

**Intra-Household Decision-Making and Family Public Goods: Survey and Experimental  
Evidence from South Africa**

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**Intra-Household Decision-Making and Family Public Goods: Survey and Experimental  
Evidence from South Africa**

**by**

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Submitted in fulfilment of the requirements in respect of the Doctoral degree qualification Doctor Philosophiae (PhD) Economics in the Department of Economics in the Faculty of Economic and Management Sciences at the University of the Free State.

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## Dedication

To my father, siblings, wife, children, and departed mother.

## DECLARATION

I, Sevias Guvuriro, declare the following:

- I. The Doctoral Degree research thesis that I herewith submit for the Doctoral Degree qualification Philosophiae Doctor (PhD) Economics at the University of the Free State is my independent work, and that I have not previously submitted it for a qualification at another institution of higher education,
- II. I am aware that the copyright is vested in the University of the Free State,
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## ABSTRACT

Intra-household decisions are of importance in achieving various development goals, including investments in family public goods and the resultant developmental outcomes of such investments, such as the attainment of education, improved health, and general family well-being. The realisation of the development impacts of investments in family public goods requires a proper understanding of gender dynamics, economic empowerment, and inter-generational cooperation in intra-household decision-making. This thesis aims to determine the role of intra-household decision-making in family public goods investments in South Africa. The study employs South African survey data and conducts a framed field experiment in two poor communities. Descriptive statistical analyses are employed to investigate associations between key variables. In-depth analysis is conducted with the aid of regression analysis. The *first* key finding in this study calls specifically for gender-based economic empowerment policies. The study finds that gender inequality in economic bargaining power within couples (heterogamy) and the broader adult population persists. Whereas women dominate the role of financial and economic decision-maker, they do so mainly as secondary decision-makers; another sign of gender inequality. However, when women are empowered economically, their decision-making power increases, and concomitantly, expenditure on family public goods. In fact, even when they are not economically empowered, expenditure on family public goods increases when females wield the decision-making power. The *second* finding argues more broadly for economic development policies and posits that economically empowered men spend more on family public goods, and delegate economic decision-making responsibility to their spouses, who in turn spend more on family public goods. In the *third* instance, the endowment size effect observed in this study is important for policy, given that the benefit of an economic opportunity for one family member of earning a wage or receiving a social grant, cascades to other family members. The *final* finding is that communication impacts positively on cooperation within extended inter-generational families, and that joint decision-making; which is associated with greater expenditure on food; requires communication to facilitate cooperation. This result calls for preventative and developmental social work programmes focusing on promoting communication within families, including training on parenting as well as marriage skills.

## OPSOMMING

Besluitneming binne huishoudings is belangrik ten einde verskeie ontwikkelingsdoelwitte te bereik, ingesluit investering in familie openbare goedere en die gepaardgaande ontwikkelings uitkomst, soos die verkryging van opleiding, beter gesondheid en algehele welsyn van families. Die verwesenliking van hierdie ontwikkelingsimpakte van investering in familie openbare goedere vereis 'n behoorlike begrip van gender dinamika, ekonomiese bemagtiging en samewerking tussen generasies in die neem van besluite binne huishoudings. Hierdie tesis stel ten doel om die rol van intra-huishoudingsbesluitneming in investering in familie openbare goedere in Suid-Afrika vas te stel. Die studie gebruik data van 'n Suid-Afrikaanse opname en voer 'n veldeksperiment in twee arm gemeenskappe uit. Beskrywende statistiese ontledings is aangewend om verwantskappe tussen sleutelveranderlikes te bestudeer. Regressie analise is gebruik vir verdere in-diepte ontledings. Die *eerste* sleutelbevinding van hierdie studie dui spesifiek op die nodigheid van geslagsgebaseerde ekonomiese bemagtigingsbeleid. Die studie bevind dat geslagsongelykheid binne pare (heterogamie) en die breër bevolking van volwassenes steeds 'n realiteit is. Alhoewel die finansiële en ekonomiese besluitnemersrol deur vroue oorheers word, bly hul rol hoofsaaklik ondergeskik, 'n verdere teken van geslagsongelykheid. Wanneer vroue egter ekonomies bemagtig word, neem hul besluitnemingsgesag toe en gelyktydig sook uitgawes op familie openbare goedere. Selfs wanneer vroue slegs bemagtig word met besluitnemingsgesag, maar nie ook ekonomies nie, word steeds meer op familie openbare goedere spandeer. 'n Tweede bevinding daarteenoor staan ook in die algemeen ekonomiese ontwikkelingsbeleid voor. Die studie bevind dat ekonomies bemagtigde mans meer spandeer op familie openbare goedere en dat hul verantwoordelikheid vir ekonomiese besluitneming aan hul vrouens delegeer, wie ook meer op familie openbare goedere spandeer. Die derde resultaat wat in hierdie studie waargeneem is, die skenkingseffek, is belangrik vir beleid gegewe dat die voordeel van 'n ekonomiese geleentheid vir een familielid, hetsy in die vorm van 'n werksgeleentheid of ontvangs van 'n maatskaplike toelaag, na ander familielede kan afwentel. Laastens, bepaal die studie dat kommunikasie 'n positiewe impak op samewerking tussen generasies binne uitgebreide families het, en dat gesamentlike besluitneming, wat geassosieer word met groter uitgawes op voedsel, kommunikasie vereis ten einde samewerking te weeg te bring. Beleidsgewys, plaas hierdie bevinding die fokus op voorkomende en ontwikkelingsgebaseerde maatskaplike werkprogramme wat kommunikasie binne families kan bevorder, insluitend opleiding in ouerskaps- en huweliksvaardighede.

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## CHAPTER ONE: GENERAL INTRODUCTION

### 1.1 Background

Households function as producers, consumers, investors in human and physical capital, and managers of risk (Doss, 1996). Elliot and Gray (2000) describe the decisions that families make on daily basis as instrumental (money, health and food), economic (use and gathering of resources) and social (values, roles and goals) in nature. Such intra-household decisions are of importance in achieving various household development goals, including investments in family public goods and in the realisation of the investments' developmental outcomes such as the attainment of education, an improvement in health, and the general family well-being (Nordman & Sharma, 2016).

This general introduction presents the problem statement, followed by the rationale and aim and objectives. The chapter also outlines the study's conceptual and theoretical framework. It concludes with a brief summary of the data, methods, and organisation of the thesis.

### 1.2 Problem statement

Research on models of intra-household decisions has made significant strides (Chiappori, 1988; Doss, 1996/2013; Browning, Chiappori & Weiss, 2014). There are however critical gaps, which motivate the current study.

*First*, intra-household decision-making is missing in the list of arenas of decision-making mentioned in target 5.5 of the Sustainable Development Goals (SDGs), which pertains to women's effective participation and leadership at all levels of decision-making in politics, economics and public life.<sup>1</sup> According to Razavi (2016:32), the "intra-household arena is the arena where the micro-politics of 'the personal' sphere plays out through bargaining over a range of issues including the allocation of resources. Households and families are clearly an essential part of the 'political and economic life' of all societies but remain invisible under the target." The *second* gap relates to the lack of knowledge about intra-household decisions on family public goods, as well as a limited understanding of who makes such decisions and

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<sup>1</sup> "Indicators are also being developed on women's participation in the executive, legislative, judiciary and law enforcement, and in local government, as well as women's representation as managers in both public and private enterprises" (Razavi, 2016:32).

the manner in which decision-maker's bargaining power and decision-making roles impact on investments in family public goods. *Finally*, the dearth of studies on inter-generational differences in cooperation regarding the provision of family public goods in extended families presents another avenue for further research.

### **1.3 Rationale**

The realisation of the development impacts of investments in family public goods requires a proper understanding of gender dynamics, economic empowerment, and inter-generational cooperation in intra-household decision-making.

### **1.4 Aim and objectives**

This thesis aims to determine the role of intra-household decision-making in family public goods investments in South Africa.

The main objectives of the study are:

- To establish the determinants of women's financial decision-making roles within couples, and how spouses' economic bargaining and financial decision-making power impact on expenditure on family public goods [*paper 1*]
- To assess how economic bargaining power and economic decision-making agency, as means to gender economic empowerment, impact on expenditure on family public goods [*paper 2*]
- To experimentally investigate patterns and drivers of intra-household cooperation in the extended inter-generational family using a public goods game [*paper 3*]

## **1.5 Conceptual and theoretical framework**

The key conceptual and theoretical pillars of the study are family public goods, economic theories of intra-household decision-making, and economic bargaining power, economic decision-making, agency and gender economic empowerment.

### **1.5.1 Family public goods**

Family public goods constitute a large fraction of household expenditure. The term “family public goods”, coined from the general public goods phenomenon, is commonly used in household studies. The public goods concept in general, according to Samuelson (1954), is an attribute describing the collectiveness of consumption of a good. Public goods are thus consumed jointly such that all individuals involved derive utility from the good and each individual’s consumption leads to no subtraction from another individual’s consumption of that good (Ostrom, 2003). This joint consumption is considered as the non-rivalry characteristic. Ostrom (2003) also alludes to Musgrave’s classification that is based on the non-excludability attribute, which suggests that there is no mechanism to exclude other consumers from enjoying the benefits of the public goods once they have been provided. Combining the two attributes, as Ostrom (2003) suggests, allows the classification of goods into four categories: pure private goods (rivalry and feasible exclusion), private goods (feasible exclusion but non-rivalry), common-pool resource goods (rivalry but exclusion not feasible), and pure public goods (non-rivalry and non-excludability). Family public goods can fall in the category of either common-pool resource (e.g. space in the family car) or pure public goods (e.g. heating and lighting in the house).

However, the studies on intra-household consumption do not concur on the classification of goods as either private or public (Ostrom, 2003). Mok, Maclean, and Dalziel (2011) consider family public goods as those goods that can be shared within the family. Gan and Vernon (2003) classify food as a public good, while Mok et al. (2011) consider household food preparation, not food per se, as a family public good. In addition, Suen, Chan and Zhang (2003) perceive a family public good as a composite good that includes household commodities ranging from shared domicile and homemade meals to consumption derived from having children. Finally, Warr (1983), in much earlier study, demonstrates that expenditure on children is public goods expenditure.

A household where two or more people live together experiences a joint consumption of some goods. As such, goods that are consumed jointly approximate public goods within the

scope of household studies. Phipps and Burton (1998) note that although food may be a private good, there is a substantial joint-ness of consumption for this category. There are, however, other public goods that are consumed at the household level. For instance, central heating is consumed jointly, thus qualifying to be a public good and bearing economies of scale. Phipps and Burton (1995) underscore this identification of goods such as telephones, showers and televisions as congestible public goods.

Furthermore, Couprie, Peluso and Trannoy's (2010) categorisation has three lists of family public goods ranging from the most restrictive [public 1] to the most extensive [public 3]. The most restrictive are the basic family public goods and comprise of the consumption of or expenditure on items such as housing, water, heat and electricity. This is followed by the somewhat broader [public 2] expenditure on items such as furniture and housing services. The third and most extensive list of family public goods includes household expenditure on car-related expenses. Whereas healthcare and education better fits the restrictive category - in as far as the goods generate positive externalities within the family, food and insurance - which are rivalrous goods, can be considered as leaning towards the extensive side on the spectrum of family public goods. Some goods, therefore, are more public while others are less public. Although some goods are strictly speaking not family public goods, they are important for the welfare of the family and hence their consideration in the empirical analysis in this study. Moreover, there are variations between household members in terms of preferences regarding goods and services, which influence allocations to family public goods expenditure (Chiappori & Meghir, 2014).

### **1.5.2 Economic models of intra-household decision-making**

Models of intra-household decision-making were born out of a realisation that individuals do not live in isolation but care for and are affected by the decisions of others. An understanding, therefore, of models of intra-household decision-making is essential in studies on gender economic empowerment, intra-familial cooperation and investments in family public goods. Following below, is a descriptive outline of the main models of intra-household decision-making guiding this study.

#### *(i) Unitary models*

Early literature attempting to understand decision-making within the context of a household, proclaims the unitary model, which treats a household as a single entity with a single set of preferences (Doss, 1996; Ward-Batts, 2008; Browning et al., 2014). Samuelson (1956) and

Becker (1981), the pioneers of the unitary model, formalised household behaviour within the extension of standard neoclassical consumer demand models to families, by using a household welfare function as an allegory for social indifference curves. In the respective frameworks of Samuelson and Becker, the household, as a unit of account, is assumed to maximise a joint welfare function. The marginal rate of substitution is equal across all pairs of goods (Samuelson, 1956; Becker, 1981/1991). The unitary model thus analyses household decisions under the hypothesis that the household is a single decision unit that somehow maximises the welfare of its members (Carter & Katz, 1997; Attanasio & Lechene, 2002; Chiappori, Fortin & Lacroix, 2002; Vermeulen, 2005).

Doss (1996) at one level, considers the unitary model as a common preference model - an approach that assumes a dictator or benevolent altruist who aggregates the individual utility functions by maximising his utility function as the basis for all household decisions. In this case, the household welfare function relies on notions of altruism to aggregate the preferences of individuals within the household into a single decision making logic (Becker, 1981). At another level, the unitary model represents a unified household model where the household acts as a single unit but incorporates both production and consumption decisions. In the unitary model, household members' shares of income or wealth (examples of distributional factors) do not affect resource allocations. Thus, commodity demands under unitary models display income pooling (Browning et al., 2014).

The unitary model, however, is heavily criticised for its failure to explain differences in individual welfare within a household, and those exhibited systematically by gender, age, or relationship with the household head (Alderman et al., 1995; Browning et al., 2014). The model aggregates choices and behaviour and its naivety lies in assuming: (i) an aggregate household utility function as compared to different and often competing preferences of individual household members, (ii) a unified production decision as compared to individuals making separate production decisions, (iii) a single household endowment of labour and other inputs as compared to individuals exercising independent control over their endowments (Alderman et al., 1995; Doss, 1996; Bergstrom, 1997). In addition, the assumption that consumption decisions are based on a single budget constraint enjoys less support than a situation where household members have separate incomes and face individual budget constraints (Doss, 1996; Carter & Katz, 1997; Haddad, Hoddinott & Alderman, 1997). Hence, the unitary model is largely discredited.

*(ii) Collective models*

As an alternative to the unitary model, collective and bargaining-type models of household behaviour disaggregate the household utility function into individual utility functions. The focus in collective models is on the individuality of household members and how individual preferences lead to a collective choice. There is one key assumption, which is that the household reaches a Pareto efficient outcome, a claim supported by the work of Bobonis (2009). There is however, no theoretical claim in the model on how exactly such efficiency is achieved within the household (Chiappori, 1988; Alderman et al., 1995; Doss, 1996; Attanasio & Lechene, 2002). Rather, as Browning et al. (1994/2014) point out, research on the collective model focuses on recovering from data the implicit or explicit rule by which the household shares resources (sharing rule) among individual members. Collective models are attractive as they consider distributional factors and are thus rationally appealing. However, collective models are lacking as they fail to provide a priori predictions about the sharing rule, and in that way very general.

*(iii) Cooperative bargaining models*

An improvement in collective models suggests that household members reconcile their different preferences in a cooperative or in a non-cooperative manner. The cooperative bargaining-type models assume that household decisions are always efficient in the sense that no one household member can be made better off without someone being made worse off – achieving Pareto optimality. In McElroy and Horney's (1981) cooperative bargaining model, household decisions are reached through a cooperative Nash equilibrium, with two people in a marriage, pooling and jointly allocating resources, each receiving utility from a pure public good, and both valuing leisure and consumption of private goods (Alderman et al., 1995; Browning et al., 2014). The Nash bargaining problem is solved by considering a threat point, in this case each individual's utility outside marriage, i.e. the utility that each would obtain in case of the dissolution of the marriage. Such an exit condition, according to Carter and Katz (1997), is both a social and economic phenomenon. Further development of the model shows that the threat point can be shifted by some extra-household environmental parameters such as institutional, demographic, and legal factors, and that these parameters may lead to non-cooperative outcomes in the cooperative model (Doss, 1996).

One key prediction of the cooperative bargaining-type model is that factors that influence the threat points of individuals may affect the distribution within households even if the individual and total household resource levels are not altered (Doss, 1996). The models,

moreover, rest on the strong assumptions of perfect information and enforcement of contracts. The models differ from collective models, which simply assume that the outcome of the intra-household decision-making process is Pareto efficient, not how such Pareto efficient allocation of resources is achieved (Doss, 1996).

Due to the weaknesses of divorce or dissolution of the marriage as an appropriate threat point, as spouses cannot promptly resort to divorce even over a minor disagreement on intra-household decisions, researchers developed the separate spheres model (Lundberg and Pollak, 1993; Carter and Katz, 1997). The separate spheres bargaining model allows for the default equilibrium to be reached and maintained as a result of the social prescription of primary responsibilities, by say gender roles, without any negotiations.

*(iv) Non-cooperative bargaining models*

Non-cooperative bargaining models include the voluntary contributions model (Browning et al., 2014), the conjugal contract model (Carter & Katz, 1997), and the Cournot-Nash framework (Chen & Woolley, 2001). Non-cooperative approaches to intra-household decision-making assume that individuals cannot enter into binding and enforceable contracts with each other (Lundberg & Pollak, 1993; Alderman et al, 1995; Carter & Katz, 1997; Browning et al., 2014). Notable of the non-cooperative models in their original form is the assumption that income is not pooled. The models are also explicit on how the levels of shared goods are chosen. Doss (1996) and Browning et al. (2014) point out that the non-cooperative models allow both for individuals to have different preferences, and to make consumption and production decisions based on their own labour and access to resources, such that both Pareto efficient and non-Pareto efficient outcomes are consistent.

The common notion across all the non-cooperative models relates to the way household members make independent but interrelated consumption and production decisions. Carter and Katz (1997), in this vein, characterise the household economy as a site of independent preferences and resource allocation decisions bound together by various forms of interdependence. According to Sen (1989), households display cooperative conflicts. However, whereas the non-cooperative models are plausible for being least restrictive as a class of models, the estimation of such models requires detailed data on individual earnings and resources and transfers among household members (Doss, 1996; Browning et al., 2014).

### 1.5.3 Other key concepts

In the context of this study, an individual may have *decision-making responsibility* which implies that one is either a decision-maker or not. An individual may also have *decision-making power*, a situation that distinguishes between being a main decision-maker or a joint-decision-maker.

Employment, education and income are typical economic factors that provide an individual in the society with leverage, to be assigned decision-making or obtaining responsibility or power. In any group, more often than not, an individual possessing more of these factors tend to have power to bargain for his/her preferences. *Economic bargaining power* in intra-household decisions, therefore, can be represented by the employment status, education levels as well as the income that the family member can bring into the household.

In general, agency refers to peoples' ability to make decisions relating to their lives and act on those decisions (World Bank, 2016) thereby gaining autonomy, which is, 'having a greater say in affairs' (Basu & Koolwal, 2005: 15). Accordingly, *economic decision-making agency* within households, refers to the ability of individuals to make decisions on economic issues, inclusive of household expenditure on goods and services.

The World Bank (2012) pushes for gender equality in economic opportunities such as employment, endowments such as income and assets, and agency. In this respect, *gender economic empowerment* is defined as a situation when there is an improvement in gender equality. A typical example is when more females are economically active, that is, having access to employment opportunities in the same way as males (Ashraf, Karlan & Yin, 2010; Duflo, 2012). In addition, *gender economic empowerment* includes females' involvement in decision-making agency on economic matters. As such, *gender economic empowerment* embraces an improvement in females' *economic bargaining power* and *economic decision-making agency*, in order to achieve gender equality.

The concepts discussed in this section, together with intra-household decision-making models, are important tools in the investigation of investments in family public goods.

## 1.6 Data

South African survey and experimental data are employed in this study. Paper 1 and 2 draws on the National Income Dynamic Study (NIDS), the first national panel study in South

Africa. While paper 1 employs data from the first survey round (2008), paper 2 analyses data from three survey rounds (i.e. 2008, 2010, and 2012) using analytical techniques for cross-section and panel data. Paper 3 is based on a field experiment conducted in two poor communities.

## **1.7 Methods**

The study adopts a wide array of methods of analysis and employs stata. Such an analysis is made possible because of the different data sources and the reality that the thesis comprises of three distinct papers with distinct research questions. Descriptive statistical analyses are employed in all the papers in an effort to investigate associations between key variables, using Chi2, t-tests and F-tests. An in-depth analysis is made possible in each paper by employing appropriate regression analysis. For categorical dependent variables, probit and multinomial probit regression functions are adopted in the analysis. For continuous dependent variables, the study employs ordinary least squares (OLS) regression models; Heckman selection regression models, Random-effects OLS regression models; and Random-effects tobit regression models.

