance to win the pot in a randomised order. The randomised order is essential to eliminate any possible effect of time preference one's might has (Thaler & Shefrin, 1981).

As shown in the game flow (figure 3), subjects were asked whether to play or exit the game on each round. If a subject decided to exit the game, the system would automatically record the final balance. To make sure that each subject aware that they were playing in a group of four with three other computer-based people, a simple thank you sentence was included in each round[5]. This small gesture is made available for all setups to make sure everyone has the same experience and whatever effect it may have will cancel each other out (McNeely & Meglino, 1994) (Bénabou & Tirole, 2006).

Before the game start, a subject was asked to self-categorise themselves to one of the MacArthur Subjective Socioeconomic Status (SSES) scale from 1 to 10 – 1 being the lowest and ten being the highest. After that, each of them was asked to choose the desirable prize for the randomised lottery in the form of a voucher from the grocery/clothing merchant of their choice. This prize picking process is essential to be done before the game was started as in an actual Rosca setting, having a clear personal or a group goal is crucial for its success (Geertz, 1962).

[5] See appendix 2 for the online game design.

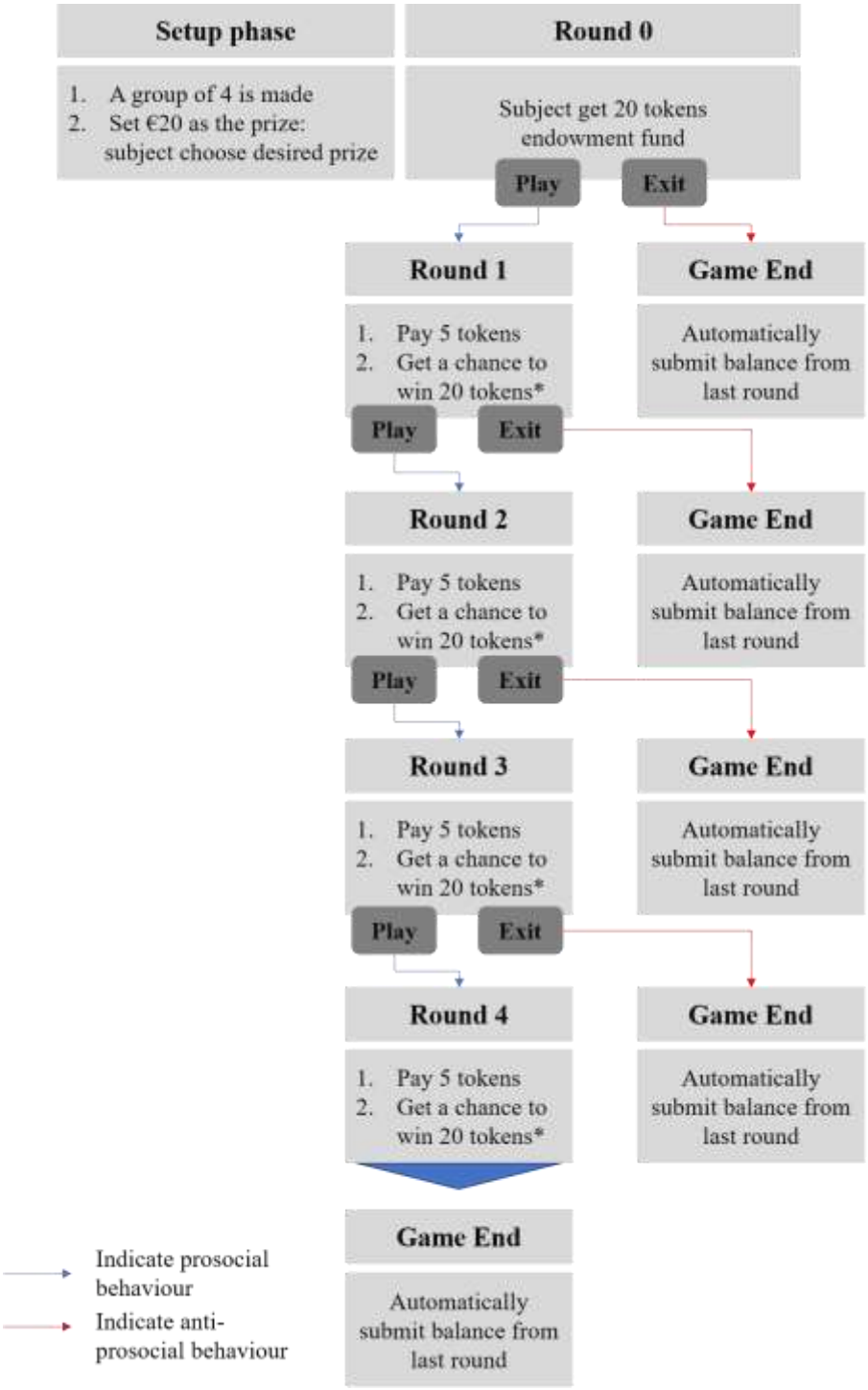


FIGURE 3: FLOW OF ROSCA GAME

After the game ends, demographical questions such as gender, age, ethnicity, and occupation were asked. These data would then be used as control variables. These questions were asked at the very end after the game finished to avoid any possible distraction on the subjects' attention to the Rosca game.

3.1.2 Control and treatment group

To test the second, third, and fourth hypothesis (H2, H3, H4), Control Group (CG) and three treatment setups was formed. Each subject in the CG played the Rosca game without knowing anything about the other group members identity. While in the Treatment Group (TG) the SSES identity of the computer-based group members is disclosed for each subject (Martinangeli, 2017). SSES identity is the only thing disclosed because it is the focus of this study; while disclosing other identities may bring unwanted effect to the result (Levitt & List, 2007) (Akerlof & Kranton, 2005).

More specifically, each subject was assigned equally to one of the following treatments (as summarised in figure 4):

- In Treatment 1 (T1), subject noticed that he/she is in a group with the rich people with SSES 8, 9, and 10.
- In Treatment 2 (T2), subject shared the group with the poor people with SSES 1, 2, and 3,
- While subject in Treatment 3 (T3) grouped with mixed SSES people, namely 1, 6, and 9.

To obtain a reasonable statistical power, a normal distribution with between-subject analysis (Mann-Whitney U) condition is set. Through the GPower software, the optimum sample size of 90 for each setup is needed. Based on this guidance, a total sample size of 380 subjects collected within three weeks. Total subjects for each setup are as follows:

Group	#Subjects
Control Group (CG)	91
Treatment 1 (T1)	94
Treatment 2 (T2)	91
Treatment 3 (T3)	103

FIGURE 4: TOTAL SUBJECTS IN THE STUDY FOR EACH SETUP

3.1.3 Controlled experimental economics and external validity

To have a controlled economics experiment, there are some assumptions need to hold. First, subjects should receive a monetary incentive so that they exert enough effort into the experiment. In this study, the tokens represent the amount of real money subject could get from a randomised lottery which would be drawn subsequently after the data collection finished. Second, subjects would have the chance to earn more money from the lottery as the amount would be equal to the tokens balance from the Rosca game. Third, the monetary incentive would be determined from a randomised lottery draw due to the limited budget, the cost of participating in the experiment is very low so that the incentives would still dominate the work required from each subject[6]. Last, Rosca Game experiment design also satisfy privacy conditions since each subject of the game could only monitor self-pay-out. In this case, the balance of tokens being shown only to the relevant subject. This information became available to the participants during the game.

[6] To complete Rosca Game, it takes on average 5 minutes of subject's time.

Additionally, since the Rosca game was done in a laboratory setting due to budget and resources constraint, it should be noted that any conclusion drawn from this study may be affected by the *framing effect*. Framing effect, in this case, means that since participant doing the game through online survey tool, he/she may tend to behave relatively nicer because the game called as *Rotating Savings and Credit Association* game (Levitt & List, 2007). What is more, in the game introduction part, the concept of Rosca was explained in brief and that the goal or Rosca is to help people who are in need. However, the game was designed in such a way so that the feeling of being in a group seems real and it is also believed that participant may bring their own context to the game (Levitt & List, 2007).

3.2 Descriptive statistics

As described in figure 4 above, 380 total subjects obtained in this study are almost equally distributed to each of the setups. The subjects consist of 50% female and 50% male with age ranging from 18 to 45 years old. About 43% of the subjects are employed, 5% unemployed, and the other 52% are students. As Rosca is popular among developing countries especially in Asia, the ethnicity of subjects is also essential to control. Out of the total sample, around 56% claimed to be Asian, 39% are White, while the other 5% are Hispanic/Latino, Black/African American, and others. These demographic data obtained will be used as control variables.

From figure 5, it is shown that subjects' SSES distribution is close to the normal distribution shape. However, it is being skewed to the left which means that the mean (6.716) is smaller than the median (7). To determine the rich and the poor, the SSES median, which is seven is set as a threshold. As used in a study, the poor are defined as people who place themselves below the median scale in the MacArthur SSES scale (Förster, 1994). Thus, subjects with SSES below 7 would be considered as *the poor*, while the rest are considered as *the rich*. This SSES classification for each experiment setup is summarised in figure 6. In summary, participants in this study consist of 253 (67%) rich people and 127 (33%) poor people.