## **1.8 Organisation of the thesis**

This thesis consists of five chapters. Chapter one, as reflected above, focuses on the general introduction of the study. Chapter two to chapter four comprise three individual research papers. Paper 1, on the one hand, focuses on how financial decision-making roles are arranged in South African couples and the determinants of the female partner's financial decision-making role. On the other hand, expenditure on family public goods is assessed with regard to the explanatory power of economic bargaining power and the financial decision-making role of spouses. Paper 2 interrogates economic bargaining power as a determinant of South African adults' economic decision-making agency and in turn evaluates how the economic empowerment of women and men impacts expenditure on family public goods. Paper 3 investigates patterns of cooperation in extended inter-generational families using a field experiment conducted in two poor communities in the Free State and Eastern Cape provinces of South Africa. Finally, chapter 5 presents a policy perspective on the main research findings documented in this thesis.

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## **CHAPTER 2: PAPER 1**

### **Family Public Goods and Intra-Household Decision-Making by Co-Resident South African Couples**

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## Abstract

Intra-household decision-making is a fundamental development issue, particularly so for less-privileged households in developing countries. The current study examines sources of bargaining power that inform financial decision-making processes within couples and determines how bargaining power and decision-making impact on family public goods expenditure. The South African National Income Dynamic Study (NIDS) offers a direct measure of financial decision-making responsibility. Probit regression models are used to establish key economic and non-economic determinants of decision-making for female partners in co-resident couples, while OLS linear regression models are employed to determine the extent to which bargaining power and financial decision-making power influence expenditure on family public goods by households. The evidence of the relevance of economic factors for financial decision-making supports bargaining-type models, as postulated by the resource theory. There are two channels through which economic empowerment influences investments in family public goods. Households with wives who gain a decision-making role via economic empowerment spend more on family public goods. Households with affluent and employed husbands who delegate financial decision-making roles to their female partners spend more on family public goods. The findings suggest that policy has to focus on narrowing heterogamy between wives and husbands through gender mainstreaming and empowerment, which would enhance the decision-making role of women within co-resident couples.

JEL Codes: D13; D19

Key words: Couples; family public goods; intra-household decision-making; South Africa



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## 1. Introduction

The debate over the household being a critical decision-making and consumption unit dates back to Paul Samuelson. Samuelson (1956:9) observed that, “in most of the cultures studied by modern economists, the fundamental unit on the demand side is clearly the ‘family’, which consists of a single individual in but a fraction of the total cases”. The perception of the family “as a ‘glued-together’ unit, whose interests are as one” (Sen, 1997:371), suggests that investigations into intra-familial issues are unnecessary (Bennett, 2013). This view of a family as a single unit, is considered in studies such as those on poverty and income inequality at household level. These studies allow for comparison between households, but neglect what happens within the household (Cantillon, 2013).

Various crucial decisions are indeed made within households. These include decisions on day-to-day expenditures (Maitra & Ray, 2006), about where to live, who to live with, who should work and how to raise income (Quisumbing & Maluccio, 2000; Kusago & Barham, 2001), as well as where children should attend school, and how to spend the available income (Sawada & Lokshin, 1999). There is a direct link between intra-household decision-making processes and expenditure by families and family members. Further decision-making processes relate to joint consumption of a number of goods within the household, which include food, shelter, and transportation, also exists. The consumption of such family public goods is thus, a key development issue that is critical in determining the welfare of family members (Couprie, Peluso & Trannoy, 2010; Mok, Maclean & Dalziel, 2011). In this regard, intra-household dynamics of resource-related decisions have a great impact on basic household outcomes, particularly where resource constraints are more pronounced (Haddad, Hodinotti & Alderman, 1997).

Recent intra-household studies focused on testing the various models developed to explain decision-making processes (Browning et al., 1994; Doss, 1996; Carter & Katz, 1997; Attanasio & Lechene, 2002; Chiappori, Fortin & Lacroix, 2002). Andreoni, Brown and Rischall (2003) point out that a consensus has emerged that households are typically not governed by a sole benevolent head, as hypothesised by Becker (1981), but are instead characterised by bargaining between spouses with different preferences, tastes and talents. The literature indicates that studies on within-household dynamics often make use of the couple as a unit of analysis, which represents a theoretically tractable representation of intra-household decision-making. Partners in couples enjoy different levels of access to financial,

physical, human and social capital, factors that determine their decision-making position and capacity to influence household consumption. In addition, bargaining within couples has significant inter-generational implications in relation to education, the health of children, and bequest motives. Consequently the couples' financial bargaining processes influence both the inter-generational transmission of poverty and the potential for upward mobility across generations on the quality-of-life ladder (Deaton, 1998). Thus, the couple is an integral part of the decision-making processes within households.

Differentials in partners' characteristics, hereinafter referred to as marriage heterogamy, play a pivotal role in explaining who holds decision-making power, which in turn influences the allocation of household expenditure on family public goods. There is a need, therefore, to shed light on how couples function by focusing on financial decision-making processes and considering family public goods as a conduit of family well-being. According to Bertocchi, Brunetti and Torricelli (2014:65), the identification of the drivers of decision-making responsibilities has crucial implications to "understanding how resources are distributed within the family, how household decisions are made in a variety of economic and non-economic realms, and how household-based and gender-related development initiatives should be designed".

Using couple-level survey data from South Africa's National Income Dynamic Study (NIDS), this paper initially describes the financial decision-making responsibility and power of male and female partners. It describes next whether the decision-making processes are mono-type or joint-type. Furthermore, the paper examines both the partners' sources of bargaining power and whether specific sources of social and economic bargaining power influence the probability of a female partner being responsible for financial decision-making within the household. Finally, the study investigates the extent to which a partner's bargaining and financial decision-making power impacts the expenditure on family public goods.

The paper is structured as follows: section 2 reviews both the theoretical and empirical literature on intra-household decision-making and its link to household expenditure in relation to couples. Section 3 outlines the data, while section 4 describes the estimation procedures followed in the study. Section 5 presents the results. Sections 6 and 7 discuss contributions and limitations. Finally, section 8 concludes the paper.

## 2. Literature Review

Economic and sociological theories on intra-household decision-making in couples inform the theoretical framework of this paper. Specifically, the resource theory, economic intra-household decision-making models and the assortative mating theory of the marriage market, provide a base upon which knowledge on economic interaction between spouses can be advanced. This section reviews relevant theories linking intra-household decision-making and bargaining power. It also discusses empirical literature on the determinants of financial decision-making within couples. Furthermore, the section reviews empirical work on the impact of financial intra-household decision-making dynamics on household expenditure.

### 2.1 Theory

The resource theory of power developed by sociologists suggests that the power of each partner is related to his/her relative resources (Wolfe, 1959; Blood & Wolfe, 1960; Cantillon, Maître, & Watson, 2016). In this context, resources are defined as anything that any individual family member can offer to the other to help that person satisfy their needs or attain their goals (Hesse-Biber & Williamson, 1984). Decision-making within a couple depends on factors such as the environment, maintenance needs and interrelatedness of decisions. Give-and-take is a common phenomenon, and negotiations and bargaining are part of resolving differences within couples. Power dynamics are inevitable. When resource theory holds, the partner who has the greatest number of resources with which to meet other partner's needs and goals is perceived to have a greater power within the couple (Scanzoni & Polonko, 1980).<sup>2</sup> Scanzoni and Polonko (1980) and Hesse-Biber and Williamson (1984) argue that resources are the currency in negotiations and are used to bargain for desired goals within the family.

Economic models of intra-household decision-making have seen a considerable development compared to the models first conceptualised by Samuelson (1956) and later by Becker (1981). Along the path of development, the intra-household decision-making models are to date classified as unitary models, cooperative (collective) models, and non-cooperative models. The unitary model analyses household decisions under the hypothesis that the household is a single decision unit that maximises the welfare of its members (Carter & Katz,

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<sup>2</sup> Scanzoni and Polonko (1980) qualified this argument by stating that the person desiring resources is assumed to be willing to relinquish power over his or her own conduct in exchange for access to those resources. Hence, the argument that the 'resource theory' is a derivative of the exchange theory.

1997; Attanasio & Lechene, 2002; Chiappori et al., 2002; Vermeulen, 2005). As a result, decisions within the household are made by a benevolent dictator whose preferences depict those of the household members to such an extent that the dictator knows and can satisfy all household members' preferences. It is upon this assumption that the model came under heavy criticism for its failure to explain differences in individual welfare within a household, and those exhibited systematically by gender, age, or relation to the household head (Alderman et al., 1995; Browning, Chiappori & Weiss, 2014). Hence, the model is largely discredited.

The collective and bargaining-type models are characterised by elements that include individualism of preferences; interdependence within the household economy; property rights, information and autonomy within the household; exit options; and voice within the household (Carter & Katz, 1997). Collective models, in their focus on the individuality of household members and how individual preferences lead to a collective choice, make the key assumption that the household reaches a Pareto efficient outcome (Chiappori, 1988; Alderman et al., 1995; Doss, 1996; Attanasio & Lechene, 2002). However, no theoretical claims are made on how exactly such efficiency is achieved within the household. Collective models, importantly, take into consideration distributional factors, i.e. variables that affect the economic decisions of households, even though they do not directly impact on preferences nor on budgets (Bertocchi et al., 2014; Browning et al., 2014).

Collective models, which suggest that household members reconcile their different preferences in a cooperative or in a non-cooperative manner, are collectively known as bargaining-type models of intra-household decision-making. The cooperative bargaining model assumes that household decisions are always efficient in the sense that no one household member can be made better off without someone being made worse off – thus achieving Pareto optimality. Non-cooperative bargaining models, however, suggest that inefficient outcomes are possible. Therefore, in the context of a couple, the cooperative bargaining model is more appealing than the non-cooperative bargaining model as the partners are assumed to be in a voluntarily established and continuous relationship.

Lührmann and Maurer (2008) note that it is not plausible to assume that partners who know each other well, by virtue of being in a voluntary association in the form of marriage, make decisions that leave Pareto gains unexploited on a constant basis. The assumption of Pareto-efficiency and holding the view that the interaction between spouses determine household

utility, allow the couple's utility function to be expressed in accordance with household utility function by Lührmann and Maurer (2008) and Browning et al. (2014) expressed as:

$$U_{household} = \mu.U_{male\_partner} + (1-\mu).U_{female\_partner} \dots \dots \dots (i)$$

In the function above,  $\mu$  is the Pareto weight of the male partner and  $U$  is the utility function. The household utility function ( $U_{household}$ ), therefore, is the weighted sum of the partners' utility functions. It is plausible to argue that where the couple is the integral part of the household unit, the household utility function can be represented by the sum of the utilities of both partners in the couple. The household utility function considers the power of one partner, relative to the other. Conditional on any fixed cardinalisation of  $U_{male\_partner}$  and  $U_{female\_partner}$  (Lührmann & Maurer, 2008), the size of  $\mu$  determines the level of influence that the male partner has on the household's utility function. At values of  $\mu$  closer to one (zero), the male partner's (female partner's) voice or influence is dominant in determining household decisions. His (her) preferences are better represented in the household's utility function.

The above representation allows for formal hypotheses to be specified. *First*, the extreme cases of a 1 or 0 value of  $\mu$  represent gender-based dictatorship within the couple. In such cases, household outcomes reflect the preferences of the partner with full control or dominance over the other partner. *Second*, a value of  $\mu = 0.5$  represents equality between the partners, which indicates a unitary model, given the assumption that the benevolent dictator knows what the household members want and his/her actions are bound to maximise household utility and satisfy every household member. In the unitary model, the Pareto weight remains fixed at 0.5. Although the outcome of equality between spouses, within the unitary model, is ideal, it does not always prevail (if it does at all), thus suggesting the relevance of cooperative bargaining models.

The household utility function 'i' represents the cooperative bargaining model and the model allows  $\mu$  to be modelled as a function (Lührmann & Maurer, 2008):

$$\mu = \mu(p, y, x, z) \dots \dots \dots (ii), \text{ where}$$

$p$  = prices,  $y$  = household income,  $x$  = individual characteristics, and  $z$  = distributional factors

It is at this juncture that the resource theory plays a role in the formulation and application of the cooperative bargaining model. Depending on the resources that each partner contributes

to the household,  $\mu$  tilts in the main contributing partner's favour with regard to decision-making within the household. Resources constitute distributional factors, which are defined as characteristics that affect neither preferences nor budget constraints, but influence household decisions through their impact on the Pareto weight only (Maitra & Ray, 2006; Lührmann & Maurer, 2008; Bourguignon, Browning & Chiappori, 2009; Bertocchi et al., 2014; Browning et al., 2014). These authors suggest that the distributional factors include relative ages, relative education, individual incomes, social norms, traditional roles, and institutional variables affecting the cost of marriage breakdown.

Related to the above theories is the assortative mating theory in the marriage market. Lam (1988:462) states that, "marriage market equilibrium exhibits positive assortative mating on spouses' wealth that they bring with into marriage". The author expands the idea to cover cases in which there is positive assortative mating on wages in marriage market equilibrium. Positive assortative mating on sources of economic bargaining power is associated with homogamy in couples.

In a theoretical sense, resources matter in gaining decision-making responsibility and power. Greater homogamy is therefore theoretically associated with greater equality in decision-making. In that case, an individual's welfare within the household does not vary much from the household average. However, there could be heterogamy in couples if positive assortative mating is less pronounced and resulting in partner differentials in sources of bargaining power. Heterogamy in couples raises the Pareto weight of a single partner who is better endowed with resources. Consequently, household outcomes may be tilted in favour of the preferences of the partner contributing more resources.

## **2.2 Empirical research**

Empirical work on intra-household decision-making has expanded in the recent past. The studies, which often focused on heterosexual couples as the unit of analysis, and test intra-household decision-making models concur in their rejection of the unitary model and claiming favour for the bargaining-type model (Browning et al., 1994; Carter & Katz, 1997; Attanasio & Lechene, 2002; Chiappori et al., 2002).<sup>3</sup> Couple studies framed in the context of resource theory and providing evidence of the influence of couple heterogamy on intra-

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<sup>3</sup> Dosman and Adamowicz (2006), using data from Canada, and Maitra and Ray (2006), using the 1993 South Africa Integrated Household Survey and the 1998 Kwazulu-Natal Income Dynamics Survey (KIDS), however, reported pooling. Maitra and Ray (2006), although not studying couples, found that pooling is restricted to expenditure on food, clothing, and energy only.

household decision-making include, Hesse-Biber and Williamson (1984), Lancaster, Maitra and Ray (2006), Lührmann and Maurer (2008), Yusof and Duasa (2010), Cantillon (2013), Antman (2014), Bertocchi et al. (2014), and Cantillon et al. (2016). Some of these studies, as alluded to below, link household power dynamics with outcomes that proxy household well-being. The major policy concern is that there is a possibility of situations where the individual welfare of some members within household might be lower than the household average.

Assessing the balance of power between spouses over their lifetime, Hesse-Biber and Williamson (1984) point out that an unequal access to money, education and occupational status is influenced by norms that define a woman's place in the home and a man's at work. The discussion also shows that differentials with regard to these factors persist even when women are employed outside the home, because women do not typically gain the positions that can provide them with resources that are equal to men (Hesse-Biber & Williamson, 1984). Thus, economic bargaining power and the gender roles of men and women affect marital power.

Lancaster et al. (2006) use the Indian National Sample Survey to extend the collective model and estimate a model in which the weights of power attached to individual household members are endogenously determined. The authors' approach on relative spousal power uses the partners' income share to estimate its impact on household expenditure. The results show that although the relationship between relative bargaining power (measured by income share) and budget shares vary significantly between expenditure items, there are positive associations between the decision-maker's relative bargaining power and expenditure shares of items (Lancaster et al., 2006). The authors concluded that household welfare is better protected in situations of homogamy – where bargaining power is evenly distributed, unlike in a heterogamy situation – where one partner dominates the other in terms of bargaining power.

Lührmann and Maurer (2008) claim that not much is known about the determinants of decision-making power. The study emphasises that decision-making processes in couples depend on the balance of power between partners, which in turn influence the welfare of household members and household outcomes. The determinants that were used to model 'balance of power' include the partners' demographic, socio-economic, and health characteristics (cf. Beegle, Frankenberg, & Thomas, 2001; Allendorf, 2007). In addition, Lührmann and Maurer's (2008) study which uses the Mexican Health and Aging Study

(MHAS) and focuses on elderly couples, found education and employment status as positively affecting women's individual decision-making power.

Yusof and Duasa (2010) found that, in their testing of the income pooling hypothesis and the bargaining model in a Malaysian sample of employed and married men and women, the relative earning share is a significant factor in decision-making and consumption expenditure. The study found out further that female partners are the ultimate decision-makers on everyday household expenditure, whereas male partners are mostly the decisive decision-makers for large household expenditures. However, partners are reported to practice autonomy in relation to financial investments. Overall, the results support the bargaining model. A similar study of Swiss couples by Bütikofer, Gerfin and Wanzenried (2009) found that the distribution of bargaining power within the household, which is generally unequal, is dependent on each spouse's relative contribution to the household income.

Cantillon (2013) investigated differences in living standards between spouses as represented by their possessions and access to certain goods and services, and control and management of household resources. The study, which employs data from Ireland, reports that a female partner's economic independence, especially based on her own income, raises her bargaining power in the household. The size of the female partner's independent income in turn translates into discernible differences in living standards (Cantillon, 2013).

Focusing on how the employment status of a spouse influences the spouse's economic bargaining power within the household, Antman (2014) found that the spouse of the household head is more likely to be involved in decision-making when she is employed, with joint decision-making being common. Joint decision-making equates to a more even distribution of bargaining power and hence better household welfare, as implied by Lancaster et al. (2006).

Bertocchi et al. (2014), whose analysis is replicated and expanded upon in this paper, adopted two approaches to explaining the decision-making responsibility of household heads using Italy's Survey of Household Income and Wealth. On the one hand, the bargaining approach is investigated on the basis of factors such as income, age and education. On the other hand, the household production approach, represented by either employment status or distinguishing degrees of complexity of economic and financial decisions, is applied. According to Bertocchi et al. (2014), factors such as age, education and income explain the probability of a wife being a decision maker in as much as the wife's characteristics match or surpass that of

the husband when the wife is the decision-maker. Bertocchi et al. (2014:66) interpret these results as indicating the importance of both strict economic characteristics that are measured in monetary terms and other factors “such as knowledge, human capital accumulation, experience, seniority, and savviness” in decision-making. Regarding the household production approach, the probability that the wife is responsible for decision-making is lower when she is employed (Bertocchi et al., 2014), which suggests a division of tasks within the household.

Recent work by Cantillon et al. (2016) focuses on the extent to which partners may derive different benefits from the couple’s total resources. The essence of the authors’ argument is that if the unitary model plays a role, then one would not expect higher levels of deprivation for the non-working partner or partner without individual income. Cantillon et al. (2016:462) qualify their argument through the statement that, “if there is validity in the argument that couples specialise in order to increase efficiency, one might expect to see lower levels of individual deprivation where there is one source of income and one decision-maker”. However, if the bargaining model is to hold, then individual deprivation would be higher for the partner with no personal income and less involved in decision-making. The study found that there is a beneficial impact on access to personal goods and services of earning income from work as well as involvement in decision-making.

### **3. Data**

The analyses in this study use the 2008 baseline of South Africa’s National Income Dynamics Study (NIDS). The survey consists of a set of individual and household level questionnaires covering a wide range of topics. The dataset is ideal for the analysis of intra-household decision-making due to a number of reasons. *First*, the data offers a unique section of questions regarding the identification of joint and main decision-makers in five decision spheres, including day-to-day expenditures, which is a precise and narrow representation of household financial decisions.<sup>4</sup> Importantly, all the household adults reported on who the decision makers are in the household. Data regarding decision-making processes, especially

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<sup>4</sup> The question reads: “Who makes decisions about: (a) “day-to-day household expenditures (e.g. groceries)”, (b) large unusual purchases such as appliances, vehicles or furniture, (c) “where your children go to school”, (d) “who is allowed to live in the household as part of the household (for example, if a relative or family member does not have a place to stay)”, (e) “where the household should live”.

the identification of the main and joint decision-makers, are generally very rare, which makes this a unique research opportunity, especially in the South African context. *Second*, the baseline has gender-disaggregated data on various determinants of economic bargaining power, including incomes, wealth, and social factors. *Third*, the data enables the matching of partners in a couple thus allowing the construction of a couple-level dataset. *Last*, data on household expenditure is disaggregated and allows the identification of expenses on family public goods.

Out of a total 15,633 South African adults residing in 7,305 unique households, 2,055 co-resident heterosexual couples were identified.<sup>5</sup> Both partners did not have financial decision-making powers in 60 (2.92%) couples and these were excluded from the analysis, leaving 1,995 co-resident couples.<sup>6</sup> The analysis includes only co-resident couples, because the decision-making section of the adult questionnaire was completed only by resident adults. The identification of the couples was followed by the construction of variables that represent household characteristics. Furthermore, variables for individual characteristics were coded and corresponding within-couple differentials computed. The variables are summarised in Table A1 in the annexure.

The most critical in the list of variables [Table A1] is the set [stage two dependent variables] that represent the decision-making role of partners within couples. Using the question ‘Who makes decisions about day-to-day household expenditures?’, the data were used (i) to establish the decision-making responsibility of each partner, distinguishing between a decision-maker (=1) versus a non-decision-maker (=0), (ii) to classify partners by their decision-making power, as main (=3) or joint (=2) decision-makers or non-decision-makers (=1), and (iii) to categorise situations where both partners within a couple are identified as either a main or joint decision-maker (=1) versus a single decision-maker in the couple (=0), i.e. joint decision-making. These three decision-making variables are categorical in nature and allow the application of probit regression analyses.

In order to measure economic bargaining power, a number of variables were selected, including incomes (labour income, social grant income, and other income), employment status, education, and asset ownership (measured as an asset index). Doss’s (2013) review

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<sup>5</sup> A co-resident partner resides at the house at least four nights a week (Brown et al., 2012).

<sup>6</sup> There were no cases of same sex couples. There were six situations of polygyny and no cases of polyandry. The polygyny cases were handled by including only the first wife on the roster, as identified by the respondent. Since the focus of this paper is not necessarily on how power is distributed within a polygamy, the exclusion of the six ‘secondary’ couples is thought as having no impact, given the total sample size.

notes that indicators and proxies of bargaining power that have drawn the attention of researchers include income and employment, assets, human capital, gender of first born, and women's perceptions on certain social norms. The measurement of economic bargaining power using assets controlled by mothers and fathers is discussed in the work of Doss (1996/1997), Quisumbing and Maluccio (2000), and Kusago and Barham (2001). Economic bargaining power is thus one of the key independent variables that are hypothesised to explain decision-making responsibility and power. Social capital (measured as an associational or network index), gender of first-born, and the presence of a spouse's parent(s) are considered key social variables that potentially determine the decision-making propensity of a spouse (Lee, 2007; Li & Wu, 2011).

Stability over time relative to accumulation is important in choosing the variables to consider as key covariates (Córdova, 2009). Stability is a proxy of long-run economic status. Thus, social grant income, assets and social capital are relatively more stable over time and were considered as factors in explaining decision-making by partners.<sup>7</sup> Wealth and asset indices are perceived as able to effectively discriminate between economically well-off and worse-off individuals (Córdova, 2009). Asset-based measures depict an individual's long-run economic status and therefore do not necessarily account for short-term fluctuations in economic well-being or economic shocks. Córdova (2009) argues that these expenditure-based economic status indicators are more reliable than income-based indices. Income-based indices are prone to high non-response rates and over-or under-reporting. However, non-response rates to questions on household and personal assets are lower (Córdova, 2009). The study makes use of both income-based and expenditure-based socio-economic indicators to obtain a more nuanced picture of drivers of financial decision-making within couples.

Data preparation also involves the calculation of household expenditure on selected categories of family public goods with possible welfare impact to all household members. NIDS uses ten classifications of expenditures, including a miscellaneous category. The seven

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<sup>7</sup> The wealth, asset and social capital indices were all computed using Multiple Correspondence Analysis (MCA). The MCA methodology is applied in order to make the weights of the items considered non-arbitrary and replicable. The three indices are calculated from variables that are categorical and/or ordinal in nature. Before the application of the MCA, cronbach's alphas were calculated to measure the reliability of the variables used in the calculation of the index. Only those items that saw cronbach's alpha being maximised were retained in the index. The MCA used the Burt method and indices were constructed on dimension one. The maximum value of alpha (dimension one inertia) for the wealth index are 0.886 (**84%**), asset index are 0.674 (**93%**), and social capital index are 0.557 (**77%**). Related variable "index quintile" was in turn constructed too by putting the index values into five groups (quintiles) and distributing the values equally after first ranking the values. Tables A1 (for asset and social capital) and Table A2 (for wealth) in the annexure provide the detail on variables used in the construction of the indices.

categories that are argued to represent expenditure on family public goods are food; transport costs; energy, water and municipal rates (utilities); insurance; household items; health care; and education.<sup>8</sup> This selection is also informed by the work of Lancaster et al. (2006).

#### 4. Methods

Descriptive statistical analysis is employed to investigate associations between economic factors, non-economic factors, and partners' financial decision-making responsibility and power. The economic factors here, which measure economic bargaining power, include different types of income; education; employment status; and asset ownership. In addition, the non-economic factors, which represent the partner's social position within the couple and possibly have an influence on a partner's decision-making responsibility, include social capital networks<sup>9</sup>; a partner's parents residing with the couple; and if the first-born is a male. Chi-squared, t-tests and F-tests are used in the descriptive analysis.

Probit regression models are first used to investigate the relative importance of economic bargaining power and social positioning in explaining the female partner's financial decision-making role. Specifically, the regression models investigate determinants of [1] the female partner taking decisions on day-to-day expenditures, and [2] both partners making decisions on day-to-day expenditures. The determinants for these two decision-making variables are presented *first* as wife's and husband's characteristics, *second* as within-couple differentials, and *last* as within-couple differentials represented by dummies. Differentials are calculated as the difference between the wife's and the husband's specific socio-economic characteristics.

Bertocchi et al. (2014:76), replicated here, argue that the preliminary exercise of introducing the differentials one by one in the analysis, which is followed here, "facilitates the exposition of the intuition behind the underlying links of marriage heterogamy and decision-making processes". The interpretation of the regression results in situations where the average differentials are reported as negative imply that an increase in the differential means that the wife is catching up or surpassing the husband on the relevant socio-economic characteristic.

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<sup>8</sup> Each of these categories has specific items for which the respondent had to indicate if some money was spent on and if so, the amount that was spent.

<sup>9</sup> This study adopts the network view of social capital, which emphasises the importance of vertical and horizontal associations between individuals and organisations (Woolcock & Narayan, 2000).

Linear ordinary least squares (OLS) regression models were then employed to investigate how partners' decision-making and economic bargaining power, separately and jointly, impact household expenditure on family public goods. Possessing economic bargaining power is hypothesised to influence females' decision-making responsibility and power, which in turn influence expenditure on family public goods. Below is a summary of the multivariate regression models.

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<b>Regression</b>	<b>Independent variables</b>
<b>Probit:</b>	<i>Female partner's financial decision-making responsibility (0/1)</i>
I	wife characteristics; husband characteristics; household characteristics
II	within-couple differentials (continuous); wife characteristics; husband characteristics; household characteristics
III	within-couple differentials (dummies); wife characteristics; husband characteristics; household characteristics
IV	employment income; social grant income; other income; total income; asset index; social capital index; first-born male; residing with parents; wife characteristics; husband characteristics; household characteristics
V	within-couple differentials for different income sources, age, education, social capital count, wife characteristics, husband characteristics; household characteristics
<b>Probit:</b>	<i>Joint financial decision-making (0/1)</i>
VI; VII; VIII	model specifications similar to models I, II, and III respectively
<b>OLS:</b>	<i>Household expenditure on family public goods (Rand)</i>
IX	partner financial decision-making responsibility; household size; household size squared; per capita household income
X	partner financial decision-making power; household size; household size squared; per capita household income
XI	partner financial decision-making responsibility * employment status; household size; household size squared; per capita household income
XII	partner financial decision-making power * employment status; household size; household size squared; per capita household income
XIII	partner financial decision-making responsibility * total income; household size; household size squared; per capita household income
XIV	partner financial decision-making power * total income; household size; household size squared; per capita household income
XV	both partners make financial decisions; household size; household size squared; per capita household income

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Note: “\*” represents interaction.

The dependent variable, “female partner’s financial decision-making responsibility”, takes the value (=1) if the female is the financial decision-maker, and otherwise assumes the value (=0). Similarly, the dependent variable “joint financial decision-making”, takes the value (=1) if both partners in the couple make financial decisions, and takes the value (=0) if a single partner in the couple makes financial decisions. As pointed out earlier on, the variable “partner’s financial decision-making power” is categorical, assuming the values of main- (=3), joint- (=2) or none- (=1).<sup>10</sup> The dependent variable “household expenditure on family public goods” represents monthly expenditures on food, transport, utilities, insurance, household items, health care, and education. Wife and husband characteristics include age, education level, employment income, and employment status, while household characteristics include household size, household income, and household wealth.

Regression I has two models, one that does not include (and the other that does) the squared values of age, years of education, and employment income of the partners, which are used to assess the influence of non-linearity. Model variations of regression II have each of the ‘within-couple differentials’ assessed separately, all in a single model, and then included together with the partners’ and household characteristics. A similar approach is employed for regression III, where the ‘within-differential dummies’ are assessed separately, all jointly in one model, and then included together with the partners’ and household characteristics. Likewise, regression IV has model variations where the identified independent variables are inserted in separate models first, included in one joint model, and finally included together with asset index, social capital index, first-born male, and parent(s) resident. Regression V follows a similar approach.

Model specifications represented by regressions VI, VII and VIII follow all the same steps in regressions I, II and III, respectively, except that the dependent variable is ‘joint financial decision-making’. According to Bertocchi et al. (2014:76), such an “univariate, preliminary

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<sup>10</sup> For the purpose of the analysis conducted in this paper, individuals were assigned their “highest” recorded level of decision-making power. In other words, if the respondent identified him/herself as “main” decision-maker, or any other household member identified the person as “main” decision-maker, the individual was assigned the status of “main” decision-maker. Next, respondents were assigned the status of “joint” decision-maker if they themselves or any other household member accorded them the role of “additional” decision-maker. Non-decision-makers are those respondents who did not identify themselves as decision-makers and was not identified as decision-makers by any other household member. For this reason, couples may include two main or two joint decision-makers. In other words, as multiple household members assigned themselves and others’ decision-making roles, there is room for disagreement as to assigned decision-making roles. A simpler approach was opted for here rather than focusing on explaining the nature of these disagreements or focusing only on those cases where there was complete agreement in the assignment of decision-making roles. It is proposed that these detailed data be employed to conduct a much richer and nuanced analysis of decision-making responsibility and power as part of further research.

exercise followed in the analysis of each independent variable is meant to facilitate the exposition of the intuition behind the underlying links”. Regression IX and regression X differ in that the former employs decision-making responsibility while the later employs decision-making power. Regressions XI – XIV interact decision-making responsibility with two key economic factors, i.e. employment status and total income. The final regression (XV) analyses the influence of joint decision-making on family public goods expenditure.

The methodology, therefore, comprises three key stages of analysis. The first stage focuses on the association between socio-economic factors and financial decision-making. The second stage assesses the explanatory power of economic and non-economic factors as determinants of female partners’ financial decision-making responsibility and joint financial decision-making. The third stage investigates the influence of decision-making, both individually and jointly with economic bargaining power, on household expenditure on family public goods. A minor component of the stage three analysis assesses the influence of joint financial decision-making on expenditure on family public goods. Stage two of the analysis informs stage three in as much as stage three employs those economic correlates found to be significant in stage two.

The study uses Thomas’ (1990) inferential approach to establish the impact of decision-making and economic bargaining power on expenditure on family public goods. As Doss (2013:66) explains:

When the proxy for women’s bargaining power has a significant impact on the outcome in question, then the inference is that women prefer this outcome. For example, if women own more household assets and more of the household budget is spent on food, it is inferred that women prefer to spend more money on food and are able to use their increased bargaining power to obtain this outcome. Thus, a necessary condition for finding that men’s and women’s bargaining power within marriage matters is that they have different preferences. If their preferences do not systematically differ, the impact of women’s bargaining power will be underestimated and will likely not be well understood by policy makers. (Doss, 2013:66)

## 5. Results

Financial decision-making by couples in this study is outlined along three dimensions, i.e. decision-making responsibility, decision-making power, and joint decision-making [Table 1]. South African couples show a substantial level of joint financial decision-making. About 81% of the couples report that both partners are involved in financial decision-making, whereas 18% report a single partner as the decision-maker. With regard to decision-making responsibility, 90% of the female partners and 91% of the male partners participate in financial decision-making. The results confirm similarly high levels of involvement in decision-making, by gender.

An assessment of the data to determine the financial decision-making power, i.e. main, joint and none, shows that male partners are mostly identified as main financial decision-makers (69%) as compared to female partners (48%). Female partners however, are identified mostly as joint financial decision-makers (41%) as compared to male partners (22%). There, however, are very rare cases where partners do not give an input to financial decisions as shown by 8% of male partners who are non-decision-makers and 9% of female partners who are non-decision-makers. In addition, there are a few couples (less than one in five) with centralised decision-making, i.e. single decision-makers. The application of a chi2 test to evaluate the statistical significance of gender differences in main, joint and none decision-making, shows that the differences are highly significant ( $p < 0.01$ ).

[Table 1 about here]

Table 2 provides a summary of the descriptive statistics for couples' household characteristics, wife's and husband's characteristics, within-couples differentials, and dummies for within-couples differentials. On average, household size is 4.28 persons and the median household has 4 members. Although the average monthly household income is R8,815, the median value is just R3,547 per month, which reflects that household income is positively skewed. The same trend is observed when considering the wife and husband's monthly total, as well as separate incomes. The wife's mean (median) total income is R1,762 (R420) per month and husband's mean (median) total income is R4,643 (R1,470) per month. A similar trend is observed in relation to employment income, with the wife's mean (median) employment income being R1,430 (R0) per month and the husband's mean (median) employment income being R4,083 (R1,100) per month. Therefore, partners' monthly incomes are, just as household monthly income, positively skewed. Average monthly

incomes are pulled up by a few seemingly unrealistic high values and so the median values give a better picture.

Within couple differentials in income show that husbands on average earn R2,652 more per month than their wives. An aggregation of income reveals that husbands receive an average R2,881 more, per month, than their wives. Only social grant income indicates that wives receive more than husbands by about R57 per month, on average and this is probably because females receive child support grants on behalf of children under their custodianship. The differences between husbands' and wives' total and employment income, but not social grant income, persist when considering the median differences: for wives outperform husbands in income differential dummies only in 14% and 26% of the cases, respectively.

The results on employment status show that only in about 7% of couples did the wife only work whereas in 34% of couples only the husband works. A reflection of the general high level of unemployment in South Africa is confirmed in that the results show that 24% of the couples had neither a husband nor wife at work. The partner's characteristics show that 41% of wives are employed while about 67% of husbands are employed.

The outcomes regarding the partners' age and education level, show that wives, as expected, are generally younger than their husbands by about 4 years, as confirmed by both the mean and median age differences. Only in 13% of the cases are the wives older than the husbands. Furthermore, the wives in only 35% of the couples outperform their husbands' education by an average of 0.12 years.

[Table 2 about here]

The results from an assessment of the association between income sources and financial decision-making responsibility show that female partners who are financial decision-makers earn an averagely higher income from all sources than female partners who are non-decision-makers. However, with regard to female partners' financial decision-making power, it is evident that income differences between main and joint decision-makers are narrow, except for employment income (main R2,368 vs joint R3,011 per month) and 'other income' (main R1,732 vs joint R4,011 per month). The direction of this difference may be the result of decision-making responsibility being delegated to joint female decision-makers by more affluent male partners. For female partners, therefore, income on aggregate plays a role, more

as a determinant of financial decision-making responsibility than as a determinant of financial decision-making power.

Nonetheless, male partners who are not financial decision-makers seem to possess similar average incomes to financial decision-makers, especially employment income. The male partners that receive income from 'other sources' category shows that non-decision-makers receive more income (R4,372 per month) than financial decision-makers (R2,817 per month). The same picture is portrayed among male partners who are non-decision-makers (R3,740 per month) compared to financial decision-makers (R2,951 per month) after the aggregation of income, probably due to the reality that employed husbands who are affluent delegate the financial decision-making duties related to day-to-day expenditures to their wives. In addition, the employed husbands could be too busy to participate in the day-to-day decision-making. Hence, an increase in a husband's income increases a wife's decision-making power. The results regarding the social grant income show marginal variations by financial decision-making responsibility across the gender of the partner. All in all, male partners, in cases across all income types, who are identified as joint decision-makers receive more income than main decision-makers. Delegation of financial decision-making duties from husband to wives is a plausible explanation for the result.

Although the variations in education levels are marginal for both female- and male- partners, the results show that more educated female partners (7.2 years) do make financial decisions more often than their less educated counterparts (6.7 years). A possible explanation is that of more trust with finances by their male partners. However, financial decision-makers among male partners seem to have less education (6.9 years) than non-decision-makers (7.5 years). This may not be a surprise if one considers that the more educated male partners are likely to be employed. They may thus, voluntarily delegate financial decision-making responsibility, especially for day-to-day expenditures, to their female partners, leaving less educated male partners more likely to be financial decision-makers.

[Table 3 about here]

The percentages in Table 4 are derived from the financial decision-making power of those partners that fall in the employed, unemployed and not economically active categories. The results show that being employed boosts the chances of participating in financial decision-making for female partners but not necessarily for male partners. The statistics show that there are 43%, 22% and 34% women who are employed, unemployed and 'not economically

active', respectively, among female partners who are financial decision-makers. However, the corresponding percentages for the female partners who are non-decision-makers are 25%, 34% and 40%. A substantial percentage (70%) of male partners who are non-decision-makers, is employed, which is in line with variations in income by financial decision-making responsibility for male partners. Again, this finding may suggest that affluent working men delegate decisions on day-to-day expenditure to their wives. For female partners, though, employment status raises the probability of financial decision-making.

[Table 4 about here]

Both models in Table 5 demonstrate that household characteristics (household size, income quintiles and wealth quintiles) do not explain the probability of a female partner being a decision-maker. Turning to the spouses' characteristics [Model 1], the wife's age positively influences the probability of her being a financial decision-maker. However, a husband's age does not matter for the wife's probability of being a financial decision-maker.

Model 1 in Table 5 also shows that, while the wife's employment income does not matter, the employment income of the husband positively impacts on the wife's probability to make financial decisions. Increasing the husband's income by a thousand South African Rand would increase the wife's probability to make financial decisions by 0.6%. Such a result reinforces the argument that more affluent men may be delegating day-to-day financial decisions to their partners. While the employment income of the wife does not matter in the model, as an explanatory variable, her employment status matters and in the expected positive direction. Being an employed wife increases the probability of being a financial decision-maker by 6.5%, while the husband's employment status in this regard is not important, supporting the pattern shown in Table 4. Therefore, being employed confers financial decision-making power on women, irrespective of the level of employment income.

Model 2 in Table 5 analyses how, in a non-linear sense, the wife's and husband's characteristics may influence the wife's financial decision-making responsibility. The results show that only the wife's age, and employment status, are significant. Although infinitesimally small, as female partners get older and older, the effect of age on their probability to make financial decisions, gets smaller and smaller. Adding the husband's squared employment income turns his employment income insignificant. The second model's results do not differ from the benchmark model, except for the husband's employment income. As measures of goodness-of-fit, both model 1 and model 2 reported the "percent

correctly predicted' value of 91.37%. Overall fitness of the regression models is confirmed by the Wald Chi-squared test.

[Table 5 about here]

As argued by Bertocchi et al. (2014), a verification of whether the dimensions of marriage heterogamy matter in explaining the probability that the wife is a financial decision-maker compelled the entering of the spouses' differentials of age, education and income as regressors into a similar set of regression models. As expected, and similar to the results in the literature, Model 1 in Table 6 shows that when the wife is older than the husband, the wife is significantly more likely to make financial decisions. Literature suggests that such finding may be a result of an increase with age in the wife's "experience, savviness and reliability" (Bertocchi et al., 2014:76).