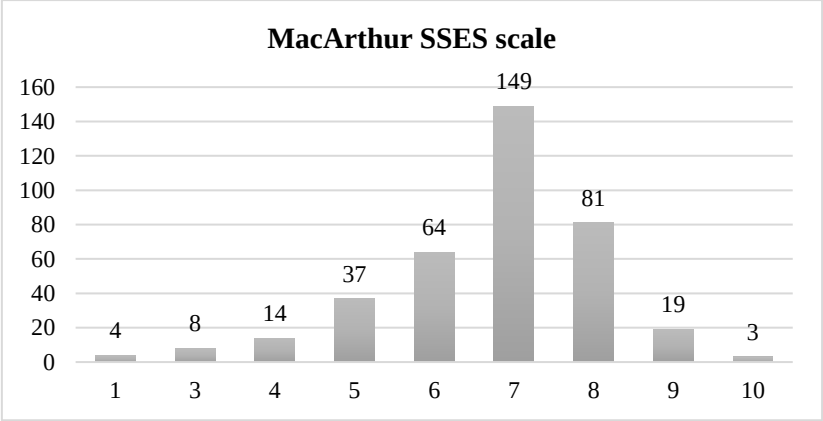


FIGURE 5: MACARTHUR SOCIAL SOCIOECONOMIC STATUS OF ALL SUBJECTS

Referring to figure 6, there has been an unbalanced amount of the rich and the poor in each setup. This happens because the control group was accidentally being excluded in the online survey system so that most of the subjects in the CG are mostly students in the Erasmus University which are mostly students and has white ethnicity. Since this difference between setups may influence the parametric and non-parametric test, the subject's characteristics, i.e. age, gender, ethnicity and occupation are controlled in all the statistical models used.

Setup	N subject	SSES	% Subjects
CG	92	Rich	82%
		Poor	18%
T1 (Rich)	94	Rich	63%
		Poor	37%
T2 (Poor)	91	Rich	57%
		Poor	43%
T3 (Mix)	103	Rich	64%
		Poor	36%

FIGURE 6: NUMBER OF SUBJECTS BASED ON EXPERIMENTAL SETUP & SSES

3.3 Statistic models

From the experiment data, most of the subjects decide to play the first round after receiving 20 tokens as the endowment fund in *Round0*, while only 19 people (5%) subject decide not to play the game. This shows that there is only 5% of all samples that are entirely rational; while most of the samples want to play the game. Therefore, the second rational decision while playing the rounds becomes the focus of this study. Considering all subjects who play, no one takes the maximum gain possible of 15 tokens from the game. Since 15 tokens gain only possible for people who win at *Round1*, then it means that all players who win at the first round decided to continue playing the next round. This decision indeed contradicts what neoclassical economic theory predicts (Scott, 2000); and therefore, shed some lights on the first hypothesis (H1). Additionally, another possible general explanation about this prosocial behaviour is how the euphoria of winning may trigger prosocial behaviour shown by contributing to more rounds (Striepens, Kendrick, Maier, & Hurlemann, 2011).

Referring to the remaining debates about prosocial behaviour between the rich and the poor, figure 7 exhibit the fact that the poor dominate fair play – showed by zero (0) gain/loss. What is more, the rich dominate about 2% and 4% in gaining 10 and 5 from the game; while the poor share a slightly higher percentage of negative gain (loss) from the game. The loss here means that a subject was willing to contribute to some rounds by paying tokens they got but decided to exit the game before his/her winning turn. As mentioned in the introduction section, this may happen because the subject felt that the game is pointless (Biggart, 2001). Another possible reason is that the subject did not understand the rules of the game or because the subject was impatient so that exiting the game seems to be a viable option rather than losing more tokens (Rohde, 2005). However, the data gathered for this study is limited and therefore, does not provides the reasoning behind such behaviour.

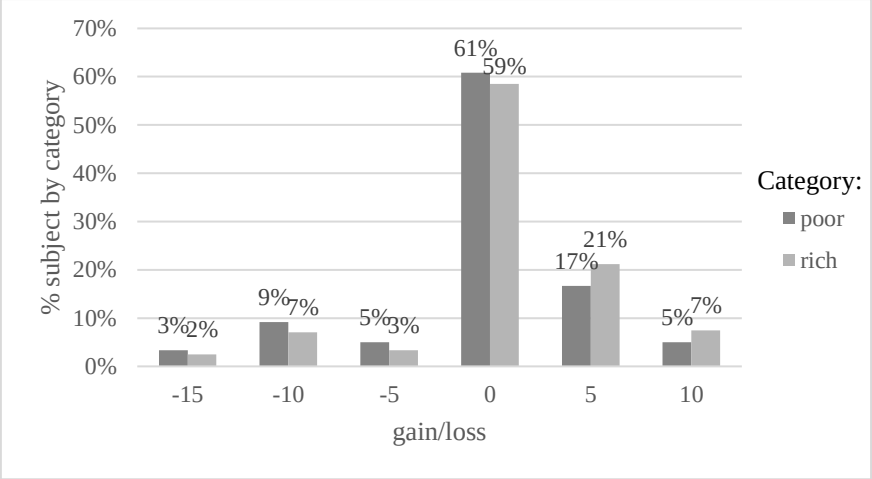


FIGURE 7: GAIN/LOSS FOR EXPERIMENT SUBJECTS

To test all hypotheses formed in this study, both non-parametric and parametric test was performed. Therefore, a model is formed to test each hypothesis. Before elaborating on each of the regression model formed in this study, first, the dependent variable of interest would be defined.

Recalling figure 2 in section 2.1.3, it is known that the most rational decision to maximise self-utility is for subject to exit right after winning and gain from the game. However, people may consider behaving unselfishly by continually contributes to the game or exiting the game after playing one or two rounds upon winning. To capture this behaviour, a continuous variable *gainloss* will be used. This variable is calculated by subtracting the endowment of 20 from the individual balance submitted by each subject.

Gainloss will have whether a positive value which reflects gain – indicates rational-selfish behaviour, or a negative value which reflects loss – indicates prosocial behaviour. *Gainloss* is used as the primary variable in the non-parametric test and as a dependent variable in the parametric analysis. Moreover, each parametric model also controls for age, gender, ethnicity, and occupation since the sample collected for CG may have different characteristics than in other groups (as mentioned in section 3.2).

3.3.1 Testing hypothesis 1

However, to test the first hypothesis (H1) regarding whether Rosca game affects subject to behave more prosocial compared to what has been found in a public goods game, non-parametric tests of the *binomial* and *chi-squared* test were used. As a rule of thumb, from the public goods game study conducted by Fischbacher (2001) and Andreoni (2004), it is expected that 50% of people would show prosocial behaviour. To address this, the first binomial test is used to show whether there are more than 50% of subjects decided to play the Rosca game. Secondly, another binomial test was applied to examine whether there are more than 50% of subjects stay in the game after winning a round. While performing binomial analysis, dummy variables note as *play* (1: play, 0: not to play) and *winexit* (1: win-then-exit, 0: win-then-stay for at least one round) are formed respectively.

Besides the binomial test, a *chi-squared* test was done using *contribution* as the primary variable. In Rosca, contribution means how much participants actually contribute to the game by paying to play rounds. As a rule of thumb, a result of 35% average contribution from an anonymous group or 50% from a non-anonymous group was obtained out of the total endowment fund. Since in this study the amount of contribution measured by a multiple of 5 tokens, the expected contribution is equal to 10 tokens – which is about 50% out of the total endowment fund of 20 tokens.

Moreover, as a robustness check, a *one sample student t-test* was applied. However, the result from the non-parametric test is more convincing as it requires less assumption than a parametric test. Therefore, the parametric test result would only count as a robustness check.

3.3.2 Testing hypothesis 2,3,4

H2, H3, and H4 were tested using Mann-Whitney U (MWU), Fisher Exact (FE), and Kruskal-Wallis (KW) non-parametric test. Moreover, an OLS and probit analysis was added as a final robustness check.

To answer the second hypotheses (H2), whether Rosca subjects behave more prosocial in an un-anonymous group, the *gainloss* distribution between the control group and treatment groups were compared. This comparison was made using the Mann-Whitney U and Fisher Exact tests. For the OLS and probit analysis, group category was determined as the main independent variable of interest; while controlling for age, gender, ethnicity, and occupation. This model will be referred as the treatment model.

$$Gainloss = \alpha + \beta_1\, i.treatment + \beta_2\, age + \beta_3\, i.gender + \beta_4\, i.ethnicity + \beta_5\, i.occupation + \varepsilon_i$$

FIGURE 8: "TREATMENT" MODEL

Pointing at figure 8, the main categorical variable, $i.treatment$ use Control Group (CG) as the base; whilst female, Asian ethnic, and employed are set as the base for gender, ethnicity, and occupation respectively.

To test whether the poor behave more prosocial towards their peers within the Rosca group (H3), a comparison of *gainloss* between different people categorisation was analysed. The main variable, people categorisation ($peoplecat$), construes the social status relation between the subject and the rest of the group members labelled as [SSES subject] to [SSES rest of the group]. The SSES of the rest of the group can be defined by the treatment – treatment 1 contains rich people while treatment 2 contains poor people. $Peoplecat$ category variable, the group of Poor-to-Rich, is set as the base since it's expected to exhibit the least prosocial behaviour compared to the other groups. $Peoplecat$ consists of four categories: poor-to-poor, rich-to-poor, poor-to-rich, and rich-to-rich. This model will be referred as the peer group model.

$$Gainloss = \alpha + \beta_1\, i.peoplecat + \beta_2\, age + \beta_3\, i.gender + \beta_4\, i.ethnicity + \beta_5\, i.occupation + \varepsilon_i$$

FIGURE 9: "PEER GROUP" MODEL

The last model is set in favour of analysing which SSES behave more prosocial in general (H4). Since there is 10 SSES categorisation, subjects were categorised into two big groups as *the rich* and *the poor*. Referring to the explanation from section 3.2, subjects who identify themselves in MacArthur SSES 1 to 6 categorised as poor while the rest SSES categorised as rich. This categorisation will then be called as *SSES*. As *poor* becomes the primary focus to examine, it is used as the dependent variable for both parametric analyses.

$$Gainloss = \alpha + \beta_1\, i.sses + \beta_2\, age + \beta_3\, i.gender + \beta_4\, i.ethnicity + \beta_5\, i.occupation + \varepsilon_i$$

FIGURE 10: "SSES" MODEL

When the result from the non-parametric test and the parametric test differ to one another, an assumption test of *Best Linear Unbiased Estimation (BLUE)* was done. This underlying assumption test

includes the *Breusch-Pagan/Cook-Weisberg* test to test any possible heteroscedasticity problem and a residual plot to see get the bigger picture whether the basic assumptions hold (see appendix 7). All results will be explained in detail manner on the results section.