When the employment income gap between the wife and the husband shrinks in favour of the wife, the wife's chances of making financial decisions increase. When all the three differentials are entered into the regression function at once [Model 4], the model shows that age and income maintain their statistical significance, thus reflecting very similar coefficients as in the regression models where the differentials are introduced individually [Models 1-3]. Closing the income differential by a thousand Rand impacts positively on the wife's probability of being a financial decision-maker, and by a marginal 0.2%. This impact is highly significant in statistical terms ( $p < 0.01$ ). However, the education differential remains statistically insignificant.

The results from introducing the within-couple differentials in the model specification where household characteristics, wife characteristics and husband characteristics are all controlled for [Model 5], show that both the age and income differentials lose their statistical significance. However, the age and employment status of the wife maintain their statistical significance. The case could be that an increase in the propensity to make financial decisions does not originate from a wife's relative distance from the husband's corresponding characteristics, but rather, from their individual characteristics. However, the parsimonious regression functions show that age and income differentials report positive statistical significance at the 5% and 1% level, respectively. Model 5 include only a sub-set of the husband's characteristics as a replication of Bertocchi et al. (2014). The "percent correctly predicted' values for all the models range from 91.37% (Model 5) to 91.51% (model 4). Thus, the regression models perform well in terms of overall fit.

[Table 6 about here]

The results on the differentials between spouses is similar when expressing these differentials as dummies [Table 7], i.e. wife is older, wife more educated, and wife earns more. When the wife is older than the husband, the probability of her making financial decisions increases by 2.9% ( $p < 0.10$ ). When the wife is more educated than the husband, the probability to make financial decisions increases by 2.1% ( $p < 0.10$ ). Also, when the wife earns more than the husband, the probability of her making financial decisions increases by 4.4% ( $p < 0.01$ ). The dummies, however, lose statistical significance when they are all entered into one regression model that includes the wife's and husband's characteristics [Model 4] as well as in the comprehensive regression model inclusive of household characteristics [Model 5]. This loss of statistical significance is probably due to multicollinearity. The differentials perform better than their dummy counterparts in terms of statistical significance, which is in support of the argument that dummies are too coarse a measurement of within-couple differentials (Lundberg, Pollak & Wales, 1997; Elder & Rudolph, 2003; Bertocchi et al., 2014). As a measure of overall goodness-of-fit, the "percent correctly predicted" by the models are relatively high, ranging from 91.37% (Model 5) to 91.53% (Model 4).

[Table 7 about here]

The investigation now shifts to the role of alternative income sources and other potential determinants of the decision-making responsibility [Table 8]. Additional determinants of the financial decision-making responsibility include an individual asset index; individual social capital index; resident parents; and the wife having a first-born male. The results show that when the spouses' income from different sources were individually considered in the regression model [Models 1-3], only the husband's employment income positively impact on the probability of the wife being a decision-maker. The husband's employment income impact becomes highly significant with a slightly higher value ( $\beta = 0.008$  compared to  $\beta = 0.006$ ) in the regression model that includes all the income sources, with the husband's 'other income' being marginally significant too [Model 4]. These significant coefficients for the husband's income bear a positive sign in both cases, i.e. increase in income enhances financial decision-making power of a wife. The aggregate income for the husband [Model 5] remains significant and with a positive sign, even in the comprehensive regression model [Model 6] that controls other factors. Again, the evidence suggests that employed men in particular are delegating financial decision-making responsibilities to their wives.

The results presented in Table 9 show that the statistical significance of different income sources does not change by expressing these income variables as differentials. The wife's employment status remained positive and significant in all the regression models presented in Tables 8 and 9. Being employed throughout enhances the probability of the wife's responsibility for financial decision-making.

Whereas the presence of a wife's parents does not impact statistically significant on her decision-making responsibility, the presence of the husband's parents in the household statistically significantly reduces the wife's propensity to make financial decisions. These results confirm Lee's (2007) findings that living with the husband's parents significantly raised the bargaining power of the husband, while living with the wife's parents reduces the husband's bargaining power. When the husband's parents are present in the household, the female partner may play a 'good wife' who is submissive to the husband and so willingly or unwillingly surrender the power of decision-making to the husband (or his parents). This is most likely in the South African context with its patriarchal norms and values.

The social capital index and the 'first-born male' variables were not found statistically significant. This is in contrast to Li and Wu (2011), who found that having a 'first-born male' impacts positively on women's role in financial decision-making. However, the reason why the 'first-born male' measure can be distorted and hence not achieve significance is that it is not possible to establish here if and in which cases the first-born is the particular couple's child or just the woman's child but with another man. "Percent correctly predicted" for models in Table 8 is relatively high, ranging from 91.36% to 91.87%. For the models in Table 9, "percent correctly predicted" range from 91.20% (model 9) to 91.51% (model 8). Thus, the models perform well in terms of overall goodness-of-fit.

[Table 8-9 about here]

In a fashion similar to the regression models presented in Tables 5-7, a dependent variable that captures a binary situation where 'both partners make financial decisions' versus 'a single partner being the financial decision-maker', is used in a series of probit regression models. The regression models include exactly the same explanatory variables as in Tables 5-7. Model 1 in Table 10 shows that household size, household size squared, wife's employment income, and husband's age are the only significant explanatory variables. The results specifically show that the greater the household size and the greater the wife's employment income, then the more likely that both partners participate in financial decision-

making. The latter result may imply that giving the wife economic bargaining power promotes syncretic as opposed to autonomic decision-making within couples. The probability of joint decision-making increases slowly with household size as shown by the negative sign on the household size squared.

The more comprehensive model [Model 2], which includes the squared variables of age, years of education, and employment income, maintains the significance of household size and its square. The probability of joint decision-making increases at a decreasing rate with household size. The wife's employment status, age and its square, as well as the wife's employment income and its square, are significant explanatory variables of the probability of joint decision-making within a couple. While the wife's squared employment income carries a positive sign, the sign on employment income changes to negative, when adjusting for employment income squared.

Representing the key determinants of decision making in the form of differentials or dummies of these differentials, as shown in Tables 11 and 12, does not tell a different story when compared to the results in Table 10. Essentially, within-couple differentials are not statistically significant or important predictors of joint decision-making in couples. The models in Table 10 report relatively high "correctly predicted" percentages of 81.49% and 81.43%, for Model 1 and Model 2, respectively. For the models in Tables 11 and 12, the "correctly predicted" percentages vary around 82%. The explanatory power of these regression models are relatively poor compared to the other probit regression models (see above), thus hinting at omitted variables bias, i.e. the exclusion from the model specification of factors of importance in predicting joint financial decision-making. Again, the models perform well in terms of overall goodness-of-fit.

[Tables 10-12 about here]

However, an important observation can be made from the regression results evaluating the significance of both the household, and the wife and husband characteristics. The key economic empowerment variables, i.e. the wife's income and employment status, and husband's income, matter in explaining the financial decision-making responsibility of female partners in South African couples, positively so.

The analysis next focuses on how the financial decision-making responsibility and financial decision-making power of partners impact household expenditure on family public goods,

which is particularly important given the potential impact on household welfare. *First*, financial decision-making responsibility is regressed on expenditure on each of the family public goods expenditure categories, using linear Ordinary Least Squares (OLS) regression analysis. This is a parsimonious analysis of the impact of the financial decision-making responsibility of partners on household expenditure, controlling for key household characteristics (Table 13 upper-panel). As a *second* step, financial decision-making responsibility is interacted with economic bargaining power (i.e. employment status and total income, which are significant in stage two) in explaining levels of household expenditure. This is an extended analysis that includes wives' and husbands' financial decision-making responsibility and employment status variables (Table 13 mid-panel) and wives' and husbands' financial decision-making responsibility and total income variables (Table 13 lower-panel) as controls. In the extended analysis, household characteristics are controlled for too.

The results show that expenditures on food (R165;  $p < 0.01$ ), utilities (R62;  $p < 0.01$ ), health care (R59;  $p < 0.05$ ) and education (R113;  $p < 0.05$ ) increase significantly when the wife is the financial decision-maker. Households with wives who are financial decision-makers spend significantly more on the listed categories as compared to households with wives who are not financial decision-makers. The food and education categories have higher figures than utilities and health care. The identification of the husband as a financial decision-maker does not make any difference to the level of family public goods expenditure in the household. The results suggest the important role that wives play in the household when they are given financial decision-making responsibility. This finding is quite critical in as much as provision of a family public good impacts on the welfare of the whole household, including children.

In households where wives who are financial decision-makers are economically empowered by either employment opportunity or the opportunity to possess some income, the transport and insurance expenditure categories show significant increases. Household transport expenditure increases by R571 ( $p < 0.01$ ) while household insurance expenditure increases by R176 ( $p < 0.01$ ), for a household with a co-resident couple comprising an employed wife who is a financial decision-maker. For a thousand increase in income of the wife who is a financial decision-maker, household transport expenditure increases by R329 ( $p < 0.10$ ) and household insurance expenditure increases by R83 ( $P < 0.10$ ). Raising the wife who is a financial decision-maker's income by a thousand Rand also raises the particular household's food expenditure by R193 ( $p < 0.01$ ). Except for household transport expenditure that

increases by R61 ( $p < 0.10$ ) when the husband who is a decision-maker's income is raised by a thousand Rand, there is no other household expenditure that responds positively to the economic empowerment of a husband in the household.

[Table 13 about here]

The findings suggest that the financial decision-making responsibility for wives matters more in as far as expenditures on family public goods are concerned. Four out of seven categories show a significant positive response to the wife being a financial decision-maker. However, economically empowering a wife who is already a financial decision-maker does impact three out of seven expenditure categories. Economically empowering wives boosts their financial decision-making responsibility, which in-turn boosts expenditures on family public goods. The results clearly suggest higher expenditures on family public goods in situations where wives are financial decision-makers as husbands' assumption of financial decision-making responsibility does not have any significant impact on household expenditure. Economically empowering husbands who are financial decision-makers also does not have a significant effect.

An analysis of the 'financial decision-making power' variable, i.e. none-, joint- and main-decision-making, as a determinant of household expenditure on family public goods is presented in Table 14. Taking non-decision-making as the base outcome, there are significant increases in household expenditures on food (R246;  $p < 0.01$ ), utilities (R70;  $p < 0.01$ ), health care (R89;  $p < 0.05$ ) and education (R224;  $p < 0.10$ ) when the wife is a main decision-maker. Furthermore, significant increases in food (R119;  $p < 0.01$ ) and utilities (R58;  $p < 0.01$ ) expenditure are reported when the wife is a joint decision-maker. The coefficients and number of significant expenditure categories are, as expected, greater for the main than joint decision-maker. Overall, the wife's main and joint decision-making favours expenditure on family public goods more than when such power lies with the husband, a situation where increases in only expenditure on food (R194;  $p < 0.01$ ) and transport (R237;  $p < 0.05$ ) are statistically significant. The results show that holding the main decision-making power is critical, particularly for the wife. When the husband is a main decision-maker, significant increases are realised only in two household expenditure categories, which is similar in the case when the wife has joint decision-making power.

[Table 14 about here]

An analysis of how household expenditure on family public goods depends on joint financial decision-making is of great relevance given that syncretic, as opposed to autonomic, decision-making processes may influence both the couples' spending and in turn the welfare of household members. Table 15 shows that significant increases are realised for food (R126;  $p < 0.01$ ), utilities (R42;  $p < 0.05$ ) and education (R107;  $p < 0.10$ ) in the event of a binary variable "joint financial decision-making" regression on different categories of family public goods expenditures. In a practical sense, joint decision-making impacts expenditure especially on those goods that are relatively more public, such as food, utilities and education.

[Table 15 about here]

Overall, the results presented here show the positive impact of economic bargaining power in particular, and social positioning to a lesser extent, on financial decision-making roles. Both economic bargaining and decision-making power impact positively on a wide variety of family public goods expenditure.

## **6. Contribution**

This couple-level analysis on intra-household decision-making contributes to the body of knowledge in the following ways.

*First*, the paper replicates Bertocchi et al. (2014) in the context of a developing country, by using a unique nationally representative South African survey to investigate the distributional factors that explain women's role in financial decision-making.

*Second*, the paper comprises a comprehensive analysis of marriage heterogamy, by employing an extended list of determinants of financial decision-making role, beyond the factors introduced by Bertocchi et al. (2014). Specifically, the determinants analysed in the study constitute both the economic and social positioning of spouses.

*Third*, the study links bargaining power and financial decision-making power to expenditure on family public goods, the first of its kind in the South African context.

## 7. Limitations

The study has a number of limitations.

*First*, the study links economic bargaining power and decision-making responsibility to expenditure on family public goods in a purely inferential approach. The approach is coarse as expenditure variables are not measured at individual level but at household level. In addition, reports on household expenditure are bound to suffer from recall bias.

In the *second* instance, joint financial decision-making, at the household level, is measured as a situation where both partners are reported to be decision-makers. Importantly, the concept 'joint' does not necessarily mean two partners coming together and making decisions together. In addition, situations of disagreements where both husband and wife are identified as main decision-makers or joint decision-makers do exist due to the nature of identification of decision-making in this study. Explaining the nature of these disagreements requires further exploration and is an avenue for further research.

*Third*, the focus on the husband-wife dyad as the relevant decision-making unit within the household oversimplifies the situation. A family, within South Africa is conceptually referred to in the country's White Paper on the Family as a societal grouping that is related by blood (kinship), adoption, foster care or ties of marriage (civil, customary or religious), civil union or cohabitation, and going beyond physical residence (Department of Social Development, 2013), and thus cannot be fully represented by a couple.

The *fourth* limitation of the study relates to residency and household structure. Non-resident couples may be characterised by very different decision-making processes and expenditure patterns as compared to co-resident partners, which were the focus of this particular study. Further research is necessary to elucidate the complexities of decision-making behaviour in non-resident couples and other family arrangements, including ethnographic-type research by sociologists and anthropologists.

In the *fifth* instance, it is important to point out that coarse data on decision-making is an oversimplification of the complexities of the decision-making processes playing out in couples and households. Financial management systems such as female-whole-wage system, male-whole-wage system, housekeeping-allowance system, pooling-with-female management, pooling-with-male management, and pooling-with-joint management (Vogler, Lyonette, & Wiggins, 2008), play a role in the South African context and deserve to be

interrogated. A detailed NIDS survey module collecting data on intra-household decision-making dynamics, including the delegation of financial decision-making responsibilities between wives and husbands, may assist in elaborating on the processes of financial management within couples and households.

*Finally*, it is important to point out that the approximation here of various household expenditure categories as family public goods is very crude, although the expenditure classification, as explained elsewhere in the introduction, fits a very broad conceptualization of family public goods. Further in-depth analysis is required to tease out the family public good nature of household expenditures as reported in the National Income Dynamics Study (NIDS).

## **8. Conclusion**

The National Income Dynamic Study (NIDS), as a nationally representative survey, enables one to study the determinants of decision-making responsibility and decision-making power of female partners in South African couples. In addition, the data allows an investigation into the impact of economic bargaining power and financial decision-making power on family public goods expenditure.

One major finding of the study is that economic factors, in the form of income and employment status, and social factors such as age, play a critical role in positioning female partners in financial decision-making. Specifically, female partners' employment status consistently feature as a significant influence on the probability of making decisions on day-to-day expenditure. Not surprisingly, the male partners' employment status and their income are positive drivers of their female partners' responsibility for day-to-day expenditure decision-making. Such a finding supports the conjecture that employed and affluent male partners delegate responsibilities for decision-making on finances to their female partners. In other words, empowering men spills over and empowers women in the process. The age factor also persistently plays a positive role in increasing the probability of a female partner being a financial decision-maker, implying savviness and experience associated with age.

A narrow gap between partners on the grounds of age, income, and employment opportunities, in marriage heterogamy, promotes financial decision-making by females. In this sense, assortative mating promotes the even distribution of decision-making power

within couples. Related to this is the prevalence of joint participation in decision-making in couples. Greater homogamy in the context of intra-household bargaining-type models suggest greater Pareto efficiency. The resultant effect of increased homogamy within the couple is increased equality within couples and households and ultimately that of their well-being.

A key finding with regards to the provision of family public goods is that financial decision-making power vested in the female partner statistically significantly increases household expenditure on food, utilities, health care, and education, irrespective of economic bargaining power. An employed financial decision-making wife is associated with statistical significant increase in household transport and insurance expenditure. Raising the income of a financial decision-making wife has a positive and statistical significance on household food, transport and insurance expenditures. In the case of the financial decision-making male partner, whether he is employed or his income is raised, does not impact statistically significantly on household expenditures. The results on household expenditures persist when relative decision-making power is taken into account. Main decision-making by the wife performs better (i.e. expenditure levels are higher) than joint decision-making, whereas, whether the husband is a main or a joint decision-maker does not significantly influence family public goods expenditures, except for food and transport. Therefore, financial decision-making power translates into increases in expenditure on selected family public goods, particularly for women.

In conclusion, the latter results provide two channels of impact on family public goods. *First*, an economic empowerment of females enables them to gain decision-making responsibility, and in turn spend more on family public goods. *Second*, an economic empowerment of males results in the delegation of financial decision-making responsibility to females, who spend more on family public goods. The latter finding supports the implementation of economic development policies more broadly. In essence, there is substantial support for the bargaining model of intra-household decision-making as it supports policies that influence the distribution of power within households by reducing heterogamy and advancing gender empowerment in pursuit of the fifth Sustainable Development Goal.