4. Results

This section contains results from both non-parametric and parametric test conducted for each of the hypothesis tested. To check the validity of each model, a residual plot from OLS final regression model of each hypothesis was examined. Since the residual plot (see appendix 7) disperses randomly either in one of the six possible values for the *gainloss* variable, the result from both OLS and probit analysis should be done with great care. Therefore, the non-parametric result would become the primary output of this study while the parametric tests will serve as a robustness check.

4.1. Hypotheses results

Result 1:*Overall, subjects behave more prosocial in Rosca Game compared to what was found in the public goods game study. There are more than 50% out of all subjects decided to play the game, and the average contribution from those who play is higher than 50% out of total endowment fund – equal to 10 tokens in Rosca game.*

Support: Figure 11 and 12 summarises the result for testing H1 which can be highlighted into three main points. First, by comparing the 10 tokens contribution in this Rosca game which is equal to 50% out of total endowment fund from the public goods game literature, a chi-square analysis shows that the average contribution for all participants in this study is distributed differently. This result is statistically significant from the chi-squared test (Ng_0=222, Ng_1=380, p<0.01). Second, from the binomial analysis of *play*, it becomes evident that there are 361 subjects – more than 50% of total subjects, decided to play the game. Third, the *winexit* shows that less than 50% of all subjects exit the game after winning. Both binomial tests are significant at 1%.

Moreover, from the robustness check using the one-sample student t-test, it is shown that the average contribution in Rosca is statistically significant to be higher than 7 (33% - 35% contribution) from the anonymous group in the CG (N=92, p<0.1) and is higher than 10 (equal to 50% of the endowment fund) for all non-anonymous group in all TG (N=288, p<0.1). Therefore, the overall contribution is higher than 50% of the endowment fund (N=380, p<0.1). ■

Experimental setup	N obs.	Chi-squared test *Pearson chi2(4)*	Student t-test *Mean*
All	222 (Ng=0) 380 (Ng=1)	125.15***	11.605*** (.2753694)
CG	92		9.130*** (.2517105)
T1, T2, T3	288		12.396*** (.3416301)

Notes: Ng=0 represent data proxy of public goods game with the contribution of 10 (50%)
Ng=1 represent all data gathered in this study, using Rosca game

FIGURE 11: CHI-SQUARED AND STUDENT T-TEST

Test	N Obs	Observed k	Expected k	Assumed p	Observed p	Pr
Play	380	361	190	0.5	0.95000	k>=361***
						k<=361
						k<=19 or k>=361***
Winexit	380	65	190	0.5	0.17105	k>=65
						k<=65***
						k<=65 or k>=315***

Note: Confidence interval for each results' p-value are identified as: ***1%, **5%, *10%

FIGURE 12: BINOMIAL ANALYSIS

	N Obs	Groups	Mann-Whitney U Adjusted variance	Fisher Exact p-value
H2: *Treatment*	CG = 88	CG & all T	567635.49 ***	0.022 **
	All T = 273	CG & T1	92014.94 **	0.068 *
	T1 = 88	CG & T2	87038.41 *	0.082 *
	T2 = 86	CG & T3	107362.84 **	0.035 **
	T3 = 99			
H3: *Peoplecat*	PP = 37	PR & PP	4905.09	0.370
	PR = 31	PR & RP	8220.75 **	0.085 *
	RP = 49	PR & RR	10443.33 **	0.062 *
	RR = 57	PP & RR	12662.32	0.173
		PP & RP	9987.00	0.219
		RR & RP	10753.11	0.370
H4: *SSES*	Poor = 120	Poor & Rich	683317.45 *	0.098 *
	Rich = 241			

Note: Confidence interval for each results' p-value are identified as: ***1%, **5%, *10%

FIGURE 13: MANN-WHITNEY U AND FISHER EXACT ANALYSIS

Result 2: *Group's anonymity significantly affects subjects' behaviour. What is more, being in a group with the rich influences a higher different behaviour compared to being in the CG. Align with this; the robustness tests show an indication that subjects' prosocial behaviour is conditionally higher in a non-anonymous group, in a group with rich participants (T1).*

Support: The non-parametric test using Kruskal-Wallis shows that at least one experimental setup might have a different distribution than the others, but this difference only become statistically significant at a 10% significance level (p=0.0571). From the other non-parametric tests, it becomes evident that anonymity significantly drives people to behave differently towards other group members (CG & all T p-value<0.01 and CG & T3 p-value<0.05). What is more, comparing CG with T1 and T2, the Mann-Whitney U test shows a higher significant difference between CG and T1 (p=0.0201).

Align with the abovementioned result, the OLS and probit analysis on the treatment model (appendix 5 and 8) indicates a higher prosocial behaviour for subjects who were being in a non-anonymous grouped with rich people (T1). More specifically, subjects who were in a non-anonymous group are willing to give 1.34 more, and those who were grouped with rich people are willing to give 1.7 tokens more. However, the probit analysis only shows a marginally significant result for T1 (p=0.102). Additionally, the gender category of male shows a statistically significant result at 5% level (p=0.040) with a positive coefficient. This indicates that being a male – compared to being a female, increases the probability of gaining as many tokens from the game. ■

Kruskal-Wallis	N Obs	Df	Chi-squared	Chi-squared with ties
H2: *Treatment*	CG=88	3	5.888	7.517*
	T1=88			
	T2=86			
	T3=99			
H3: *peoplecat*	Poor to Poor=37	3	4.795	6.153
	Poor to rich=31			
	Rich to Poor=49			
	Rich to Rich=57			

Confidence interval for each results' p-value are identified as: ***1%, **5%, *10%

FIGURE 14: KRUSKAL-WALLIS ANALYSIS

Result 3: *In Rosca game, the effect of group formation, sense of belonging, and a sense of camaraderie within peer group cannot be identified. This study finds that compared to the rich, the poor behave differently especially to the rich, of which behaviour lean towards a higher prosocial behaviour.*

Support: Although the Kruskal-Wallis test shows only marginally significant evidence that at least one of the people categories distribute differently (p=0.1044), the Mann-Whitney U and Fisher Exact test show stronger evidence. From those tests, it becomes evident that the behaviour of poor people to rich people is significantly different compared to the behaviour of the rich in general. This effect is statistically significant at 5% and 10% respectively.

As a robustness check, both parametric analyses (see appendix 5 and 8) indicates that the poor behave most nicely to the rich. The OLS analysis display that the poor gives 2.5 tokens more when being in a group with rich people compared to being in a group with their peers (p=0.021). The probit analysis points out that being in the low SSES level and in a group with subjects with the highest SSES level, decreases the probability of gaining 10 tokens from the Rosca game (p=0.086). ■

Result 4: *In general, there is a shred of evidence that the poor behave significantly different than the rich. Further, the results indicate that the poor are less selfish compared to the rich.*

Support: From figure 7, section 3.3 it is known that the poor are in general tend to play fairly by not gaining as much as the rich in the Rosca game. Through the non-parametric test (figure 13), it becomes evident that the poor are indeed behave differently than the rich (p<0.1). This result is consistent across different type of the non-parametric tests – the Mann Whitney U and Fisher Exact test.

The result for *sses* is not significant at any of the parametric analyses. However, both parametric tests of OLS and probit analysis show a significant result specifically for SSES 4. The result indicates that subject who identifies him/herself sits at SSES 4 present the highest prosocial behaviour compared to the others (p=0.036 and p=0.023 respectively). Additionally, looking at the control variables, the probit analysis laid out that being a white ethnicity and being a male increases the probability to gain from the game. This is shown by a positive coefficient in appendix 8 (p=0.030 and p=0.006, respectively). ■

4.2. Interesting findings from correlation test

Besides the OLS and probit analysis, some interesting correlation between the primary variable and control variable(s) is explained in this part (see figure 14). First, the correlation tests between *treatment* and the control variables clarify the limitation of this study sample collection. Second, the *peoplecat* variable defines its independence from other variables. Third, there is some interesting correlation between *macarthurses* and the control variables which may explain why a specific characteristic of people relate themselves to be in certain SSES level. Therefore, this part is divided into three parts.

Treatment:
From the correlation test, *the treatment* variable correlates with control variables – *ethnicity* and *age*. This confirms one of the study limitations that the timeline of collecting the data for the CG is different from the other treatment groups, which took place mostly at the Erasmus University Rotterdam started from the 2nd week of the data collection time frame. Thus, makes the subjects assigned to the CG are mostly student, with a relatively young age and has a white ethnicity.

Peoplecat:
As this variable was built based on treatment a subject was in, is expected to correlate with other controlling variables because of the reasons described above. However, *peoplecat* correlation tests show no correlation with either *ethnicity, age,* or *occupation* variables. This shows that even though this variable is constructed from the sample collected, it defines its independence.