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**Table 1: Financial decision-making of couples (%), by partner**

<b>Decision making power:</b>	<b>Female partner</b>	<b>Male partner</b>	<b>Total</b>	<b>Chi2 test</b>
Main	48.48	69.37	58.93	318.83***
Joint	41.95	22.04	31.99	
None	9.57	8.59	9.08	
Total	100.00	100.00	100.00	
Sample (n)	1,995	1,995	3,990	
<b>Decision making responsibility</b>				
Yes	90.43	91.41	90.92	0.69
No	9.57	8.59	9.08	
Total	100.00	100.00	100.00	
Sample (n)	1,995	1,995	3,990	
<b>Both partners make decision in a couple</b>				
Yes	81.84	81.84	81.84	0.00
No	18.16	18.16	18.16	
Total	100.00	100.00	100.00	
Sample (n)	1,995	1,995	3,990	

**Table 2: Descriptive statistics**

Variable	Mean	Median	St dev	Min	Max	Sample (n)
<b>Household characteristics:</b>						
Household size (per couple)	4.2863	4	2.3062	2	16	1,995
Income (per couple)	8,815.47	3,547.57	13,912.6	0	137,443.5	1,995
Only wife works	0.0751	0	0.02636	0	1	1,982
Only husband works	0.3435	0	0.4750	0	1	1,974
None works	0.2433	0	0.4291	0	1	1,964
Wealth index (per couple)	-0.4521	-0.4062	1.0816	-2.6637	1.7984	1,737
<b>Wife characteristics:</b>						
Age	41.8377	39	13.5501	16	93	1,982
Education (years)	8.7534	10	4.402	0	18	1,991
Employment income	1,430.73	0	3,997.70	0	40,000	1,995
Social grant income	223.58	0	405.512	0	6,000	1,994
Other income	110	0	1,655.969	0	50,000	1,993
Income total	1,762.66	420	4,302.86	0	55,000	1,995
Asset index	-0.3870	0.1912	1.3177	-6.5459	0.5297	1,985
Association index	-0.0627	0.2937	1.3235	-22.804	0.2937	1,961
Association count	0.6048	0	1.1355	0	16	1,995
Working/employed	0.4170	0	0.4931	0	1	1,982
Employee	0.2792	0	0.4487	0	1	1,995
Self-employed	0.0677	0	0.2513	0	1	1,995
Casually-employed	0.0304	0	0.1719	0	1	1,995
Housewife	0.1423	0	0.3495	0	1	1,195
Retired	0.0009	0	0.0313	0	1	1,995
<b>Husband characteristics:</b>						
Age	46.4908	45	13.7492	19	99	1,987
Education (years)	8.6071	10	4.8238	0	18	1,988
Employment income	4,083.67	1,100	8,682.14	0	100,000	1,995
Social grant income	165	0	721.849	0	17,000	1,995
Other income	394.47	0	2,946.96	0	40,000	1,995
Income total	4,643.70	1,470	9,995.49	0	125,000	1,995
Asset index	-0.8468	-0.3758	1.5666	-6.5459	0.5297	1,976

Association index	-0.0960	0.2937	1.2684	-15.312	0.2937	1,966
Association count	0.5324	0	1.0246	0	9	1,995
Working/employed	0.6797	1	0.4666	0	1	1,974
Employee	0.4863	0	0.4999	0	1	1,993
Self-employed	0.1224	0	0.3278	0	1	1,994
Casually-employed	0.0622	0	0.241	0	1	1,992
Retired	0.0024	0	0.0498	0	1	1,995
<b>Within-couples differentials:</b>						
Age (wife - husband)	-4.6408	-4	6.1966	-55	26	1,976
Education years (wife – husband)	0.1232	0	3.3992	-12	14	1,984
Education category (wife – husband)	0.6492	0	1.1824	-4	5	1,984
Employment income (wife – husband)	-2,652.94	-385.97	8357.57	-100000	24,833.33	1,995
Income total (wife – husband)	-2,881.04	-650	9890.61	-125000	38,175.16	1,995
Social grant income (wife – husband)	57.0912	0	778.25	-17000	6,000	1,994
Association count (wife – husband)	0.0724	0	1.2613	-9	16	1,995
Dummies for within-couples differences:						
Wife older	0.1304	0	0.3369	0	1	1,976
Wife more educated	0.3523	0	0.4778	0	1	1,984
Wife earns more	0.1476	0	0.3548	0	1	1,995
Wife has more income	0.2635	0	0.4406	0	1	1,995

Note: we round downwards; four decimal places and weights are used (post stratified)

**Table 3: Socio-economic outcomes by financial decision-making power, by partner**

Decision making power								
Socio-economic outcome	Female partner				Male partner			
	Main	Joint	Any	None	Main	Joint	Any	None
Social grant income	642.25	626.20	634.20	560.12	928.09	1,166.89	976.07	869.11
Employment income	2,368.69	3,011.79	2,655.80	1,327.27	4,093.33	5,887.84	4,436.83	4,956.23
Other income	1,732.00	4,011.04	2,457.69	566.67	2,343.08	4,111.81	2,817.31	4,372.40
Total income	1,305.76	1,399.03	1,351.21	480.34	2,739.88	3,768.24	2,951.35	3,740.07
Education (years)	7.47	7.01	7.24	6.70	6.85	7.53	6.99	7.53
Association count	0.55	0.57	0.56	0.48	0.53	0.47	0.52	0.52

**Table 4: Financial decision-making (%), by employment status, by partner**

Decision-making	Female partner					Male partner				
	Employed (%)	Unemployed (%)	Not economically active (%)	Sample (n)	Chi2	Employed (%)	Unemployed (%)	Not economically active (%)	Sample (n)	Chi2
Main	46.25	20.25	33.50	925	41.23***	68.27	9.34	22.39	1422	5.40
Joint	40.22	24.58	35.20	887		65.97	10.66	23.37	366	
Any	43.44	22.27	34.29	1812		67.72	9.66	22.63	1788	
None	25.27	34.53	40.20	170		70.64	11.06	18.31	186	
<b>Total</b>	41.71	23.44	34.85	1982		67.97	9.78	22.25	1974	

**Table 5: Determinants of female partner’s financial decision-making responsibility**

Independent variables	Regression I	
	Model 1	Model 2
<b>Household characteristics:</b>		
Household size	0.0076 (0.95)	0.0060 (0.85)
Household size <sup>2</sup>	-0.0006 (1.23)	-0.0005 (1.19)
Income 2 <sup>nd</sup> quintile	-0.0128 (0.61)	-0.0052 (0.29)
Income 3 <sup>rd</sup> quintile	-0.0225 (1.01)	-0.0093 (0.48)
Income 4 <sup>th</sup> quintile	-0.0379 (1.43)	-0.0160 (0.65)
Income 5 <sup>th</sup> quintile	-0.0169 (0.45)	0.0135 (0.50)
Wealth index 2 <sup>nd</sup> quintile	0.0126 (0.69)	0.0118 (0.74)
Wealth Index 3 <sup>rd</sup> quintile	-0.0332 (1.34)	-0.0243 (1.12)
Wealth Index 4 <sup>th</sup> quintile	-0.0231 (0.89)	-0.0155 (0.69)
Wealth index 5 <sup>th</sup> quintile	-0.0052 (0.22)	0.0007 (0.04)
<b>Wife’s characteristics:</b>		
Age	0.0018** (2.11)	0.0106*** (3.27)
Age <sup>2</sup> (x100)		-0.0098*** (3.16)
Education in years	0.0015 (0.79)	0.0035 (0.85)
Education in years <sup>2</sup> (x100)		-0.0174 (0.53)
Employment Income (x R1000)	0.0410 (0.73)	-0.0041 (0.30)
Employment Income <sup>2</sup>		9.28e-10 (0.71)
Employed	0.0659*** (4.85)	0.0567*** (3.61)
<b>Husband’s characteristics:</b>		
Age	0.0002 (0.35)	-0.0028 (1.05)
Age <sup>2</sup> (x100)		0.0028 (1.20)
Education in years	-0.0010 (0.53)	0.0001 (0.04)
Education in years <sup>2</sup> (x100)		-0.0082 (0.30)
Employment Income	0.0068** (2.19)	0.0022 (0.32)
Employment Income <sup>2</sup>		1.96e-10 (0.57)

Employed	-0.0064 (0.44)	-0.0062 (0.41)
Sample (n)	1,691	1,691
Wald chi2	66.67***	94.96***
Pseudo R <sup>2</sup>	0.0892	0.1035
Successfully predicted	91.37%	91.37%

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Marginal effects of probit estimates calculated at the mean of the explanatory variables and robust errors clustered at household level (robust z-statistics in parentheses). Checking for endogeneity, running regression functions where household wealth and household income are separated, did not improve the results of the two variables. However, the regression function that excludes the employment status of the partners improves the employment income results of both the wife and the husband whereas the function that excludes employment income for partners give similar results as shown here.

**Table 6: Within-couple differentials as determinants of female partner’s financial decision-making responsibility**

Independent variables	Regression II				
	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Within-couple differential:</b>					
Age (wife – husband)	0.0017** (2.19)			0.0019** (2.35)	0.0028 (1.05)
Education (wife – husband)		0.0021 (1.13)		0.0030 (1.63)	-0.0001 (0.04)
Income ( xR1000) (wife – husband)			0.0028*** (3.15)	0.0028*** (3.10)	0.0022 (0.32)
Household characteristics					Yes
<b>Wife’s characteristics:</b>					
Age					0.0077*** (3.19)
Age <sup>2</sup> (x100)					-0.0098*** (3.16)
Education in years					0.0037 (0.80)
Education in years <sup>2</sup> (x100)					-0.0174 (0.53)
Employment Income (x 1000)					-0.0018 (0.11)
Employment Income <sup>2</sup>					9.28e-10 (0.71)
Employed					0.0567*** (3.61)
<b>Husband’s characteristics:</b>					
Age <sup>2</sup> (x100)					0.0028 (1.20)
Education in years <sup>2</sup> (x100)					-0.0082 (0.30)
Income <sup>2</sup>					1.96e-10 (0.57)
Employed					-0.0062 (0.41)
Sample (n)	1,976	1,984	1,995	1,967	1,691
Wald chi2	4.80**	1.28	10.11***	15.62***	94.96***
Pseudo R <sup>2</sup>	0.0035	0.0011	0.0033	0.0014	0.1035
Successfully predicted	91.50%	91.43%	91.43%	91.51%	91.37%

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Marginal effects of probit estimates calculated at the mean of the explanatory variables and robust errors clustered at household level (robust z-statistics in parentheses).

**Table 7: Within-couple differential dummies as determinants of female partner's financial making-decision responsibility**

Independent variables	Regression III				
	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Dummies for within-couple differences:</b>					
Wife older	0.0291* (1.92)			0.0010 (0.07)	0.0023 (0.14)
Wife more educated		0.0211* (1.67)		0.0186 (1.42)	0.0192 (1.27)
Wife earns more			0.0442*** (3.09)	-0.0101 (0.51)	0.0046 (0.22)
<b>Additional controls:</b>					
Employed wife				0.0386*** (2.74)	0.0570*** (3.53)
Employed husband				0.0005 (0.05)	-0.0065 (0.44)
Household characteristics				No	Yes
Wife's characteristics				Yes	Yes
Husband's characteristics				Yes	Yes
Sample (n)	1,976	1,984	1,995	1,936	1,691
Wald chi2	2.97*	2.64	6.51**	97.81***	97.04***
Pseudo R <sup>2</sup>	0.0027	0.1044	0.0061	0.0968	0.1050
Successfully predicted	91.50%	91.43%	91.43%	91.53%	91.37%

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Marginal effects of probit estimates calculated at the mean of the explanatory variables and robust errors clustered at household level (robust z-statistics in parentheses).

**Table 8: Income sources as determinants of female partner's financial decision-making responsibility**

	Regression IV					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<b>Wife's characteristics:</b>						
Employment income ('000)	0.041 (0.73)			0.0056 (0.97)		
Social grant income ('000)		0.0114 (0.69)		0.0168 (1.16)		
Other income ('000)			0.0048 (0.38)	0.0116 (0.77)		
Total income ('000)					0.0074 (1.23)	0.0174** (2.34)
Asset index						-0.0093 (0.92)
Social capital index						0.0009 (0.12)
First-born male						-0.0004 (0.05)
Parents residence						-0.0011 (0.02)
Age	0.0018** (2.11)	0.0018* (1.92)	0.0018** (1.97)	0.0016 (1.93)	0.0017** (2.01)	0.0007 (1.06)
Education (years)	0.0015 (0.79)	0.0017 (0.89)	0.0015 (0.80)	0.0013 (0.77)	0.0014 (0.77)	0.0010 (0.62)
Employed wife	0.0659*** (4.85)	0.0731*** (6.09)	0.0715*** (5.97)	0.0624*** (4.60)	0.0614*** (4.62)	0.0472*** (3.32)
<b>Husband characteristics:</b>						
Employment income ('000)	0.0068** (2.19)			0.0084*** (2.61)		
Social grant income ('000)		-0.0034 (0.43)		0.0014 (0.17)		
Other income ('000)			0.0158 (1.29)	0.0229* (1.72)		

Total income ('000)					0.0082** (2.58)	0.0052* (1.76)
Asset index						0.0018 (0.25)
Social capital index						-0.0032 (0.70)
Parent(s) resident						-0.2797*** (3.25)
Age	0.0002 (0.35)	0.0002 (0.32)	0.0001 (0.23)	0.0002 (0.26)	0.0001 (0.22)	0.00004 (0.06)
Education (years)	-0.0010 (0.53)	-0.0006 (0.34)	-0.0008 (0.42)	-0.0011 (0.63)	-0.0010 (0.56)	-0.0010 (0.65)
Employed husband	-0.0064 (0.44)	0.0043 (0.27)	0.0052 (0.34)	-0.0051 (0.36)	-0.0042 (0.30)	-0.0114 (0.92)
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Sample (n)	1,691	1,691	1,690	1,690	1,691	1,488
Wald chi2	66.67***	65.91***	67.89***	67.92***	64.03***	92.29***
Pseudo R <sup>2</sup>	0.0892	0.0834	0.0843	0.0933	0.0917	0.1319
Successfully predicted	91.37%	91.37%	91.36%	91.36%	91.37	91.87%

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Marginal effects of probit estimates calculated at the mean of the explanatory variables and robust errors clustered at household level (robust z-statistics in parentheses). Excluding employment status in these models, the coefficients of the wife's and the husband's employment income become significant.

**Table 9: Income source differentials as determinants of female partner’s financial decision-making responsibility**

	Regression V								
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
<b>Within-couple differential:</b>									
Age (wife – husband)	0.0017** (2.19)							0.0019** (2.37)	0.0020 (0.78)
Education (wife – husband)		0.0021 (1.13)						0.0031* (1.65)	0.0001 (0.04)
Total income (‘000) (wife – husband)			-0.0027*** (3.21)					-0.0027*** (3.18)	-0.0061 (0.79)
Employment income (‘000) (wife – husband)				0.0028*** (3.15)					
Social grant income (‘000) (wife – husband)					-0.0007 (0.13)				
Other income (‘000) (wife – husband)						-0.0025 (1.28)			
Social capital count (wife – husband)							-0.0027 (0.40)	-0.0026 (0.39)	-0.0034 (0.42)
Household characteristics									Yes
<b>Wife’s characteristics:</b>									
Age									0.0075** (2.32)
Age <sup>2</sup> (‘000)									-0.0924 (2.30)
Education in years									0.0039 (0.83)
Education in years <sup>2</sup>									0.2559 (0.77)
Total income (x 1000)									0.0201 (0.89)
Total income <sup>2</sup>									2.35e-10 (0.10)

Employed wife									0.0444*** (2.76)
Asset index									-0.0102 (1.00)
Social capital index									-0.0068 (0.72)
<b>Husband's characteristics:</b>									
Age <sup>2</sup> ('000)									0.0238 (0.98)
Education in years <sup>2</sup> ( '000)									-0.0604 (0.21)
Total Income <sup>2</sup>									4.85e-11 (0.46)
Employed husband									-0.0040 (0.30)
Asset index									0.0034 (0.46)
Social capital index									0.0025 (0.37)
Sample (n)	1,976	1,984	1,995	1,995	1,994	1,993	1,995	1,967	1,625
Wald chi2	4.80**	1.28	11.10***	10.11***	0.02	1.65	0.16	16.86***	92.36***
Pseudo R <sup>2</sup>	0.0035	0.0011	0.0035	0.0033	0.0000	0.0005	0.0002	0.0094	0.1095
Successfully predicted	91.50%	91.43%	91.43%	91.43%	91.42%	91.42%	91.43%	91.51%	91.20%

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Marginal effects of probit estimates calculated at the mean of the explanatory variables and robust errors clustered at household level (robust z-statistics in parentheses).

**Table 10: Determinants of joint financial decision-making**

	Regression VI	
	Model 1	Model 2
<b>Household characteristics:</b>		
Household size	0.0288** (2.16)	0.0230* (1.82)
Household size <sup>2</sup>	-0.0018** (1.99)	-0.0015* (1.78)
Income quintiles	Yes	Yes
Wealth quintiles	Yes	Yes
<b>Wife's characteristics:</b>		
Age	-0.0005 (0.39)	0.0096* (1.75)
Age <sup>2</sup>		-0.0001** (1.99)
Education in years	0.0011 (0.35)	0.0023 (0.32)
Education in years <sup>2</sup>		-5.88e-05 (0.11)
Employment income (x R1000)	0.0140*** (2.62)	-0.0370** (1.97)
Employment income <sup>2</sup>		5.52e-09*** (2.73)
Employed	0.0139 (0.62)	0.0449* (1.82)
<b>Husband's characteristics:</b>		
Age	0.0026* (1.82)	0.0002 (0.04)
Age <sup>2</sup>		2.04e-05 (0.43)
Education in years	-0.0008 (0.25)	0.0028 (0.41)
Education in years <sup>2</sup>		-0.0003 (0.67)
Employment income (x R1000)	0.0010 (0.45)	0.0058 (1.42)
Employment income <sup>2</sup>		-7.82e-11 (1.47)
Employed	0.0010 (0.04)	-0.0164 (0.72)
Sample (n)	1,691	1,691
Wald chi2	37.48***	Not reported
Pseudo R <sup>2</sup>	0.0213	0.0310
Successfully predicted	81.49%	81.43%

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Marginal effects of probit estimates calculated at the mean of the explanatory variables and robust errors clustered at household level (robust z-statistics in parentheses).

**Table 11: Within-couple differentials as determinants of joint financial decision-making**

Independent variables	Regression VII				
	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Within-couple differential:</b>					
Age (wife – husband)	-0.0005 (0.46)			-0.0002 (0.21)	-0.0002 (0.04)
Education (wife – husband)		0.0025 (0.98)		0.0024 (0.93)	-0.0028 (0.41)
Employment income (wife – husband) (x R1000)			-0.0001 (0.08)	-0.0003 (0.23)	-0.0058 (1.42)
<b>Household characteristics</b>					
Household size					0.0230* (1.82)
Household size <sup>2</sup>					-0.0015* (1.78)
Income quintiles					Yes
Wealth quintiles					Yes
<b>Wife’s characteristics:</b>					
Age					0.0098** (2.46)
Age <sup>2</sup>					-0.0001** (1.99)
Education in years					0.0051 (0.66)
Education in years <sup>2</sup>					-5.88e-05 (0.11)
Employment income					-0.0311 (1.60)
Employment income <sup>2</sup>					5.52e-09*** (2.73)
Employed					0.0449* (1.82)
<b>Husband’s characteristics:</b>					
Age <sup>2</sup>					2.04e-05 (0.43)
Education in years <sup>2</sup>					-0.0003 (0.67)
Employment income <sup>2</sup>					-7.82e-11 (1.47)
Employed					-0.0164 (0.72)
Sample (n)	1,976	1,984	1,995	1,967	1,691
Wald chi2	0.21	0.96	0.01	1.02	Not reported
Pseudo R <sup>2</sup>	0.0001	0.0006	0.0000	0.0006	0.0310
Successfully predicted	82.09%	82.16%	82.11%	82.16%	81.43%

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Marginal effects of probit estimates calculated at the mean of the explanatory variables and robust errors clustered at household level (robust z-statistics in parentheses).

**Table 12: Within-couple differential dummies as determinants of joint financial decision-making**

	<b>Regression VIII</b>				
	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<b>Dummies for within-couple differences</b>					
Wife older	-0.0028 (0.12)			-0.0055 (0.20)	-0.0153 (0.51)
Wife more educated		0.0053 (0.30)		-0.0171 (0.63)	-0.0242 (0.83)
Wife earns more			0.0250 (1.08)	-0.0058 (0.19)	0.0159 (0.50)
<b>Additional controls:</b>					
Working wife				0.0374 (1.54)	0.0410 (1.56)
Working husband				-0.0123 (0.58)	-0.0142 (0.61)
Household characteristics	No	No	No	No	Yes
Wife's characteristics	No	No	No	Yes	Yes
Husband's characteristics	No	No	No	Yes	Yes
Sample (n)	1,976	1,984	1,995	1,936	1,691
Wald chi2	0.01	0.09	1.08	Not reported	Not reported
Pseudo R <sup>2</sup>	0.0000	0.0000	0.0006	0.0245	0.0317
Successfully predicted	82.09%	82.16%	82.11%	82.02%	81.43%

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Marginal effects of probit estimates calculated at the mean of the explanatory variables and robust errors clustered at household level (robust z-statistics in parentheses).

**Table 13: Financial decision-making responsibility and economic bargaining power as determinants of expenditure on family public goods**

	<b>Food</b>	<b>Transport</b>	<b>Utilities</b>	<b>Insurance</b>	<b>Household items</b>	<b>Health care</b>	<b>Education</b>
<b>Financial Decision maker(Comparison: none decision maker)</b>							
Wife	165.83*** (3.69)	-34.03 (0.18)	62.54*** (3.20)	30.77 (0.78)	8.76 (0.17)	59.76** (2.21)	113.73** (2.56)
Husband	90.89 (1.48)	182.54 (1.45)	23.57 (0.86)	-13.93 (0.31)	67.40 (0.76)	-40.59 (0.38)	102.52 (1.18)
Sample(n)	1,995	1,995	1,989	1,979	1,988	1,990	1,987
F-test	18.71***	16.73***	18.59***	12.38***	1.55	22.33***	3.17***
R <sup>2</sup>	0.3162	0.2041	0.2906	0.2331	0.0384	0.2385	0.0188
	165.83*** (3.69)	-34.03 (0.18)	62.54*** (3.20)	30.77 (0.78)	8.76 (0.17)	59.76** (2.21)	113.73** (2.56)
<b>Decision making * Employed</b>							
Wife	34.85 (0.30)	571.19*** (2.76)	46.15 (0.97)	176.70*** (2.92)	-336.05 (1.61)	73.28 (1.34)	50.58 (0.33)
Husband	-51.98 (0.49)	14.11 (0.07)	-34.02 (0.67)	-49.28 (0.69)	-80.44 (0.60)	-133.18 (0.77)	-6.08 (0.04)
Sample(n)	1,964	1,964	1,959	1,949	1,958	1,960	1,956
F-test	20.94***	19.42***	17.14***	14.67***	3.48***	14.62***	3.65***
R <sup>2</sup>	0.3334	0.2377	0.3054	0.2423	0.0398	0.2687	0.0211
<b>Decision making * total income</b>							
Wife (‘000)	193.00*** (2.83)	329.05* (1.66)	-59.87 (1.53)	83.76* (1.86)	-104.73 (0.91)	19.17 (0.46)	-39.48 (0.67)
Husband (‘000)	10.41 (0.65)	61.97* (1.93)	12.57 (0.89)	16.69 (1.03)	-4.33 (0.14)	2.21 (0.09)	22.98 (0.75)
Sample(n)	1,995	1,995	1,989	1,979	1,988	1,990	1,987
F-test	26.49***	12.35***	16.88***	9.78***	1.64*	14.59	3.05***
R <sup>2</sup>	0.3408	0.2634	0.3014	0.2558	0.0506	0.2422	0.0321

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Household characteristics included in regressions. Decision-making and employment status variables for partners are included when interactions are assessed in mid-panel regressions. Similarly, decision-making and income variables for partners are included in lower-panel regressions.