Macarthurses:
Having *macarthurses* psychological-reflection question asked as the first question to all subjects through the survey, the result of a simple correlation test between this variable with each of the control variables would be interesting. Therefore, a 1-on-1 correlation test was performed. First, from the tests, it becomes evident that the younger the subject, the wealthier they felt (p=0.0018). This may reflect how students feel having financial support from the parents. Second, subjects who are white feel that they sit in a high SSES in their community (p=0.0000). However, even though it could be interesting to examine the correlation of being a female or unemployed may psychologically affect one's perspective of being in a low level of SSES in the society, there is not enough evidence to conclude such things.

	age	*gender*	*ethnicity*	*occupation*
treatment	0.2831***	0.0321	-0.2185***	-0.1157
peoplecat	-0.1172	-0.0395	0.1541	-0.0203
macarthurses	-0.1598***	-0.0284	0.2395***	0.0602

Note: *** identify a 1% confidence interval level

FIGURE 15: CORRELATION ANALYSIS

5. Discussion and limitation

5.1. Hypothesis discussion

The primary objective of this study was to research prosocial behaviour of the rich and the poor in a Rosca-mimicking game. As far as it could be accessed, this study is the first to use the principle of Rosca game into a game to examine people's prosocial behaviour.

Hypothesis 1: From the Rosca theory elaborated in section 2.1.3, in the real world, Rosca practice has shown tremendous success in helping less-fortunate people to gain access to financial services (Guha & Gupta, 2005). However, the unique setting of Rosca may influence people to gain by inflicting an economic loss on the other member within a group (Biggart, 2001). Therefore, a brief comparison between public goods game and Rosca was tested as the first hypothesis. The result shows that the average contribution in the Rosca game is higher than the average contribution in the public goods game literature (Andreoni & Petrie, 2004) (Fischbacher, Gächter, & Fehr, 2001).

This is an exciting finding since Rosca game enable subject to exit the game whenever they wanted to, while subjects in this game stay a bit longer and contribute more. This contradicts what was found by List (2007) and Bardsley (2008) in a dictator and ultimatum game. A possible explanation to this is that the name of Rosca framed the game to a community kind of game, which affect each subject's belief which then influence people to behave nicer than what they would do if the game named differently (Dufwenberg, Gächter, & Hennig-Schmidt, 2011). However, the real reason remains unknown. Unable to detect the exact reason for this to happen is one of the limitations of this study because the experimental design does not allow it. ■

The second and third hypothesis was formed to test whether social group formation and self-identification may influence people to behave more prosocial towards other subjects with the same SSES (Tajfel, 2010), especially amongst the poor (Martinangeli, 2017).

Hypothesis 2: The second hypothesis tested in this research is to see whether a subject will behave more prosocial if each subject knows the others SSES (TG) in a group. To examine this, it is fair to compare CG with T3 since, in the treatment 3, the subject was grouped people with mix SSES. From the result, it is found that there's an indication that people will behave more prosocial to people if they know a little bit more about the others – in this case knowing the SSES. This is aligned with the previous study done by Tajfel (2010).

However, the evidence is found to be stronger while comparing the CG with T1. It implies that being in a group with rich people (with SSES 8, 9, 10) will influence subject to be less-selfish. This result pointed out one of limitation from this study because the assumption that people will behave nicer towards their peers does not hold. This means that there may be other strong confounding factors affecting people's behaviour in a Rosca game that cannot be detected from the study design. From this hypothesis test alone, it remains unclear whether the rich or the poor behave less selfishly. That is why the third hypothesis testing becomes the critical result of this study. ■

Hypothesis 3: While evaluating the third hypothesis, it pointed out a tendency for the poor to behave nicer, especially to the rich. This shed some lights on the remaining question from the second hypothesis. However, it contradicts previous literature which found that the poor behave more prosocial to people with relatively same SSES (Martinangeli, 2017). Some possible explanations for this are that in a Rosca game context, the poor might trust themselves more among the rich because they believe that the rich have more resources and therefore have the higher credibility to pay and stay in

the game consistently. Moreover, the poor might assume that the rich know that they are the only poor people in the group so that the rich feel sorry for them, and therefore would pay the contribution to play more rounds. These assumptions and explanations are some examples of other confounding factors that are excluded in this study – observed as one of this study limitations. Nonetheless, there is no previous paper discuss specifically this reasoning as far as it could be searched through online.

Furthermore, rich people tend to behave nicer to the poor compared to their own peers shed more lights on the refusal of this third hypothesis. Though, the probable reason for this to happen is quite reasonable – the rich might feel sorry for the poor. ■

Hypothesis 4: Align with the findings from hypothesis 3, the result from hypothesis 4 strengthen the evidence that the poor are in general less selfish compared to the rich. What is more, the parametric tests also examine a one-level deeper about which SSES level did behave nicer. However, the result only comes back positively for poor people with specific SSES level of 4 indicating a high prosocial behaviour compared to the other SSES level.

A reason that may help explain why this result focus on a certain SSES level out of all levels, is that at the back of people's mind, 7 is the middle number (which then showed as the median in figure 5). Therefore, from the poor point-of-view, 4 is the 'middle number' between 1 and 7, which represent the low SSES, but still seems reasonable – not considering themselves as too desperate as SSES 1, 2, or 3 (Dhar & Gorlin, 2013). ■

5.2. General limitations

Apart from the limitations highlighted in the discussion section above, this study carried some general limitations from both its experimental survey design and some assumptions made. First, this study obtained its samples mostly from young adults and adults who live in either The Netherlands or Indonesia and was not purely random due to the budget constraint. This selection bias is not a good representation of the whole population since having a specific culture may bring-in a particular way of thinking or behaviour into the analysis. Moreover, samples in the CG was accidentally started a bit behind than the other experimental group so that it consists mostly of Erasmus University student. This homogeneity may not represent the whole population of the CG since students may have a similar mindset and ideas.

Secondly, the Rosca game design may trigger subjects' excitement to play, and not thinking through the social story behind the game even though it was mentioned in the game intro. Besides, regardless of the simple game rules, unpaid subjects may not put enough effort into the game. Moreover, the experiment design cannot include all confounding factors which affect people to behave in a certain way in the game, e.g. the time constraint that subjects may have while doing the survey.

Finally, several assumptions made to interpret the result of this study act as a limitation to this research. Subjects were assumed to have a clear picture of themselves sitting in one of the Macarthur SSES scales, were aware that if he/she can gain to the cost of others by exiting the game, and that subjects entirely behave as if they play with real money (1 token = 1 EUR).

5.3. Suggestions for future research

Since study about the effect of SSES group formation on prosocial behaviour is still minimal and people lives in a community or groups, further research on this topic is essential. Further research may either use a different kind of group games or include a more heterogeneous sample from various culture or different kinds of group formation across the world. Moreover, since the control variable of male gender, Hispanic/Latino ethnic, and White indicates some effects in subject's prosocial behaviour in either OLS and probit analysis, it would be interesting to have a research focus on subjects with specific characteristics in the future.

However, since no research in behavioural economics uses Rosca and since it has a unique structure, it would be very much compelling to use Rosca game in a field setting. There are quite a few things that further research can explore if it uses Rosca game in a field setting. First, further study may examine how different level of participants' bond within group members may affect prosocial behaviour. Second, using real money and real prize in Rosca field game may also be interesting to see the result on, since real-world setting may influence each person's behaviour. Third, in further use of Rosca game both in the laboratory and field setting, it may also be relevant to ask a follow-up question about the reason(s) that makes people stay in the game – e.g. whether it is purely driven by kindness or something else.

Lastly, as this study conclude that the poor behave more prosocial while being in a group with more prosperous people, further research can be conducted to study what drives poor people's behaviour to behave more prosocial to others. Besides, since Rosca is an actual on-going and widely practised involving a homogenous group in developing countries, it would be interesting to test whether mixing *the poor* and *the rich* in a group will result in a higher success rate. If this is the case, then Rosca might also be an excellent framework to promote a new and innovative way for charity.

6. Conclusion

Income inequality problem has been an increasing social-economic problem which solve remains a big question mark to the world. This issue is important because it may increase political and economic instability and criminality rate. Knowing that Rosca was the first initiatives which inspire the forming of microfinance institutions to build the bridge between the rich and the poor, this aim of this study was to examine a method to examine whether SSES group formation and anonymity may affect people's prosocial behaviour in a Rosca group setting. In doing so, a Rosca-mimicking game was designed in a group game, as it has never been used in the literature before. From the analysis, two conclusions can be drawn from this study. First, Rosca game triggers higher contribution compared to the average contribution in a public goods game. Second, being in a non-anonymous group with *the rich* will trigger prosocial behaviour. What is more, white ethnicity behaves most selfishly compared to the other ethnicity. This implies that forming a non-anonymous group with a mix SSES might be useful for triggering one's prosocial behaviour – which then might help to address the income inequality problem. However, considering that this research was done through an online survey tool, a real-life setting based on this study would be very much interesting for further research.

7. List of References

Adams, D. W., & de Sahonero, M. (1989). Rotating Savings and Credit Associations in Bolivia/Les Institutions Informelles De Crédit En Bolivie (Roscas). *Savings and development*, 219-236.

Adler, N., Singh-Manoux, A., Schwartz, J., Stewart, J., Matthews, K., & Marmot, M. G. (2008). Social status and health: a comparison of British civil servants in Whitehall-II with European-and African-Americans in CARDIA. *Social science & medicine, 66*(5), 1034-1045.

Akerlof, G. A., & Kranton, R. E. (2005). Identity and the Economics of Organizations. *Journal of Economic perspectives, 19*(1), 9-32.

Alesina, A., Baqir, R., & Easterly, W. (1999, November). Public Goods and Ethnic Divisions. *The Quarterly Journal of Economics, 114*(4), 1243-1284.

Andreoini, J., Nikiforakis, N., & Stoop, J. (2017, March 3). Are the rich more selfish than the poor, or do they just have more money?: A natural field experiment.

Andreoni, J. (1988). Why free ride?: Strategies and learning in public goods experiments. *Journal of Public Economics, 37*(3), 291-304.

Andreoni, J., & Croson, R. (2008). Partners versus Strangers: Random Rematching in Public Goods Experiments. In C. R. Plott, & V. L. Smith (Eds.), *Handbook of Experimental Economics Results* (Vol. 1, pp. 776-783).

Andreoni, J., & Petrie, R. (2004). Public goods experiments without confidentiality: a glimpse into fund-raising. *Journal of Public Economics, 88*, 1605-1623.

Ardener, S. (1964). The Comparative Study of Rotating Credit Associations. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland, 94*(2), 201-229.

Bardsley, N. (2008). Dictator game giving: altruism or artefact? *Experimental Economics, 11*, 122-133.

Bénabou, R., & Tirole, J. (2006, December). Incentives and Prosocial Behavior. *American Economic Review, 96*(5), 1652-1678.

Bergstrom, T., Blume, L., & Varian, H. (1986). On the private provision of public goods. *Journal of public economics, 29*(1), 25-49.

Besley, T., & Coate, S. (1995, February). Group lending, repayment incentives and social collateral. *Journal of development economics, 46*(1), 1-18.

Besley, T., & Levenson, A. R. (1996, January). The Role of Informal Finance in Household Capital Accumulation: Evidence from Taiwan. *The Economic Journal, 106*(434), 39-59.

Besley, T., Coate, S., & Loury, G. (1993). The Economics of Rotating Savings and Credit Associations. *American Economic Association, 83*(4), 792-810.

Besley, T., Coate, S., & Loury, G. (1994, October). Rotating Savings and Credit Associations, Credit Markets and Efficiency. *The Review of Economic Studies, 61*(4), 701-719.

Biggart, N. W. (2001). Banking on Each Other: The Situational Logic of Rotating Savings and Credit Associations. *Advances in Qualitative Organization Research*, 129-152.

Biggart, N. W. (2004). Systems of exchange. *Academy of management review, 29*(1), 28-49.

Bollen, K. A., Glanville, J. L., & Stecklov, G. (2001). Socioeconomic status and class in studies of fertility and health in developing countries. *Annual review of sociology, 27*(1), 153-185.

Bouis, H. E. (1994). The effect of income on demand for food in poor countries: Are our food consumption databases giving us reliable estimates? *Journal of Development Economics, 44*(1), 199-226.

Brewer, M. B., & Caporael, L. R. (1990). Selfish Genes vs. Selfish People: Sociobiology as Origin Myth. *Motivation and Emotion, 14*(4), 237-243.

Chan, K. S., Mestelman, S., Moir, R., & Muller, R. A. (1996). The Voluntary Provision of Public Goods under Varying Income Distributions. *The Canadian Journal of Economics, 29*(1), 54-69.

Chan, K. S., Mestelman, S., Moir, R., & Muller, R. A. (1999). Heterogeneity and the Voluntary Provision of Public Goods. *Experimental Economics*, 5-30.

Charness, G., & Rabin, M. (2002, August 2002). Understanding Social Preferences with Simple Tests. *The Quarterly Journal of Economics, 117*(3), 817-869.

Chen, Y., & Li, S. X. (2009, March). Group Identity and Social Preferences. *The American Economic Review, 99*(1), 431-457.

Deaton, A. (1992). *Understanding Consumption.* Oxford: Oxford University Press.

Dekle, R., & Hamada, K. (2000, October). On the Development of Rotating Credit Associations in Japan. *Economic Development and Cultural Change*, 77-90. Retrieved from http://www.jstor.org/stable/10.1086/452491

Dhar, R., & Gorlin, M. (2013). A dual-system framework to understand preference construction processes in choice. *Journal of Consumer Psychology, 23*(4), 528-542.

Dufwenberg, M., Gächter, S., & Hennig-Schmidt, H. (2011). The framing of games and the psychology of play. *Games and Economic Behavior, 73*(2), 459-478.

Fairbrother, M. (2012, October 1). Rich People, Poor People, and Environmental Concern: Evidence across Nations and Time. *European Sociological Review, 29*(5), 910-922.

Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature, 425*(6960), 785.

Fischbacher, U., Gächter, S., & Fehr, E. (2001). Are people conditionally cooperative? Evidence from a public goods experiment. *Economics letters, 71*(3), 397-404.

Förster, M. F. (1994). *Measurement of Low Incomes and Poverty In A Perspective of International Comparisons.* Paris: OECD.

Friedman, M. (1957). The permanent income hypothesis. In M. Friedman, *A theory of the consumption function* (pp. 20-37). Princeton University Press.

Geertz, C. (1962, April). The Rotating Credit Association: A "Middle Rung" in Development. *Economic Development and Cultural Change, 10*(3), 241-263. Retrieved from http://www.jstor.org/stable/1151976

Goldin, C., & Katz, L. F. (1999). The Shaping of Higher Education: The Formative Years in the United States 1890 to 1940. *Journal of Economic Perspectives, 13*(1), 37-62.

Gugerty, M. K. (2007, January). You Can't Save Alone: Commitment in Rotating Savings and Credit Associations in Kenya. *Economic Development and Cultural Change, 55*(2), 251-282.

Guha, S., & Gupta, G. (2005). Microcredit for income generation: The role of ROSCA. *Economic and political weekly*, 1470-1473.

Handa, S., & Kirton, C. (1999, October). The economics of rotating savings and credit associations: evidence from the Jamaican `Partner'. *Journal of Development Economics, 60*(1), 173-194.

Izumida, Y. (1992). Development of rural finance and ROSCAs: Role of Kou in Japan. *Bulletin of the College of Agriculture Utsunomiya University*.

Kennedy, B. P., Kawachi, I., Prothrow-Stith, D., Lochner, K., & Gupta, V. (1998, July). Social capital, income inequality, and firearm violent crime. *Social Science & Medicine, 47*(1), 7-17.

Kolenikov, S., & Angeles, G. (2008, June 23). On costs of repeated clustered surveys.

Kolenikov, S., & Angeles, G. (2009). Socioeconomic status measurement with discrete proxy variables: Is principal component analysis a reliable answer? *Review of Income and Wealth, 55*(1), 128-165.

Korndörfer, M., Egloff, B., & Schmukle, S. C. (2015). A large scale test of the effect of social class on prosocial behavior. *PloS one*, e0133193.

Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social Class, Solipsism, and Contextualism: How the Rich Are Different From the Poor. *Psychological Review, 119*(3), 546-572.

Lammers, J., Galinsky, A. D., Dubois, D., & Rucker, D. D. (2015). Power and Morality. *Current Option in Psychology, 6*, 15-19.

Levitt, S. D., & List, J. A. (2007). What do laboratory experiments measuring social preferences reveal about the real world? *Journal of Economic perspectives, 21*(2), 153-174.

Light, I., & Deng, Z. (1995). Gender Differences in ROSCA Participation Within Korean Business Households in Los Angeles. In *Money-go-rounds: The Importance of Rotating Savings and Credit Associations for Women* (pp. 217-240). Washington DC: BERG.

Lindemann, K. (2007). The Impact of Objective Characteristics on Subjective Social Position. *A Journal of the Humanities & Social Sciences, 11*(1), 54-68.

List, J. A. (2007, June 3). On the Interpretation of Giving in Dictator Games. *Journal of Political Economy, 115*(3), 482-493.

Markussen, T. (2011). Inequality and Political Clientelism: Evidence from South India. *The Journal of Development Studies*.

Martinangeli, A. F. (2017, November 13). Do what (you think) the rich will do: inequality, belief formation and group identity in public goods game.

Maslow, A. (1943). A Theory of Human Motivation. *Psychological Review, 50*(4), 370-396.

McNeely, B. L., & Meglino, B. M. (1994). The Role of Dispositional and Situational Antecedents in Prosocial Organizational Behavior: An Examination of the Intended Beneficiaries of Prosocial Behavior. *Journal of Applied Psychology, 79*(6), 836-844.

Oakes, J. M., & Rossi, P. H. (2003). The measurement of SES in health research: current practice and step towards a new approach. *Social Science & Medicine, 56*, 769-784.

OECD. (2017). *Bridging the Gap: Inclusive Growth 2017 Update Report.* OECD Centre for Opportunity and Equality.

Oxford Living Dictionaries. (2018). *Definition*. Retrieved from English Oxford Living Dictionaries: https://en.oxforddictionaries.com/definition/altruism

Piff, P. K., Kraus, M. W., Cote, S., Cheng, H. B., & Keltner, D. (2010). Having Less, Giving More: The Influence of Social Class on Prosocial Behavior. *Journal of Personality and Social Psychology, 99*(5), 771.

Porta, R. L., de Silanes, F. L., Shleifer, A., & Vishny, R. (1999). The Quality of Government. *Journal of Law, Economics, & Organization, 15*(1), 222-279.

Rohde, K. I. (2005). The Hyperbolic Factor: A Measure of Decreasing Impatience.

Scott, J. (2000). Rational Choice Theory. In G. Browning, A. Halcli, & F. Webster (Eds.), *Understanding Contemporary Society: Theories of The Present* (pp. 129-144). Sage Publications.

Singh-Manoux, A., Adler, N. E., & Marmot, M. G. (2003). Subjective social status: its determinants and its association with measures of ill-health in the Whitehall II study. *Social science & medicine, 56*(6), 1321-1333.

Smeets, P., Bauer, R., & Gneezy, U. (2015). Giving behavior of millionaires. *Proceedings of the National Academy of Sciences, 112*(34), 10641-10644.

Srinivasan, S. (1995). ROSCAs Among South Asians in Oxford. In S. Ardener, *Money-Go-Rounds: The Importance of Rotating Savings and Credit Associations for Women* (pp. 199-208). Washington DC: BERG.

Striepens, N., Kendrick, K. M., Maier, W., & Hurlemann, R. (2011). Prosocial effects of oxytocin and clinical evidence for its therapeutic potential. *Frontiers in neuroendocrinology, 32*(4), 426-450.

Swap, W. C. (1991). Perceiving the Causes of Altruism. In R. A. Hinde, & J. Groebel, *Cooperation and Prosocial Behaviour* (pp. 147-158). Cambridge: Cambridge University Press.