**Table 14: Financial decision-making power as a determinant of expenditure on family public goods**

Decision making power (comparison: none decision making)		Food	Transport	Utilities	Insurance	Household items	Health care	Education
Wife	Joint	119.65** (2.47)	-48.48 (0.25)	58.74** (2.55)	25.71 (0.63)	51.58 (0.73)	40.71 (1.39)	22.14 (0.46)
	Main	246.62*** (4.59)	19.09 (0.10)	70.84*** (3.12)	37.02 (0.80)	-29.97 (0.43)	89.86** (1.96)	224.75* (1.96)
Husband	Joint	11.52 (0.15)	8.85 (0.06)	7.21 (0.23)	-8.74 (0.16)	-56.20 (0.70)	-57.23 (0.50)	211.49 (1.27)
	Main	194.68*** (2.88)	273.87** (2.01)	35.84 (1.20)	-8.04 (0.17)	48.51 (0.54)	-4.27 (0.04)	203.66 (1.39)
Sample(n)		1,995	1,995	1,989	1,979	1,988	1,990	1,987
F-test		18.93***	13.59***	14.73***	9.42***	1.45	16.04***	2.50**
R <sup>2</sup>		0.3206	0.2068	0.2910	0.2332	0.0403	0.2389	0.0210

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Household characteristics included in regressions.

**Table 15: Joint financial decision-making as a determinant of expenditure on family public goods**

Independent variable	Food	Transport	Utilities	Insurance	Household items	Health care	Education
Both partners making decision (yes/no)	126.72*** (3.13)	79.00 (0.70)	42.12** (2.25)	7.31 (0.24)	-0.00 (0.63)	7.07 (0.12)	107.90* (1.90)
Sample(n)	1,995	1,995	1,989	1,979	1,988	1,990	1,987
F-test	17.39***	20.87***	17.03***	15.44***	2.44**	28.00***	3.69***
R <sup>2</sup>	0.3159	0.2033	0.2903	0.2329	0.0046	0.2380	0.0188

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10. Household characteristics included in regressions

## Annexure

**Table A1: List of variables and their descriptions**

<b>Variable</b>	<b>Description</b>
Household head relation	Relationship to household head: Head; Husband/Wife/Partner; Son/Daughter; Father/Mother; Brother/Sister; Grandchild; Other family; Other non-family
Household size	Number of household residents
Age	Age of the respondent in years
Age differential (wife – husband)	Variable representing the difference between wife and husband age (in years), ranging between -55 and 26
Wife older	Binary variable assuming value 1 if within the couple the wife is older than the husband, 0 otherwise
Gender	Binary variable assuming value 1 if the person is a male and 2 if the person is a female
Household income	A continuous variable representing monthly income and with full imputations (in South African Rands)
Household income quintiles	Per capita household income quintiles
Household wealth index	Using Multiple Correspondence Analysis (MCA), an index is calculated from categorical variables which, in some cases, represent the material used or the state of the asset owned by the household. In other instances, binary variables indicate ownership of some asset. The household wealth index for the couples ranges from -2.66 to 1.79. For more information about this index, see table A2.
Household wealth index quintile	Households from which couples were drawn were distributed into quintiles depending on the size of the household wealth index thereby distributing couples into quintiles.
Individual asset index	Using MCA, an asset index for each individual is calculated using binary variables showing whether that person owns the item or not. The assets included are: radio; stereo; sewing machine; private vehicle; commercial vehicle; bicycle; computer; camera. The index ranges from -6.54 to 0.52.
Individual asset index quintile	Individuals are distributed into quintiles depending on the size of the individual asset index.
Social Capital/association Index	Index of association or networks as a measure of social capital. The associations identified and used in the calculations are: stokvel; burial society; community garden; farmers association; sewing group; sports group; study group; singing group; youth group; informal traders group; men association; women association; school committee; water committee; development committee; tribal authority; religious group; other group. The index ranges from -22.80 to 0.29.
Social Capital Index quintile	Participants/spouses were grouped into quintiles using the social capital index

Social capital/association count	Number of associations that an individual belongs to. This is a discrete variable ranging from 0 to 16 and is calculated by adding up the value of each association (which is 0/1) across associations for each individual.
Association count differential	The difference in number of associations that a partner belongs to.
Individual employment income	Continuous variable representing the amount of income that an individual earns from all work related tasks per month (in rands). The values range from 0 to R100 000 and has a mean of R3776.90
Employment income differential (wife – husband)	Within couple differences in employment income calculated from the spouses' employment income values. All missing values are given zeros to allow calculation of the differences. The values range from –R100 000 to R24 833.
Wife earns more	This is a binary variable taking the value 1 if the wife earns more, 0 otherwise
Individual Social grant income	Amount of income received as social grants by the spouses in South African Rands.
Social grant income differential (wife – husband)	Within couple differences in social grant income calculated from the spouses' social grant income values. Missing values were given zero values to allow the computation. The values range from –R17 000 to R6 000.
Other income	Total amount of income from other sources which are not social grants or employment
Individual income total	Individual's monthly total income from all sources ranging from R0 to R125 000.
Income total differential (wife – husband)	Within couple differences in income calculated from individual monthly total income from all sources and ranging from –R125 000 to R38 175.
Wife has more income	A binary variable taking the value 1 if the wife receives more income than the husband aggregated from different sources, 0 otherwise.
Education attained category	Categorical variable representing the education for spouses. The categories are: no schooling, incomplete primary; complete primary; incomplete secondary; complete secondary; higher education. The codes range from 0 to 5 respectively.
Education attained category differential (wife – husband)	Within couple difference in education calculated using the “education category” variable
Education attained (years)	Number of years of education by individuals. The variable ranges from 0 to 18 years
Education attained years differential (wife – husband)	Within couple differential in years of education ranging from -12 to 14 years
Wife more educated	A binary variable taking the value 1 if the wife is more educated, 0 otherwise
Employed	A binary variable taking the value 1 if the spouse is employed, 0 otherwise
Employment status	Categorical variable taking value 0 if not economically active, 1 if unemployed and 2 if employed

Female employed	A binary variable taking the value 1 if the wife is employed, 0 otherwise
Male employed	A binary variable taking the value 1 if the husband is employed, 0 otherwise
Female and male unemployed	A binary variable taking the value 1 if both the wife and the husband are unemployed, 0 otherwise
Only wife works	A binary variable taking the value 1 if only the wife works, 0 otherwise
Only husband works	A binary variable taking the value 1 if only the husband works, 0 otherwise
Employee	A binary employment status variable taking the value 1 if the spouse is an employee, 0 otherwise
Self-employed	A binary employment status variable taking the value 1 if the spouse is self-employed, 0 otherwise
Casual employee	A binary employment status variable taking the value 1 if an individual is employed on part time basis, 0 otherwise
Housewife	A binary variable taking the value 1 if the wife identified herself as housewife, 0 otherwise
Retired	A binary variable taking the value 1 if an individual is identified as retired, 0 otherwise
<b>Stage Two Dependent variables</b>	
Financial decision-making power	A categorical variable indicating whether a spouse is a main financial decision-maker (= 3), joint decision-maker (=2) or non-decision-maker (=1)
Financial decision-making responsibility	A binary variable assuming a value of 1 if a spouse is a financial decision-maker, 0 otherwise
Financial main or joint decision-maker	A binary variable assuming a value of 1 if a spouse is a financial main decision-maker or 0 when the spouse is a joint decision maker
Number of decision-makers in a couple	Number of financial decision makers within a couple. A discrete value taking values 0,1,2
Joint decision-making in a couple	A binary variable assuming the value 1 if there is joint decision-making within the couple, 0 otherwise
Both partners are identified financial decision-makers	A binary variable assuming the value 1 when both partners are identified as financial decision makers, 0 if there is a single decision-maker. Cases where both partners could be identified as main decision makers are included. These may mean disagreement in the household.

**Table A2: Household wealth index variables**

<b>Variable</b>	<b>Code</b>	<b>Narration</b>
<b>Dwelling type</b>	1	informal dwelling/shack/flatlet/caravan
	2	traditional dwelling/hut
	3	Flat/apartment/townhouse/backyard flat
	4	dwelling/house or brick structure on the yard
<b>Dwelling roof type</b>	1	wood/plastic/cardboard/mud bricks/wattle
	2	bricks/mud & cement/stone & rock
	3	Thatching
	4	corrugated iron/zinc
	5	asbestos
	6	Tiles
<b>Dwelling wall type</b>	1	wood/plastic/cardboard/wattle/tile/thatching
	2	corrugated iron/zinc
	3	mixture of mud & cement/mud bricks/stone and rock
	4	cement block and concrete
	5	bricks
<b>Water source</b>	1	rain water/flowing water/dam/well/spring
	2	tanker/borehole on or off site
	3	public tap
	4	pipel(tap) water on site or in yard
	5	pipel (tap) water in dwelling
<b>Toilet facility</b>	1	bucket/none/other
	2	pit latrine without ventilation
	3	chemical toilet/pit latrine with ventilation
	4	flush toilet with offsite disposal
	5	flush toilet with onsite disposal
<b>Energy for cooking</b>	1	animal dung/other
	2	wood/coal

	3	gas/paraffin
	4	electricity from mains/generator/solar
<b>Energy for heating</b>	1	animal dung/other
	2	wood/coal
	3	gas/paraffin
	4	electricity from mains/generator/solar
<b>Energy for lighting</b>	1	other/none
	2	gas/paraffin/candles
	3	Electricity from mains/generator/solar power
<b>Each of the following separately:</b> Electricity in the house; telephone; regular cellphone; radio; stereo; TV; satellite; video; computer; camera; cellphone; electric stove; gas stove; paraffin stove; microwave; fridge; washing machine; sewing machine; lounge suite; private vehicle; commercial vehicle; motorcycle; bicycle; plough; tractor; wheelbarrow; grinding mill; livestock/poultry	0	no
	1	yes

## **CHAPTER 3: PAPER 2**

### **Economic Bargaining power, Economic Decision-Making Agency, and Household Expenditure in South Africa**

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## Abstract

Economic bargaining power and decision-making agency constitute economic empowerment; a policy goal regarded as an end in itself and a means to achieving other development goals. Viewed through the lens of the Capability Approach (CA), household expenditure on family public goods represent “achievements” emanating from the “means to achieve” (economic bargaining power), through the vector of “functionings” (economic decision-making agency), intermediated by “conversion factors” (gender and intra-household decision-making models). The study which employs South Africa’s National Income Dynamics Study (NIDS) carries out a gendered analysis of economic bargaining power, economic decision-making agency, and household expenditure on family public goods. Analysis suggests that economic bargaining power, a driver of economic decision-making agency for both women and men, is still a gendered phenomenon. Large strides have however been made towards empowering women as economic decision-makers. Both economic bargaining power and economic decision-making agency positively impact on expenditure on family public goods regardless of gender. Joint economic decision-making positively impacts on food expenditure. The patterns of household expenditure, on the one hand, call for economic development policy. On the other hand, disparities between household expenditure for female-headed versus male-headed households, as well as economic bargaining power between males and females, argue a case for gender biased economic empowerment policies.

JEL Codes: B54; D19; H41; I39; J16

Key Words: Decision-making agency, economic empowerment, family public goods, household expenditure, gender, South Africa



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## 1. Introduction

Gender economic empowerment is an important issue for researchers and policy makers in both developed and developing economies. The United Nations' Sustainable Development Goal (SDG) No. 5 clearly stipulates the importance of gender equality and points out that although much progress has been made on the matter, there are still gaps that are of concern. The SDG No. 5 seeks to transcend the gender Millennium Development Goal's (MDG) focus on education through its emphasis on the enhancement of the female voice and decision-making power. The condition that women find themselves in is articulated clearly in the statement that:

“Half of women are economically active, compared with over three-quarters of men. On top of limited economic opportunities, women often have restricted agency – their ability to make decisions about their lives and to act on those decisions. While women and girls usually bear the direct costs of inequalities, gender bias has a cost to all, reducing the pace of development.” (World Bank, 2016:10)

Iversen (2003) emphasises how domestic power imbalances, often organised around gender lines, generate inequality and mediate opportunities to achieve well-being among household members. Doss (2013) states that many key development outcomes such as the health and education of children, the general well-being of women and girls, the sharing of housework, and the participation in wage work, depend on women's ability to negotiate a favourable household allocation of resources. According to Duflo (2003), female preferences include spending on investment in education, housing, and children's nutrition, which implies that the economic empowerment of women has positive impact on household outcomes. Consequently, the empowerment of women has increasingly become a policy goal, both as an end in itself and a means to achieving other development goals, including investment in family public goods (Ashraf, Karlan & Yin, 2010; Duflo, 2012).

Duflo (2012:1052), commenting on labour market opportunities, states that “women are less likely to work, they earn less than men for similar work, and are more likely to be in poverty even when they work”. Rao (2014) argues further that, paid work may increase women's drudgery and work burdens instead of uplifting them. For example, “poorly remunerated work devalues women's labour time without enhancing agency” (Rao, 2014:81). Heyer (2014) also states, in concurrence that, some work may be oppressive and exploitative rather than empowering.

In the African context, Wekwete (2014) argues that gender inequality, including limitations to women's economic participation, has remained a challenge. South Africa's slow pace of gender economic empowerment is indicated through the feminisation of income poverty (Bhorat & Van der Westhuizen, 2008), and the fact that female-headed households are over-represented among the poor (Armstrong, Lekezwa & Siebrits, 2008; Bhorat & Van der Westhuizen, 2008; Posel & Rogan, 2012). Posel and Rogan (2012) concluded that poverty in South Africa remains a gendered phenomenon and that the post-apartheid decline in poverty has favoured males and male-headed households. Nonetheless, Patel, Knijn and Van Wel (2015) argue that these gender dynamics of poverty and empowerment remain poorly understood.

The current South African analysis of the interaction of economic bargaining power, economic decision-making agency and expenditure on family public goods is spurred on by the above-noted observations. This paper, which draws from the 2008, 2010 and 2012 consecutive survey rounds of the National Income Dynamics Study (NIDS), proffers a gender-based analysis of the extent to which economic bargaining power influences adult South Africans' economic decision-making. The paper analyses further how economic bargaining power and economic decision-making agency, as components of gender economic empowerment (Ahmed et al., 2010), impact on household expenditure on family public goods. Joint decision-making and its association with expenditure on family public goods, is analysed at household level.

The paper proceeds as follows. The theoretical framework and empirical literature are discussed in sections 2 and 3, respectively. Section 4 describes the data used in the analysis. An outline of the methodology is presented in section 5, followed by the discussion of results in section 6. Sections 7, 8 and 9 respectively encompass the contributions of the study, its limitations, and the conclusion.

## **2. Theory**

The intersection of economic bargaining power, economic decision-making agency and household expenditure, can be conceptualised theoretically using Amartya Sen's Capability Approach (CA). The Capability Approach (CA), as the literature suggests, is a "framework of thought, which can address diverse problems and can be applied in quite different ways"

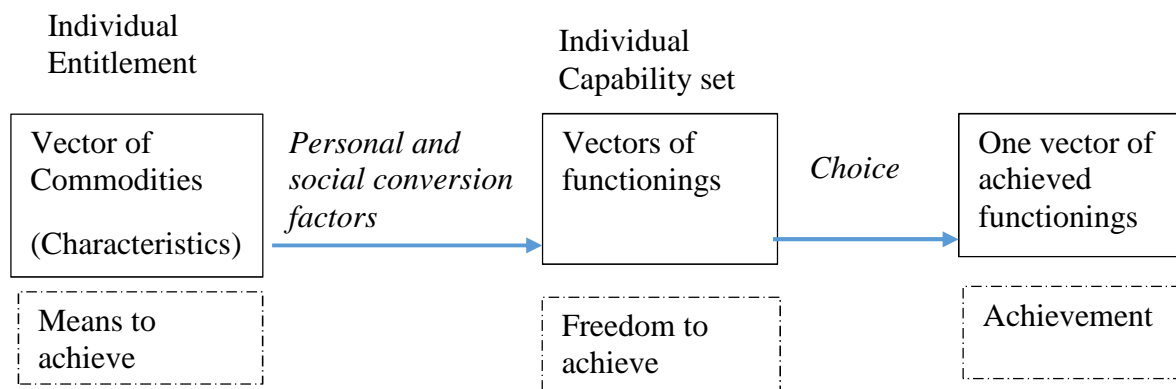
(Robeyns, 2000:1). For these reasons, the CA, with its “plurality of purposes” (Sen, 1993:49 cited in Robeyns, 2000:3), represents a potential tool for understanding the interrelatedness between economic bargaining power, economic decision-making agency and household expenditure on family public goods. In addition, the CA can assist in advancing knowledge on gender empowerment, the process by which women acquire enabling resources that may in turn enhance women’s decision-making agency (Yount et al., 2016). An understanding of decision-making agency, on the one hand, and what the CA and its major components entail, on the other hand, is a necessary starting point to situating the current study in the theoretical framework of the CA.

Women’s agency refers to women’s ability to make strategic life choices under historically evolving constraints (Kabeer, 1999). In general, agency is an individual’s ability to define his/her own life-choices (Yount et al, 2016). There is almost a general consensus in literature that women’s agency is multi-dimensional and context specific (Kabeer, 1999; Mason, 2005; Yount, 2005). Yount et al. (2016) point out that the multi-dimensionality of women’s agency comprises of women’s influence in family decisions, their freedom of movement and attitudes about gender violence. Economic decision-making, therefore, as a feature of women’s agency, is an important end in itself (Young et al, 1994), and a useful means to other ends, such as infant morbidity and maternal nutritional status (Malhotra & Schuler, 2005; Shroff et al., 2011).

The “Capability Approach is a broad normative framework for the evaluation and assessment of individual well-being and social arrangements, the design of policies, and proposals about social change in society” (Robeyns, 2005:94). The CA has two major constituents, which are articulated as “functionings” and “capabilities”. According to Robeyns (2000:4), “functionings” relate to the “beings and doings” of a person, while “capabilities” are “the various combinations of functionings that a person can achieve”. In this sense, a functioning is considered an achievement whereas a capability is the ability to achieve. Robeyns (2005) points out that the CA highlights the difference between means and ends.

The approach, which adopts the schematic framework of the CA as in Robeyns (2000) and Iversen (2003), can assist in describing the theoretical interdependence between the two pillars of gender economic empowerment (i.e. economic bargaining power and economic decision-making agency), on the one hand, and household expenditure or investments in family public goods, on the other hand.

**Figure 1: The Capability Approach**



Source: Robeyns (2000:5)

The schematic framework presented in Figure 1 shows the vector of commodities in this study as represented by employment status, employment income, total income and education, which epitomise fundamental sources of gender economic empowerment (Moghadam & Senftova, 2005; Varghese, 2011). Pambe et al. (2014) identify education, employment and being rich or poor, as the three socio-economic indicators of gender economic empowerment. The four economic factors therefore, are ‘individual entitlements’ which, in the CA’s semantics, represent the “means to achieve”. The four commodities’ value depend on an individual’s personal and social conversion factors (Robeyns, 2000/2005), with gender being the main conversion factor in the current study.

Economic decision-making agency is a component of gender economic empowerment (Mason & Smith, 2003; Varghese, 2011). Economic decision-making in the CA represents a functioning. Economic bargaining power can give an individual the power to assume a decision-making role, depending on the personal and social conversion factors. In this way, gaining access to enabling human, economic and social resources may facilitate an individual’s agency, which in turn, may enhance achievements (Kabeer, 1999; Mahmud, Shah, & Becker, 2012). An individual can acquire economic decision-making agency through the constitution of and realisation of enabling personal and social conversion factors, higher income, greater education and being employed. Functionings thus entail a set of things that an individual can do in life (Sen, 1999; Robeyns, 2000), and these include making economic decisions.