Tajfel, H. (1978). Differentiation Between Social Groups: Studies in The Social Psychology of Intergroup Relations. In *European Monographs in Social Psychology.* London: Academic Press.

Tajfel, H. (2010). *Social identity and intergroup relations.* Cambridge: Cambridge University Press.

Thaler, R. H., & Shefrin, H. M. (1981). An Economic Theory of Self-Control. *Journal of Political Economy, 89*(2), 392-406.

The World Bank. (2018). *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution.* Washington DC: World Bank Group.

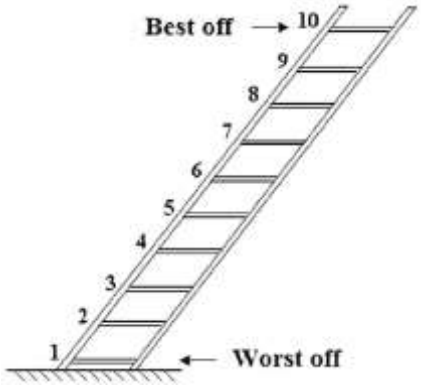
Trautmann, S. T., van de Kuilen, G., & Zeckhauser, R. J. (2013). Social class and (un) ethical behavior: A framework, with evidence from a large population sample. *Perspectives on Psychological Science, 8*(5), 487-497.

Van den Brink, R., & Chavas, J.-P. (1997). The microeconomics of an indigenous African institution: the rotating savings and credit association. *Economic development and cultural change, 45*(4), 745-772.

World Inequality Lab. (2018). *World Inequality Report: Executive Summary 2018*. World Inequality Lab. World Inequality Lab. Retrieved June 3, 2018

8. Appendix

8.1 Appendix 1: MacArthur Scale of Subjective Social Status

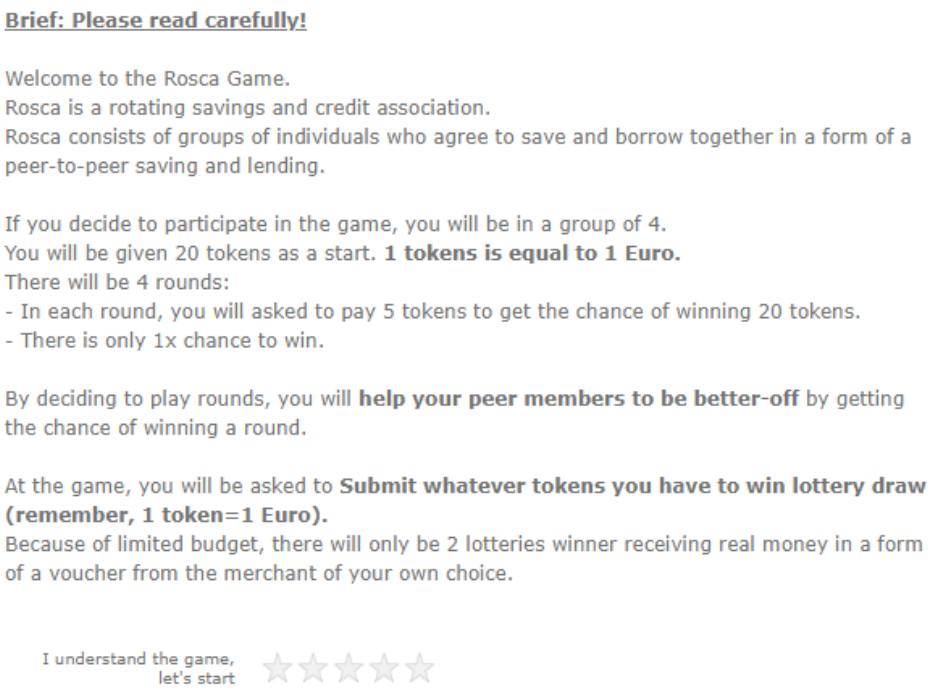


Retrieved from "The reduction of socioeconomic bias in intelligence testing.", by MacArthur, R. S., and W. B. Elley, 1963, *British Journal of Educational Psychology*, *33*(2), 107-119. Copyright 2011 by Wiley Online Library

8.2 Appendix 2: Online Rosca Game Design

- Rosca game – SSES question:

- Rosca Game – game brief page:



Brief: Please read carefully!

Welcome to the Rosca Game.
Rosca is a rotating savings and credit association.
Rosca consists of groups of individuals who agree to save and borrow together in a form of a peer-to-peer saving and lending.

If you decide to participate in the game, you will be in a group of 4.
You will be given 20 tokens as a start. **1 tokens is equal to 1 Euro.**
There will be 4 rounds:
- In each round, you will asked to pay 5 tokens to get the chance of winning 20 tokens.
- There is only 1x chance to win.

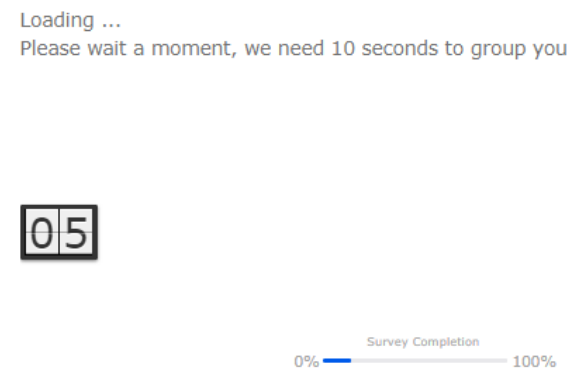
By deciding to play rounds, you will **help your peer members to be better-off** by getting the chance of winning a round.

At the game, you will be asked to **Submit whatever tokens you have to win lottery draw (remember, 1 token=1 Euro).**
Because of limited budget, there will only be 2 lotteries winner receiving real money in a form of a voucher from the merchant of your own choice.

I understand the game, let's start

Please take your time reading the text above. Next button will be available after 45 seconds.

- Rosca Game – loading page with countdown numbers from 10 to 0:

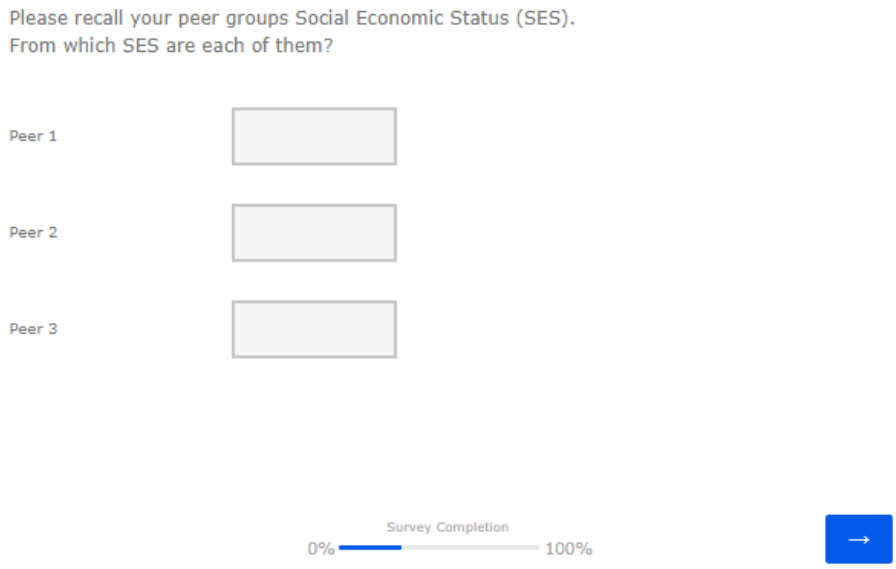


Loading ...
Please wait a moment, we need 10 seconds to group you in a group of 4 ...

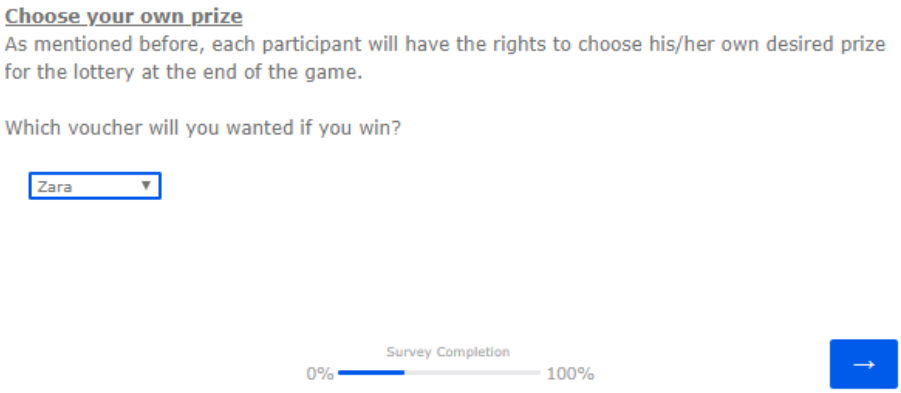
05

Survey Completion
0% 100%

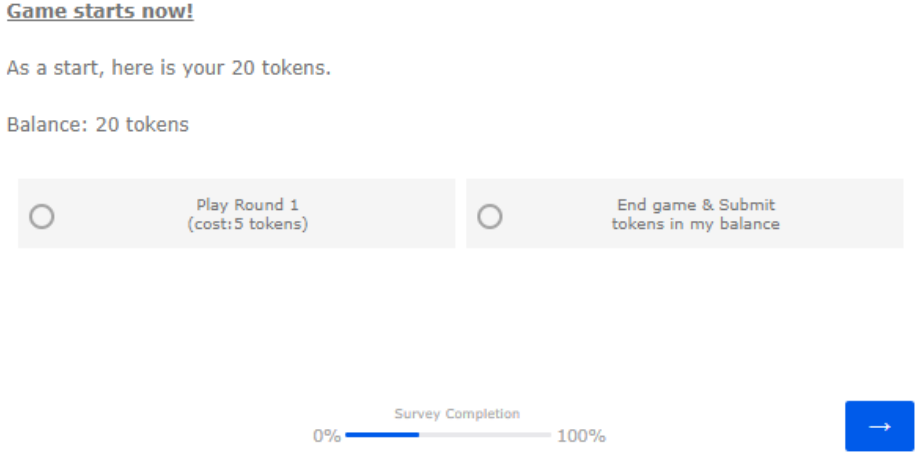
- Rosca Game – awareness check (applied for T1, T2, and T3)



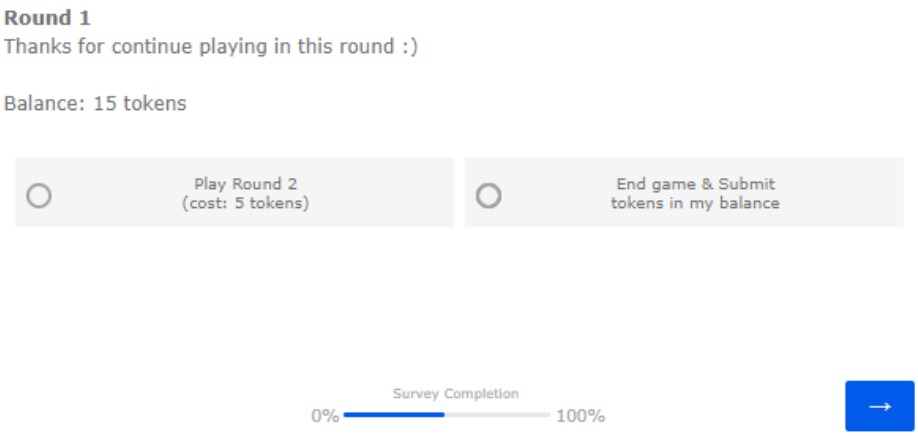
- Rosca Game – choosing prize as the goal



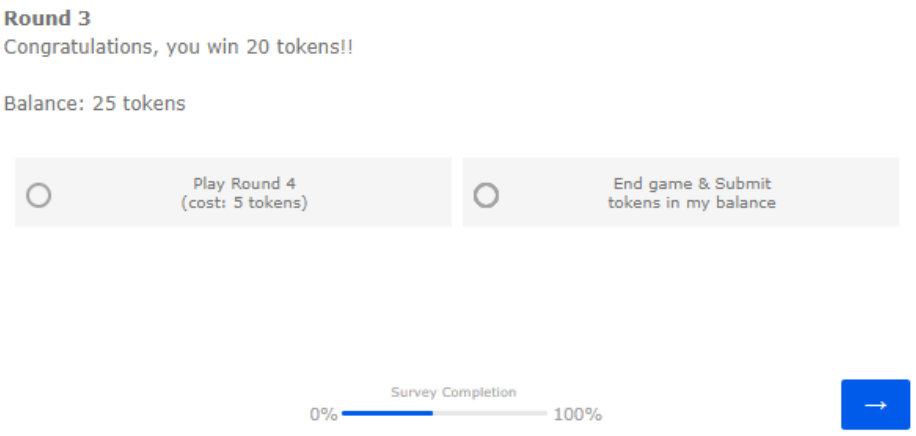
- Rosca Game – endowment fund



- Rosca Game – example of ordinary round



- Rosca Game – example of a winning round



- Rosca Game – closed by a demographic question page to fill gender, age, ethnicity, occupation, and email address to send the lottery prize.

8.3 Appendix 3: Descriptive Statistics

Variable	N Obs.	Mean	Std. dev.	Min	Max
gainloss	361	.2631579	5.150512	-15	10
treatment	380	2.539474	1.13054	1	4
peoplecat	185	2.708108	1.128287	1	4
macarthurses	380	6.715789	1.419154	1	10
age	380	26.43421	5.36611	18	45
gender	380	1.502632	.505895	1	3
ethnicity	380	2.689474	1.936565	1	5
occupation	380	1.618421	.5803989	1	3
contribution	380	11.60526	5.367937	0	20

8.4 Appendix 4: H1 tests output

8.4.1 H1 test: Chi-Squared test

Chi-squared test		Sig
N obs	Base N_0=222 Tested N_1=380	
Pearson chi2 (4)		125.1526***
Likelihood-ratio chi2 (4)		177.0764***
Fisher's exact		p=0.0000***

Confidence interval for each results' p-value are identified as: ***1%, **5%, *10%

8.4.2 H1 test: One-sample Student t-test

Student t-test H0	N Obs	Mean	Std error	Std dev	Df	t
CG: Mean=7	92	9.130435	.2517105	2.414323	91	8.4638***
TG: Mean=10	288	12.39583	.3416301	5.797655	287	7.0129***
CG & TG: Mean=10	380	11.60526	.2753694	5.367937	379	5.8295***

Confidence interval for each results' p-value are identified as: ***1%, **5%, *10%

8.5 Appendix 5: OLS regression

OLS Analysis	Treatment model	Peer group modell	SSES model	MacArthurSSES model
Treatment				
T1 (Rich)	-1.697114 ** (.8458742)			
T2 (Poor)	-.9728035 (.8514399)			
T3 (Mix)	-1.343588 * (.8129759)			
People category				
Poor to Rich		-2.525013 * (1.333898)		
Rich to Poor		-.5752703 (1.237045)		
Rich to Rich		-.3274685 (1.190716)		
SSES			-.3623288 (.6121636)	
MacArthurSSES				
3				-.5915866 (3.316361)
4				-6.793484 ** (3.014454)
5				-2.496777 (2.729679)
6				-2.506108 (2.660109)
7				-2.537698 (2.621765)
8				-2.076769 (2.655733)
9				-2.619305 (2.85097)
10				-2.860784 (5.890376)
Age	-.0109457 (.06449)	-.0612405 (.0874778)	-.0280931 (.0636998)	-.0026724 (.0651258)
Gender				

OLS Analysis	Treatment model	Peer group modell	SSES model	MacArthurSSES model
Male	.7969476 (.5557848)	.649862 (.8424723)	.7853212 (.555671)	.5602614 (.9181891)
Other	1.524761 (5.590713)		1.131748 (5.594979)	.1835072 (5.59858)
Ethnicity				
Black/African American	1.359373 (3.695935)	4.829425 (5.566884)	1.700713 (3.701541)	2.075657 (3.699978)
Hispanic/Latino	-1.342738 (2.351193)	-6.901593 * (3.927815)	-1.257271 (2.356429)	-1.331674 (2.351869)
Others	.0472376 (1.854275)	-5.157224 (5.604328)	.5442134 (1.842833)	.8970313 (1.849903)
White	.7807009 (.7127401)	.5292309 (1.13826)	.9199789 (.7174286)	1.312652 * (.7386159)
Occupation				
Student	.3461041 (.7481255)	-.5306597 (1.126889)	.5151279 (.7418654)	.4529611 (.7409924)
Unemployed	-.5810392 (1.282778)	-.172836 (1.749032)	-.4753529 (1.294711)	-.1425826 (1.299406)
Constant	.7357281 (1.950431)	2.035174 (2.81839)	.1449799 (1.933938)	1.652357 (3.13913)
N (obs.)	361	174	361	361
R-squared	0.0442	0.0677	0.0330	0.0601
Adj R-squared	0.0113	0.0044	0.0054	0.0135
Non-parametric				
Kruskal Wallis	p=0.0571 *	p=0.1044	N/A	p=0.2414

Note: Standard errors for each coefficient are in parentheses.
Confidence interval for each results' p-value are identified as: ***1%, **5%, *10%

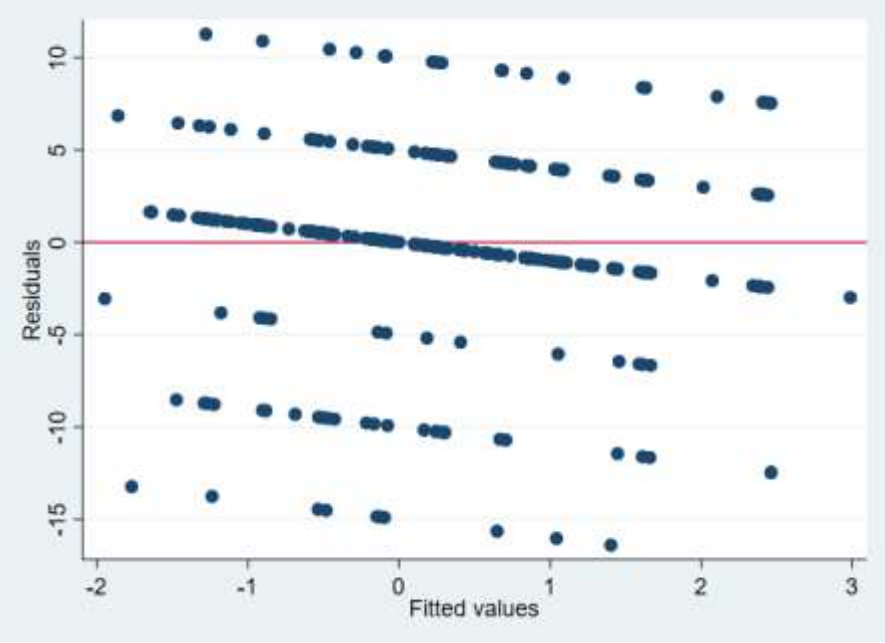
8.6 Appendix 6: Breusch-Pagan/Cook-Weisberg test

Breusch-Pagan/ Cook-Weisberg test	Chi2 (1)
Treatment model	3.76*
Treatment full-model	0.04
Peer group model	0.09
Peer group full-model	0.01
SSES model	4.14**
SSES full-model	0.02