In as much as gender empowerment manifests in different forms (Heckert & Fabic, 2013) and thus is multi-dimensional (Mason & Smith, 2003), gender empowerment in the current study

is economic and of a material nature (Iversen, 2003). In this case, gender economic empowerment is embodied at two levels, which are having both an individual entitlement to the four economic bargaining power factors and the economic decision-making agency. In other words, participation in economic decision-making presents evidence of economic empowerment, but so is being employed, educated, and having an income. Therefore, acquiring knowledge on whether or not a woman has a say in economic decision-making within the household enables one to determine the extent to which she is economically empowered, which is evidence of a woman's accrued influence in decisions customarily reserved for men (Mahmud, 1994).

In the CA framework, household expenditure on family public goods is typical of a vector of achieved functionings. These "achievements" (expenditure on family public goods) emanate from the "means to achieve" (economic bargaining power), through the vector of "functionings" (economic decision-making) and intermediated by "conversion factors" (gender and intra-household decision-making models).<sup>11</sup> This theoretical framework allows for the analysis of gender economic empowerment in a household decision-making context. Having discussed the vectors of commodities, functionings and achieved functionings, it is critical to understand that the interdependence between these components are influenced by intra-household decision-making arrangements, which are represented by intra-household decision-making models such as the unitary, collective, cooperative bargaining or non-cooperative bargaining models.

The unitary model's hypothesis that the household is a single decision unit that maximises the welfare of its members (Carter & Katz, 1997; Attanasio & Lechene, 2002; Chiappori, Fortin, & Lacroix, 2002; Vermeulen, 2005) disqualifies the model as an instrument to understand economic bargaining power and decision-making agency. However, the view of the collective and bargaining-type models that there is individualism of preferences; interdependence within the household economy; property rights, information and autonomy within the household; exit options; and the voice within the household (Carter & Katz, 1997), suggests the importance of gender economic empowerment. Distributional factors, i.e. variables that affect household economic decisions even though they do not directly impact on preferences nor on budgets (Bertocchi, Brunetti & Torricelli, 2014; Browning, Chiappori

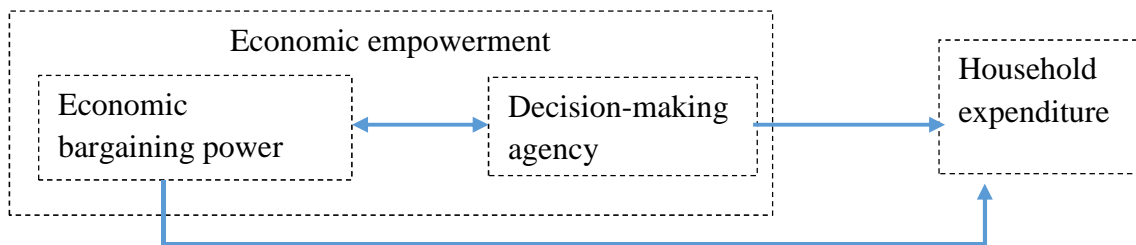
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<sup>11</sup> In the Capability Approach, achieved functionings are individualistic as the approach facilitates interpersonal comparisons of opportunities for achieving well-being (Robeyns, 2000/2005). The focus here, however, is on a collective and household-level outcome.

& Weiss, 2014), become necessary sources of gender economic empowerment. Intra-household economic decision-making arrangements can also be part of the social conversion factors when viewed as institutional characteristics of the family, and linked to the functionings when representing living arrangements as “beings and doings” of a person (Robeyns, 2000).

The interrelatedness of economic bargaining power and economic decision-making agency, as sources of gender economic empowerment, and household expenditure on family public goods, can be represented as follows:

**Figure 2: Economic empowerment and household expenditure**



There is an iterative relationship between economic bargaining power and economic decision-making responsibility and power. The bargaining-type of intra-household decision-making models suggest that an individual with an entitlement over economic resources is more likely to be an economic decision-maker within the household (Acharya et al., 2010; Doss, 2013). Being an economic decision-maker also means that the individual may have power to decide on whether to participate in activities that raise further their economic bargaining power such as participating in the labour market. Therefore, economic bargaining power and economic decision-making agency are complimentary components of gender economic empowerment.

### 3. Empirical literature

Empirical literature that jointly assess the association between economic bargaining power, economic decision-making agency and household expenditure on family public goods is limited. Some focus on the determinants of decision-making agency, while other studies link economic bargaining power with household expenditure. Some of these studies are reviewed below.

An investigation on gender empowerment in rural Bangladesh carried out by Mahmud et al. (2012) found out that, with regard to decision-making agency, married women are commonly second decision-makers regardless of the type of decision, and were least likely to have the final say in financial decisions (buying furniture, taking a loan, and selling livestock). On average, married women's roles in household decision-making was relatively greater only on health and family planning decisions, but lower on decisions related to household expenditures and personal autonomy. Joint decision-making was found to be a common phenomenon (Mahmud et al., 2012).

Varghese (2011) carried out a study on gender empowerment in the Oman domestic sphere that focuses on economic empowerment (economic decision-making power), household empowerment (household decision-making power), and social empowerment (physical freedom of movement). A Women Empowerment Index (WEI) was constructed. Furthermore, the study's striking result is that, although women are empowered in all three domains, their interest towards domesticity affects their empowerment negatively, which confirms that social power plays an important role in generating and sustaining gender inequalities (Varghese, 2011).

Ashraf et al. (2010) argue that, in a couple experiment in the Philippines, women's decision-making power in households can be increased directly through interventions that give women control over assets. The authors tested the hypothesis experimentally by employing a design that examines whether access to individually held commitment savings accounts increases women's decision-making. The results supported the idea that offering some training on commitment savings to women who have control over financial accounts and hold separate saving accounts enables these women to gain decision-making power.

MacPhail and Dong (2007) evaluated whether market work, as represented by employment status, is a determinant of women's "household status" in rural China. The findings suggest that unemployed women have lower "household status" than men, an indication that women are more involved in domestic labour, responsible for domestic tasks and have less household decision-making control. The market wage for employed women reduces domestic work and responsibility for domestic tasks, and enhances household decision-making control. Rao (2014) points out that paid work can enhance monetary contributions and lead to a sense of self-worth in rural South India.

Acharya et al. (2010) found out that, in their consideration of women's education and participation in wage work as determinants of economic bargaining power in Nepal, such economic empowerment impacts positively on women's say in economic decision-making. Similarly, Boateng et al. (2014) found that employed and educated women in Ghana are more likely to have an opinion on all aspects of household decision-making relative to unemployed women and women with no formal education. In rural India, women's bargaining power increases with wages and education (Sinha, 2012). According to Pambe et al.'s (2014) study in Burkina Faso, high levels of human capital and financial autonomy positively influence women's participation in economic decision-making. However, traditional gender roles weaken the influence of both human capital and financial autonomy on economic decision-making (Pambe et al., 2014).

Gender economic empowerment has also been lauded as an important driver for achieving household development goals. Fafchamps, Kebede, and Quisumbing (2009) established that gender economic empowerment benefits child nutrition and education in rural Ethiopia. A review by Malhotra and Schuler (2005) concludes that gender economic empowerment and egalitarian gender relationships are important mechanisms towards a more favourable child health care and investments in children's schooling. Rico et al. (2011) documented further evidence of the favourable influence of gender empowerment on the maternal and child health.

In addition, studies on intra-household bargaining suggest that exogenous increases in the women's share of income, interpreted as providing the female with more power in the household, lead to an allocation of resources that reflect the preferences of the woman (Duflo, 2003; Rangel, 2006; Ashraf et al., 2010). Ashraf et al. (2010) report that the existence of empowered women result in an increase in female-oriented durable goods purchased in the household. Duflo (2003) points out that pensions received by women in South Africa have a positive impact on the anthropometric status of girls. Rangel (2006) likewise reports that more decision-making power in the hands of women raises investments in the education of children.

According to the empirical evidence, therefore, economic bargaining power is an important determinant of economic decision-making agency, on the one hand, and economic decision-making agency is a determinant of household outcomes, on the other hand. Hence, "there is econometric support for the qualitative evidence that household decisions are contested and

that individual preferences and endowments matter” (Doss, 1996:1604). A comprehensive analysis of the joint association between economic bargaining power, economic decision-making agency and investment in family public goods is therefore relevant and called for. The current study seeks to provide such analysis using South African survey data.

#### 4. Data

Data for this paper, which is drawn from the first three waves of South Africa’s National Income Dynamics Study (NIDS) (i.e. for 2008, 2010 and 2012), facilitates the analysis of decision-making dynamics, including transitions over time in economic decision-making responsibility. The NIDS allows a gendered cross-sectional and panel data analysis of the associations between economic bargaining power, decision-making and expenditure on family public goods.

Economic bargaining power is measured by four factors as articulated by Duflo (2012). An adult’s employment status is a binary variable (=1) if the individual is employed and (=0) otherwise. Next is the employment income and total income, in South African Rand.<sup>12</sup> The last factor of economic bargaining power, which is educational level, is measured as a continuous variable representing the number of years of schooling.

An aspect of the NIDS survey that makes it unique and attractive for this study is that the survey collects information on decision-making.<sup>13</sup> The economic decision-making indicator used here was constructed from combining the “day-to-day expenditure” and the “large, unusual purchases” spheres of decision-making. For each sphere, the interviewee has to identify the main decision-maker, and where relevant, the joint decision-maker, within the household. The *economic decision-making responsibility* of an individual is represented by a

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<sup>12</sup> Employment income is the sum of monthly income derived from the main job, casual job, piece jobs, self-employment, profit sharing, thirteenth cheque and bonus. Non-employment income include social welfare grants, inheritance, rentals, gifts and remittances. No specific attention was given to grant income as chapter 2 shows that it is not significant in the couple analysis. Total income is obtained by summing up employment income and other monthly non-employment income. All the monetary values were adjusted for inflation. Wave 1 year (2008) was used as the base to adjust the income and expenditure figures for wave 2 and wave 3. The consumer Price Indices of 111.7 and 123.9 for year 2010 and year 2012 were respectively used for adjustments (StatsSA, 2012).

<sup>13</sup> The question on decision-making in the adult questionnaire reads as follows: “Who makes decisions about: (a) “day-to-day household expenditures (e.g. groceries), (b) “large, unusual purchases such as appliances, vehicles or furniture”, (c) “where your children should go to school”, (d) “who is allowed to live in the household as part of the household (for example, if a relative or family member does not have a place to stay)”, (e) “where the household live”.

binary variable taking the value (=1) if the individual is an economic decision-maker and (=0) otherwise. *Economic decision-making power* in turn is a categorical variable taking the value (=3) if the individual is a *main decision-maker*, the value (=2) if the individual is a *joint decision-maker*, and the value (=1) if the individual is a *non-decision-maker*. Hence, economic bargaining and decision-making power, as the two components of gender economic empowerment, are represented in the data. Households with no resident economic decision-makers, i.e. with only non-resident economic decision-makers, were excluded from the dataset, making it possible to construct a variable that captures *joint* (multiple decision-makers) versus *centralised* (one decision-maker only) decision-making. In NIDS, a resident is one who ‘usually resides at the house for more than four nights a week’ (Brown et al., 2012:3).

The seven household expenditure categories considered in the study are food, health care, transport, utilities, insurance, household items, and education. The data represent expenditure in the last thirty days before the interviews, and hence are monthly. For each category of household expenditure, medians of real monthly household expenditure are computed for both male- and female-headed households, together with the relative differences between the medians.<sup>14</sup>

## 5. Methods

The econometric analysis in this paper follows a multi-pronged approach. *First*, gender-based comparisons of economic bargaining power are carried out. Averages and the t-tests for the mean differences in each economic bargaining power factor of each wave and pooled data are presented by gender. In terms of regression analyses seeking to establish the impact of economic bargaining power on decision-making, probits and multinomial probits at cross-sectional level, and xtprobits at panel level, are estimated separately for males and females, where:

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<sup>14</sup> Percentages of zero monthly expenditure for each expenditure category are also reported. As expected, no zero expenditure was reported for food across survey rounds for both male headed and female headed households. The utilities expenditure category also reported a reasonably low percentage of zeros, ranging from 12% (2012) to 21% (2008). The insurance and transport expenditure categories have zero expenditure that range from 43% (2012) to 54% (2008), and from 62% (2008) to 73% (2010), respectively. The percentage of zero monthly expenditure for education ranges from 74% (2008) to 83% (2012), while the range for health care is from 79% (2008) to 86% (2010), and that for household items is from 84% (2010) to 86% (2012). Since expenses on education, health care, and household items are occasional and the questionnaire asked for expenses in the last 30 days, it is reasonable to find high percentages of zero expenditure, especially among the poor. Response bias due to poor recall cannot be ruled out as another contributing factor [Tables 23a-23d].

Economic decision-making =  $\Omega$  (economic bargaining power factor; socio-demographics)..(i)

Economic decision-making is represented by different variables. For the probit and xtprobit models, the economic decision-making variable is binary: ‘yes versus no’, ‘joint versus none’, ‘main versus none’, or ‘main versus joint’. For the mprobit models, the dependent variable has three categories, which are main-, joint- and non-decision-maker. Due to concerns with multicollinearity, separate regression models are estimated for each economic bargaining power factor, i.e. employment status, employment income, total income, and education. Socio-demographics are employed as control variables and include age, race, headship, household size, and marital status.

*Second*, gender differences in economic decision-making, as well as differences between and within economic decision-making responsibility and power, and transitions in economic decision-making responsibility and power, are described. Cross-section, pooled and panel probit models are then used to determine the role of (female) gender in predicting economic decision-making responsibility and power. The general regression function in this case is represented as:

Economic decision-making =  $\Omega$  (gender; socio-demographics) .....(ii)

Economic decision-making in regression function (ii) is represented by the same variables as in regression function (i) as are the socio-demographic control variables.

*Third*, analyses that focus on the influence of the gender and economic empowerment of South African economic decision-makers on household expenditure are explored using an inferential approach (Thomas, 1990). The reality that some expenditure categories have many zero values is indicative of the need to determine whether there is a selection bias problem. A two-step heckman selection estimation model (Cameron & Trivedi, 2009) is employed for the cross-sectional datasets (i.e. each wave and pooled), with the inverse Mills ratios (IMRs) informing the choice between the heckman selection model and the ordinary least squares (OLS) model. OLS regression models are implemented (Phipps & Burton, 1998; Attanasio & Lechene, 2002) in cases where the IMRs show no selection bias. The results for the heckman two-stage model are reported when there is selection bias. For the household expenditure panel data analyses, a similar approach is followed, using the appropriate random-effect tobit and random-effect OLS regression models. The main independent variables are the factors of

economic empowerment and a sub-sample of economic decision-makers is considered. The general regression function for both cross-sectional and panel data analyses is as follows:

$$\text{Household expenditure} = \Omega (\text{economic empowerment; socio-demographics}) \dots\dots\dots(\text{iii})$$

Economic empowerment represents the economic bargaining power factors and economic decision-making factors. When individual income variables are the explanatory variables, household income is not included in the regression model to avoid multicollinearity.

The *final* component of the analyses starts with a descriptive analysis of joint decision-making, by gender of the household head. Furthermore, the analyses provide a summary of the economic bargaining power of household heads, by economic decision-making responsibility. Summary descriptions of household expenditure are also provided by gender of the household head. An application of the heckman model or the OLS model, based on the above IMR approach, household level decision-making variables, is used to explain the level of household expenditure. The general regression function for the household level analysis is:

$$\text{Household expenditure} = \Omega (\text{household level decision-making; household head socio-demographics})\dots\dots\dots(\text{iv})$$

Household level decision-making includes variables such as joint decision-making (yes/no), and the presence in the household of a female (male) decision-maker, female main (joint) decision-maker, and male main (joint) decision-maker, all coded as yes (=1) or no (=0).<sup>15</sup> The household head socio-demographics are marital status, race, and age. Finally, weights are used in the analysis (Phipps & Burton, 1995).

In summary, the multi-pronged approach to the econometric analysis adopted here establishes how economic bargaining power influences economic decision-making, and then determines how economic empowerment impacts on household expenditure. The analysis further assesses the extent of the influence of joint household decision-making on household expenditure. Gender takes prominence in each analysis. Together, the analyses provide a nuanced representation of the influence of economic empowerment on household expenditure on family public goods, a proxy of household well-being.

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<sup>15</sup> Although the random effects tobit model was the first choice for the panel data analysis of household expenditure, in some situations, the regression models could not converge. The second best random effects linear regression model was adopted in situations where the model passed the Breusch and Pagan Lagrangian test for random effects. Otherwise the results are for the pooled OLS regression model.

## **6. Results**

The analysis below focuses on gender differences evident in the economic bargaining power of South African adults, gender and economic decision-making (responsibility and power), and also assesses how gender and economic bargaining power explain economic decision-making. The two sources of gender economic empowerment, i.e. economic bargaining power and economic decision-making agency, are investigated as drivers of expenditure on family public goods. Finally, decision-making arrangements within households are employed to assess levels of expenditure on family public goods.

### **6.1 Economic bargaining power**

Economic bargaining power is identified as a ‘means to achieve’ functionings in the Capability Approach (CA), and represents an important means of economic empowerment [Table 1]. The case in each survey round reflects that half of male adults are employed, whereas about a third of female adults are employed. The females’ employment income ranges between 33% and 48% of the employment income of their male counterparts, while the total income of females range between 57% and 80% of the total income of their male counterparts. The mean differences between males and females, regarding years of education, range from 0.16 years to 0.24 years, in favour of males. The gender gap for employment income and education level, however, narrowed over time, but widened for total income. The t-tests for the mean differences are all significant at the 1% level. Women are, therefore, at a distinct disadvantage in comparison to men in as far as economic bargaining power is concerned.

[Table 1 about here]

### **6.2 Gender and economic decision-making**

Evidence on gender differences in economic decision-making among South African adults is presented in Table 2. A relatively large share of adults are deemed decision-makers, particularly main decision-makers. The percentage of economic decision-makers among adults increase over time from 67% (2008) to 72% (2010) and 82% (2012), a trend that is preserved when the analysis is presented by gender. The percentage of economic decision-makers among female adults is 68%, 74% and 85%, while that among male adults is 66%, 70% and 79%, for 2008, 2010, and 2012, respectively. The data show that female adults in each individual survey year are statistically significantly more likely than male adults to be

identified as economic decision-makers. An analysis by Gumede (2009) that draws on the 2008 NIDS survey data found similar results of greater female involvement in decision-making.

The analysis of the economic decision-making power (main, joint, none) as reflected in the three survey rounds show that most South African adults are main decision-makers and that the percentage increases over time from 52% (2008) to 57% (2010) and 66% (2012). The percentage of none decision-makers correspondingly decreases over time from 32% (2008) to 27% (2010) and 17% (2012). The percentage of joint-decision-makers among South African adults remains constant at 14-15%. Thus, main decision-making power is more prominent than joint decision-making power.

The percentages of main and joint (none) decision-makers among female adults increase (decrease) over time, which is indicative of women's greater involvement in economic decision-making. Whilst the percentage of non-decision-makers among male adults also decreases over time, the percentage of main (joint) decision-making falls (rises) in 2010 and rises (falls) again in 2012. As expected, the 2008 and 2012 surveys show that the percentage of female adults who are joint-decision-makers is higher than the percentage of male adults who are joint-decision-makers.

The trends between survey rounds in economic decision-making reported in Table 2 are all highly significant ( $p < 0.01$ ) for both male and female adults. The main finding in Table 2 is that, on aggregate, the role of female adults in economic decision-making surpasses that of male adults, i.e. females are more likely to play some decision-making role. Literature suggests that women's procurement of economic decision-making power may impact households' development goals (Duflo, 2003; Rangel, 2006; Ashraf et al., 2010), a condition that the South African data may be pointing towards. It is also interesting, however, to note that participation in economic decision-making has increased over time for both female and male adults, in these representative cross-sections.

[Table 2 about here]

The analysis of between- and within- variations in economic decision-making responsibility is presented in Table 3a. The 'between' summary of the '2008 – 2010' panel shows that 74% of South African adults had ever (i.e. at least once) been an economic decision-maker. The percentage among males is 67%, while that among females is 78%. Economic decision-

making, therefore, is more common among female than male adults. The ‘within’ figure, which is gender invariant, indicates that 87% of South African adults who ever were economic decision-makers were always economic decision-makers in ‘2008 – 2010’. Stability in the assignment of decision-making responsibility is, therefore, relatively substantial. However, there is no marked difference between male and female adults with regard to “permanency” in decision-making responsibility.