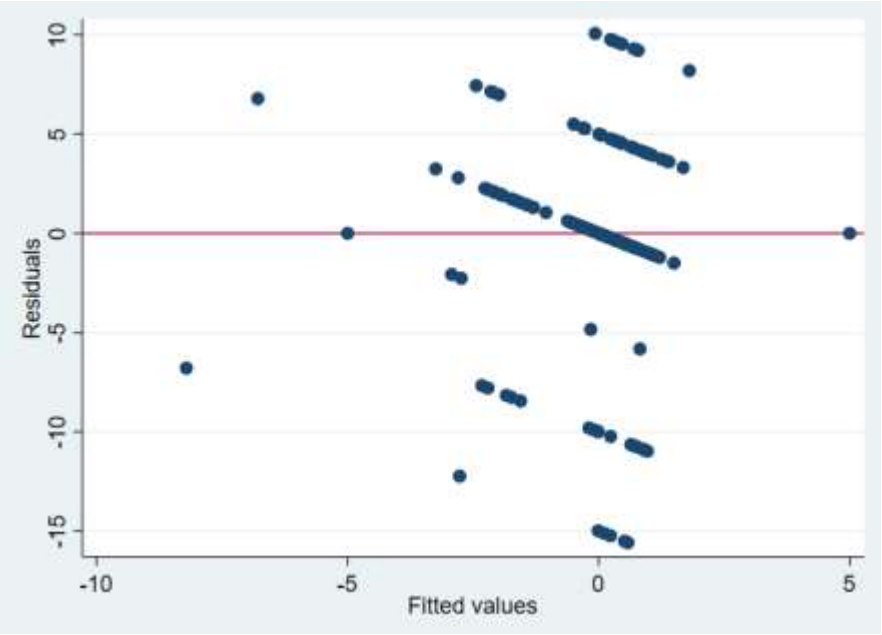
Confidence interval for each results' p-value are identified as: ***1%, **5%, *10%
Ho: constant variance (homoscedasticity)

8.7 Appendix 7: Residual plot from each of the full model

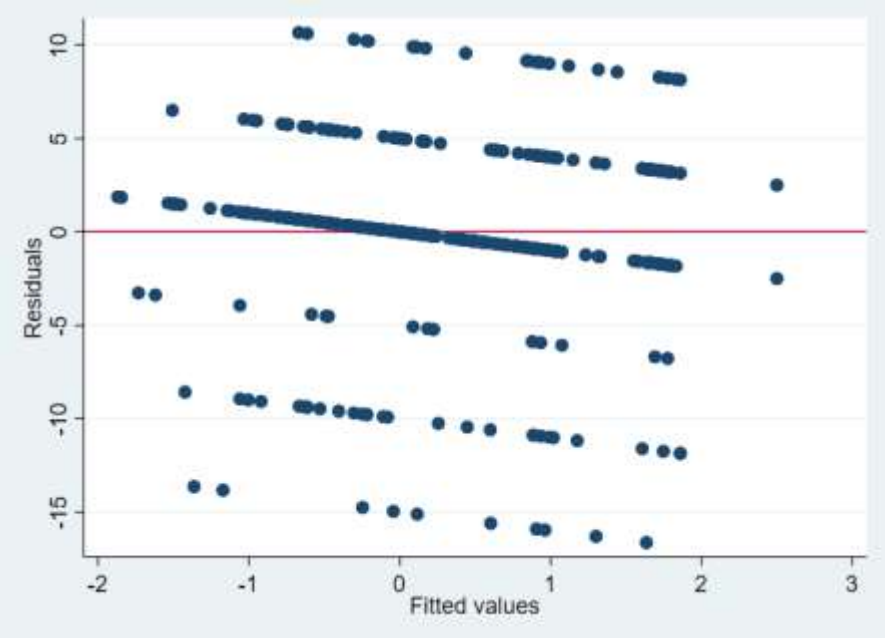
8.7.1 Treatment full-model residual plot



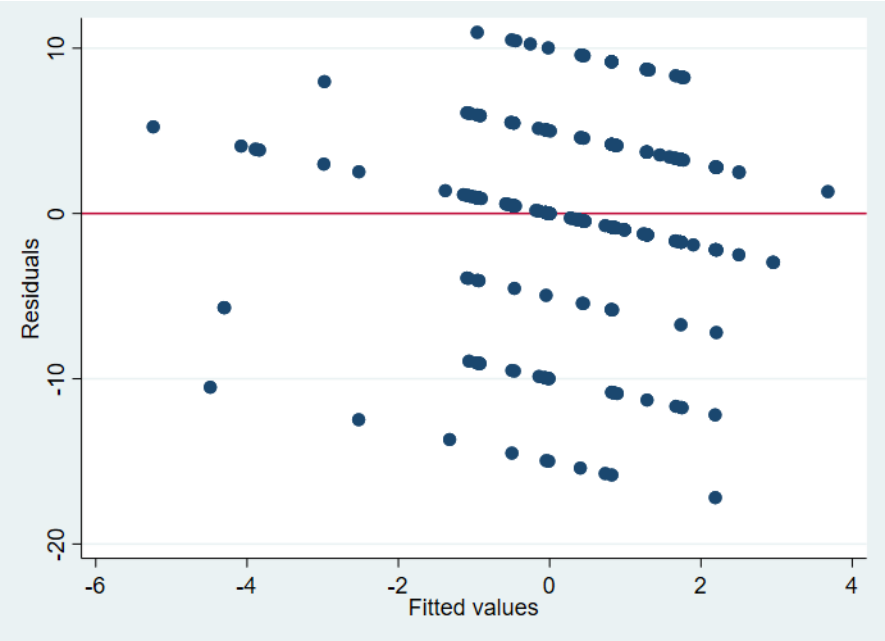
8.7.2 Peer group full-model residual plot



8.7.3 SSES model residual plot



8.7.4 MacArthurSSES residual plot



8.8 Appendix 8: Probit analysis

	Treatment model	Peer group model	SSES model	MacArthurSSES model
Treatment				
T1 (Rich)	-.2960299 (.1812288)			
T2 (Poor)	-.1796288 (.1817768)			
T3 (Mix)	-.2623781 (.173873)			
People category				
Poor to Rich		-.4691551 * (.2730258)		
Rich to Poor		-.0755794 (.2530256)		
Rich to Rich		-.0032569 (.2434758)		
SSES			-.0612659 (.1307184)	
MacArthurSES				
3				-.1764198 (.7052094)
4				-1.457469 ** (.6424949)
5				-.6283348 (.5784609)
6				-.5483366 (.5624521)

	Treatment model		Peer group model	SSES model	MacArthurSSES model	
7					-.600669	
					(.5543439)	
8					-.4840445	
					(.5613167)	
9					-.6124787	
					(.6050772)	
10					-.7459108	
					(1.301426)	
Age	-.0085871		-.0191709	-.011854l	-.0064299	
	(.0138721)		(.0179959)	(.0136671)	(.0140586)	
Gender						
Male	.2447432	**	.2089484	.2416215	.2701611	**
	(.1194549)		(.171523)	(.1190159)	(.1209451)	
Other	.2696938			.1860797	.0280247	
	(1.238816)			(1.234832)	(1.245043)	
Ethnicity						
Black/African American	.3048558		1.105719	.359241	.4583533	
	(.7790429)		(1.071761)	(.7783822)	(.7829574)	
Hispanic/Latino	-.1522369		-1.3599	-.1361072	-.1444239	
	(.4974884)		(.840969)	(.4965103)	(.4987713)	
Others	-.0513429		-1.085488	.0363821	.1289643	
	(.4024039)		(1.045392)	(.3985229)	(.4034306)	
White	.2260977		.1838537	.2506549	.3380633	**
	(.1531613)		(.2316383)	(.1538774)	(.1595294)	
Occupation						
Student	.0844335		-.1391224	.1152617	.1002137	
	(.1605577)		(.2293076)	(.158534)	(.1592798)	
Unemployed	-.045643		.0120451	-.0293516	.0377785	
	(.2717055)		(.3514874)	(.2735252)	(.2765115)	
/cut1	-2.122292		-2.358472	-2.000561	-2.414226	
	(.4366868)		(.6018705)	(.4300396)	(.6776639)	
/cut2	-1.456922		-1.710868	-1.345131	-1.738134	
	(.4231896)		(.5853179)	(.4176978)	(.6692077)	
/cut3	-1.266941		-1.581872	-1.156939	-1.546636	
	(.4225083)		(.5845789)	(.417172)	(.6686977)	
/cut4	.4865044		.1979865	.5908435	.2294047	
	(.4218865)		(.57871)	(.4171699)	(.6655161)	
/cut5	1.40229		1.120083	1.503851	1.150697	
	(.4257217)		(.584606)	(.4212441)	(.6678872)	
N (Obs.)	361		174	361	361	
Log-likelihood	-434.81901		-207.5186	-436.29639	-431.55252	

Note: Standard errors for each coefficient are in parentheses.
Confidence interval for each results' p-value are identified as: ***1%, **5%, *10%

8.9 Appendix 9: Pair-wise correlation matrix

	treatment	peoplecat	macarthurses	age	gender	ethnicity	occupation
treatment	1.0000						
peoplecat	-0.4943***	1.0000					
macarthurses	-0.1377	0.7194***	1.0000				
age	0.2831***	-0.1172	-0.1598***	1.0000			
gender	0.0321	-0.0395	-0.0284	0.0623	1.0000		
ethnicity	-0.2185***	0.1541	0.2395***	-0.4791***	-0.0153	1.0000	
occupation	0.3661***	-0.0203	0.0602	-0.3355***	0.0169	0.3661***	1.0000

Confidence interval for each results' p-value are identified as: ***1%, **5%, *10%