The results for the ‘2010 – 2012’ panel exhibit the same pattern, i.e. economic decision-making is more common in female than male adults, but not different in terms of stability in economic decision-making [Table 3a]. The ‘between and within’ analysis for the pooled weighted dataset, as expected, reflects the same pattern, though the levels of the outcomes are generally lower. In general, the results presented in ‘Table 3a’ also portray strong evidence of an improvement in gender economic empowerment in as far as economic decision-making is concerned.

[Table 3a about here]

A gendered ‘between and within’ analysis of the economic decision-making power for each of the three panels is presented in Table 3b. A consideration of the ‘between’ variation for the ‘2008 – 2010’ panel shows that 65% (58%) of the female (male) adults were main decision-makers at least once in the given period. In addition, it is evident that 28% (20%) of the female (male) adults were joint decision-makers at least once (i.e. ever) in the given period. For the ‘2010 – 2012’ panel, 66% (56%) of the female (male) adults were main decision-makers at least once in the period, while 29% (24%) of the female (male) adults ever were joint decision-makers. The same trend of a higher figure for females than males on both main decision-making (62% vs 51%) and joint decision-making (33% vs 23%) is reflected in the combined panel. Thus, women are relatively more empowered than men in terms of economic decision-making.

The ‘within’ analysis indicates that 79% (80%) of the female (male) adults observed in the ‘2008 – 2010’ panel who were ever identified as main decision-makers remained in that state. For the female (male) adults ever identified as joint decision-makers, 57% (55%) always were joint decision-makers, for the ‘2008 – 2010’ panel. There is more stability in being a main decision-maker as compared to being a joint decision-maker, both for female and male adults. Almost the same pattern is reported for ‘2010 – 2012’ with regard to joint decision-making. The results from an analysis of economic decision-making as an indicator of

empowerment reflected in Table 3b, just as the results in Table 3a, show substantial gender economic empowerment.

[Table 3b about here]

In a balanced panel [Table 4], the descriptive analyses of economic decision-making responsibility and economic decision-making power tell a similar story. The ‘between’ variation shows that the male percentage (77%) is lower than the female (86%), i.e. females are more likely than males to ever have been decision-makers. The same applies to the ‘within’ variation with males (71%) and females (76%) always being decision-makers. The economic decision-making stability is, in this case, more pronounced among females than male adults. Stability regarding main and joint decision-making power is higher for females (67% and 43%) than male (65% and 39%) adults. On aggregate, therefore, there is evidence of gender economic empowerment in form of decision-making.

[Table 4 about here]

Transition probabilities for both economic decision-making responsibility [Tables 5a] and economic decision-making power [Table 5b] are presented by gender. The results show that a third of non-decision-makers gained decision-making responsibility between survey rounds. The data in the ‘2008 – 2010’ panel show that gains in economic decision-making responsibility are 24% for males and 39% for females, i.e. of those adults who were not decision-makers at any point in time, 24% (males) and 39% (females) had taken on the role of decision-maker by a subsequent period. Losses in responsibility for economic decision-making are only 11% for males and 8% for females. The gains in economic decision-making reflected in the ‘2010 – 2012’ panel are 31% for males and 43% for females, whereas the losses in economic decision-making responsibility are 10% (males) and 8% (females). The combined panel shows the same patterns, reporting 28% and 41% for gains and 10% and 8% for losses in economic decision-making responsibility, for males and females, respectively.

Interestingly, females have made larger strides in acquiring decision-making responsibility than males (39% vs 24% for ‘2008 – 2010’ and 43% vs 31% for ‘2010 – 2012’). Also, females are relatively less likely than males to relinquish decision-making responsibility (8% vs 11% for ‘2008 – 2010’ panel, and 8% vs 10% for ‘2010 – 2012’ panel). Thus, gender economic empowerment with regards to economic decision-making responsibility is

relatively evident as reflected in the transitions in economic decision-making responsibility between the three survey rounds.

[Table 5a about here]

An examination of the transition probabilities for economic decision-making power [Table 5b] shows that approximately half or more of joint decision-makers acquired main decision-making power over the course of time. The percentages transitioning from joint to main decision-making power for males are 51% for the '2008 – 2010' panel, 59% for the '2010 – 2012' panel and 56% for the combined panel, while the percentages for females are 59% for the '2008 – 2010' panel; 47% for the '2010 – 2012' panel, and 54% for the combined panel. There are, however, no clear consistent patterns in the gendered analysis in this case.

As expected, transitions from main to joint decision-making is far less common for both males (16%, 11% and 14%) and females (10%, 14% and 12%) in the '2008 – 2010', '2010 – 2012' and 'combined' panels, respectively. Joint decision-makers, as expected, are much less likely to retain their decision-making power over time than are main decision-makers (19% vs 9% for males, and 14% vs 6% for females in the '2008 – 2010' panel; 19% vs 6% for males, and 18% vs 5% for females in the '2010 – 2012' panel, and 19% vs 8% for males, and 16% vs 5% for females in the combined panel). Females are more likely than males to gain main and joint decision-making power over time ('21% and 17%' vs '14% and 10%' for '2008 – 2010'; '24% and 18%' vs '19% and 12%' for '2010 – 2012', and '23% and 18%' vs '17% and 11%' for combined panel). Possible explanations of transition probabilities for economic decision-making are the dissolution of households across waves due to divorces or deaths in the household and the resultant reconstitution of household structure due to these and other demographic factors; an avenue worth interrogating in future research.

[Table 5b about here]

Strides have been made too, towards enhancing women's economic decision-making power. The data shows that economic decision-making is concentrated among females in the household. The probit and multinomial probit regression models were used to analyse the role of gender in economic decision-making. Tables 6 and 7 show that in each survey round, being a female adult raises the probability of being an economic decision-maker by a statistically significant margin ( $p < 0.01$ ). In all cases (except for the main-joint comparison in the 2012 survey), being female enhances the probability of being a joint- rather than a non-

decision-maker, being a main- rather than a non-decision-maker, and being a main- rather than a joint-decision-maker. The regression results corroborate the earlier descriptive analysis on economic decision-making power that women are relatively more empowered in terms of economic decision-making. Hence, there is some evidence of gender economic empowerment with regard to economic decision-making.

[Table 6 and Table 7 about here]

The panel probit regression analysis confirms that gender predicts economic decision-making responsibility. Table 8 shows that the gender dummy for each panel is positive and statistically significant ( $p < 0.01$ ) and conforms that being a female adult increases the probability of being an economic decision-maker. The results from the employment of economic decision-making power (Table 9) are consistent for each panel. Female adults are more likely to be a main- than a non-decision-maker, more likely to be a joint- than a non-decision-maker, and, finally, more likely to be a main- than a joint-decision-maker.

[Table 8 and Table 9 about here]

Participation in economic decision-making, as an economic empowerment indicator, has therefore, shown a marked improvement in South Africa. Female adults are centrally involved in economic decision-making and more so over time.

### **6.3 Gender, economic bargaining power and economic decision-making**

The factors of economic bargaining power were plugged into a multivariate regression model separately for men and women in order to test the hypothesis that when an individual gains economic bargaining power, s/he is also empowered as they gain economic decision-making agency. In other words, being employed, having a higher income, or being more educated, should positively affect the economic decision-making responsibility and economic decision-making power. As expected, economic bargaining power positively influence economic decision-making responsibility [Table 10] irrespective of gender. In addition, only the total income of males is statistically insignificant across survey rounds.

[Table 10 about here]

An analysis of how economic bargaining power impact on economic decision-making power reveals that employment confers economic decision-making power on South African adults across survey rounds [Tables 11a to 11d]. Importantly, being employed raises the probability

of being a main versus a non-decision-maker more than a joint versus non-decision-maker. The impact of employment on the probability of being a main versus a joint decision-maker is, as observed in both males and females, also statistically significant ( $p < 0.01$ ). Employment status has a larger impact among females than males in the 2010 survey and across all decision-making comparisons. The 2008 survey shows that employment status has a larger impact on ‘main versus none’ and ‘main versus joint’ for females than males. However, the 2012 survey reflects that employment status has a greater impact among males as compared to females, and this is the case across all decision-making comparisons. In general, however, employment empowers both men and women to participate in economic decision-making.

Employment income promotes females from being non-decision-makers to main or joint decision-makers, more than it does for males. This result that employment income promotes someone from a joint to a main decision-maker holds across the survey rounds and significantly so ( $p < 0.05$ ). Only in the 2012 survey and in the pooled data, does employment income have a positive impact on ‘main versus joint’ decision-making ( $p < 0.05$ ). A consideration of total income as a predictor of economic decision-making power shows that a statistical significance is realised only in females, and in explaining the probability of being a main versus none- decision-maker than the probability of being a joint versus a non-decision-maker. Only in the 2012 survey is total income statistically significantly influencing the probability of being a main versus a joint decision-maker for female adults.

As expected, higher levels of education play a significant role in explaining economic decision-making power for both males and females. It is evident consistently across the survey rounds that, the impact in males of education on joint versus non-decision-maker is higher than the impact on main versus non-decision-maker, while no statistical significance is observed when assessing the ‘main versus joint’ probability. However, for females, the impact of education on main versus non-decision-maker is higher than the impact on joint versus non-decision-maker across survey rounds. The impact of education on the probability of being main versus joint is significant for the 2008 and 2010 surveys, but not in the 2012 survey. Overall, the cross-sectional analysis suggests the importance of economic bargaining power for economic decision making responsibility and power for both men and women.

[Tables 11a – 11d about here]

The results in Table 12 are from a panel data analysis on the effect of the four factors of economic bargaining power on economic decision-making responsibility. Employment status and education show positive and statistically significant results ( $p < 0.01$ ) for both males and females, with coefficients being larger for males than females. Employment and total income also show statistically significant and positive results for both males and females, except for the male coefficient of the '2008 – 2010' panel, which is statistically insignificant. However, the impact for the total income variable for each panel is larger for females as compared to males. The results for employment status and employment income are consistent with what was reported for each survey round, i.e. increasing the probability of South African adults making economic decisions.

[Table 12 about here]

An analysis of probabilities of 'joint versus none', 'main versus none' and 'main versus joint' decision-making shows that employment status has a clear positive relation with economic decision-making power. As expected, the coefficient, as observed for both males and females, is largest for the 'main versus none', followed by 'joint versus none', and lastly for the 'main versus joint' decision-making, across the panels. Females' income (both employment and total income) produced consistent and statistically significant results that are similar to the way employment status influences economic decision-making power. For males, employment and total income are significant for the 'joint versus none' and 'main versus none' probabilities of economic decision-making power in the '2010 – 2012' and 'combined' panel, but not in the '2008 – 2010' panel. Education also impacts significantly, for both males and females, on the probabilities of the 'joint versus none' and 'main versus none' decision-making across all panels. In other words, employment status, income (both employment and total income) and education, are important in differentiating between decision-makers with regards to decision-making power and determining decision-making responsibility for both men and women.

[Tables 13 – 15 about here]

Therefore, both the cross-sectional and panel analyses of economic bargaining power show that economic factors play a role in determining an individual's economic decision-making responsibility and economic decision-making power, but not more so for women than men.

## **6.4 Gender, economic empowerment and household expenditure**

This section analyses the association between economic empowerment and household expenditure in order to enhance the understanding of how adults' economic bargaining power and decision-making agency impact on household members' welfare. The analysis assesses if and how men and women's economic empowerment impacts on the levels of household expenditure on selected family public goods. The hypothesis is that economic bargaining power and decision-making agency, as measures of economic empowerment, impact positively on household expenditure on family public goods.

### **6.4.1 Employment**

Controlling for employment status and socio-demographics, the 2008 survey shows that households with female decision-makers spend significantly more on food (R61), transport (R244) and health care (R262) than households with male decision-makers. However, the 2010 survey reveals that households with female decision-makers spent significantly more on insurance (R109), while health care expenditure remains significant but turns negative, i.e. households with a female decision-maker spend significantly less on health care. It is evident that by 2012, households with female decision-makers, unlike those with male decision-makers, spent significantly more on transport (R175) and marginally so on utilities (R27). On aggregate, households with female decision-makers spent more on food (R52), insurance (R64), and statistically marginally so on household items (R1,114).

It is noted, with regard to employment status that households with an employed decision-maker in 2008, spend significantly more on all other expenditure categories, except for household items expenditure category, when compared to households without an employed decision-maker. The magnitude of differences in household expenditure ranges from R48 (utilities) to R505 (transport). A similar result is reported in 2010 but only for food, transport, insurance and utilities, with the magnitude in differences in expenditure ranging from R92 (utilities) to R398 (food). Expenditure on food, transport, insurance, and household items are statistically significantly more in 2012 for households with an employed decision-maker and range from R57 (utilities) to R614 (household items). On aggregate, significantly higher expenditure is reported for food, transport, utilities and insurance. The coefficients range from R40 (insurance) to R437 (transport) for households with employed decision-maker(s) in comparison to those without employed decision-maker(s). Thus,

households with decision-makers who are economically empowered through employment, spend more on family public goods.

Interacting gender and employment status in relation to the 2008 survey shows that statistically significantly more is spent only on education (R315) and transport (R322) expenditure, by households with an employed female decision-maker. However, significant positive coefficients are reported for food, transport, insurance, and household items, ranging from R157 (food) to R730 (transport) for a household with an employed male decision-maker. More is significantly spent in 2010 on utilities (R75), though statistically marginally, and on insurance (R106), within households that have an employed female decision-maker. In the case of an employed male decision-maker, significantly more is spent on utilities (R117), food (R354), insurance (R384), and transport (R431), according to the 2010 survey.

The 2012 survey shows more spending on insurance (R37), transport (R115) and food (R187), for the household with an employed female decision-maker and more only on transport (R444) for the household with an employed male decision-maker. On aggregate, significantly more is spent on insurance (R92), education (R156) and food (R322) in households with employed female decision-maker(s), while significantly more is spent on utilities (R51), food (R248), insurance (R286) and transport (R315), in households with employed male decision-maker(s). Education expenditure in households with an employed male decision-maker carries a significant and negative coefficient of R366. The general impression from this result is that the presence of employed economic decision-makers, especially males, increases expenditure on some family public goods, particularly food and utilities, with that expenditure on some family public goods being also higher in households with employed female decision-makers.

[Table 16a about here]

The panel regression results for gender and employment status are reported in Table 16b. The '2008 – 2010' panel reflects that households with female decision-makers spent significantly more on food, utilities, insurance, and education. Estimates of increases in expenditure range from R31 (utilities) to R412 (education). The '2010 - 2012' panel reported similar results and the magnitude of increases in expenditure ranges from R34 (utilities) to R303 (education). Finally, an analysis of the three-wave combined panel shows that households with female decision-makers spend statistically significantly more on utilities (R28), food (R35), and insurance (R70).

A consideration of households with employed decision-makers for '2008-2010' reveals that statistically significantly more expenditure is reported on all categories, except household items, with the magnitude of increases in expenditure ranging from R71 (utilities) to R742 (transport). The '2010 - 2012' panel shows that households with employed decision-makers also spend significantly more on all categories of expenditure, except health care and household items. Increases in expenditure range from R60 (utilities) to R469 (education). The three-year panel shows that only expenditure on household items and education are statistically insignificant, with the significant increases in expenditure ranging from R50 (utilities) to R327 (transport). An interaction of gender and employment status in the '2010-2012' panel, shows that households with an employed female decision-maker spend significantly more, but only for utilities (R71) and education (R608). In no other panel are there statistically significant differences in household expenditure for employed female decision-makers.

However, in '2008-2010', households with an employed male decision-maker are showing significant increases in all expenditure categories except health care and household items. The increases range from R68 (utilities) to R778 (transport). In '2010 - 2012', the coefficient on education expenditure is also not statistically significant, but, significant increases are reported for all other expenditure categories, for households with an employed male decision-maker, and these range from R40 (utilities) to R358 (transport). However, education expenditure regains significance as noted in its increase in the three-year panel, the analysis of which report increases in expenditure ranging from R40 (utilities) to R366 (transport) for households with an employed male decision-maker. According to the panel analysis, the presence of female decision-makers and employed decision-makers in households promote expenditure on family public goods, with increases reported in a minimum of four out of the seven expenditure categories. However, interacting the gender and employment status of decision-makers, shows more pronounced increases for households with employed male decision-makers than employed female decision-makers.

[Table 16b about here]

#### **6.4.2 Employment income**

When gender and employment income are employed as key explanatory variables in the regression analysis [Table 17a], the data shows that households with female decision-makers spend statistically significantly more in all categories, except insurance and education, as

compared to household with a male decision-maker. For 2008, statistically significant increases range from R48 (utilities) to R658 (household items). Yet, only food (R153) is significant for the 2010 survey; and all except health care for the 2012 survey, with a range from R47 (utilities) to R444 (household items). All expenditure categories in the pooled analysis, except health care and education, are significant and positive.

An increase in a decision-maker's employment income of R1,000, resulted in the relevant household's expenditure increasing in all categories except for household items and education in 2010 and education in 2012. The increase ranges from R24 (utilities) to R96 (transport) in 2008; from R10 (utilities) to R75 (transport) in 2010; from R32 (utilities) to R95 (transport) in 2012, and, in the combined, from R18 (utilities) to R80 (transport). This finding is not a surprise given the fact that expenditure is a function of income.

The data shows that every R1,000 increase in a female decision-maker's employment income resulted in a significant increase in all the categories of the particular household's expenditure in 2008, ranging from R43 (utilities) to R261 (household items). Surprisingly, in 2010, only utilities (R19) show a significant increase when female decision-makers' employment income increases. However, for 2012, four out of the seven household expenditure categories, namely R30 (utilities), R63 (food), R86 (health care) and R94 (insurance), exhibit significant increases when female decision-makers' employment income increases by R1,000. A significant increase in household expenditure is reported for utilities (R30), food (R58), education (R94), and transport (R118) as a result of a R1,000 increase in a female decision-maker's employment income in a household when considering the results from the pooled analysis.

The data in all the survey rounds shows that in a household, when a male decision-maker's employment income increases by R1,000, household expenditure in all categories increase, except for household items and education. The ranges of improvement in household expenditure are R19 (utilities) to R66 (transport) for 2008, R7 (utilities) to R80 (transport) for 2010, and R29 (utilities) to R89 (transport) for 2012. Only the household items category does not increase statistically significantly when the pooled data is analysed. Those expenditure categories exhibiting significant increases ranged from R14 (utilities) to R65 (transport). Except for the 2010 survey, the decision-maker's employment income emerges as an important determinant of greater household expenditure on family public goods.

[Table 17a about here]

Panel regression models that take into consideration the gender and employment income of the decision-maker, for '2008 – 2010', show that a household that has a female decision-maker spends statistically significantly more on food, utilities, insurance and education, with increases in expenditure ranging from R25 (utilities) to R349 (education). The food category loses its marginal statistical significance in the '2010 - 2012' panel, but regains statistical significance in the combined panel. The education expenditure category, however, loses statistical significance in the combined panel. Except for household items, a R1,000 increase in a decision-maker's employment income, across all panels, is associated with a statistically significant increase in household expenditure. The range in the increases in household expenditure for the '2008 - 2010' panel is R11 (utilities) to R56 (transport); for the '2010 - 2012' panel from R13 (utilities) to R86 (transport), and for the combined panel from R13 (utilities) to R84 (utilities). These increases are, however, in most cases of a relatively small economic significance.

Only household expenditure on health care ('2008 – 2010' and '2010 - 2012'), and transport ('2010 - 2012'), do not show any significant positive response to a R1,000 increase in female decision-makers' employment income. All other expenditure categories are statistically significant, with coefficients ranging from R23 (utilities) to R175 (household items) for the '2008 - 2010' panel, from R25 (utilities) to R196 (household items) for the '2010 - 2012', and from R24 (utilities) to R158 (household items) (combined). Only household expenditure on household items does not display any significant response to a R1,000 increase in male decision-makers' employment income, across all panels. Changes in household expenditure associated with a R1,000 increase in male decision-makers' employment income range from R8 (utilities) to R42 (transport) in the '2008 - 2010', from R9 (utilities) to R88 (transport) in the '2010 - 2012', and from R9 (utilities) to R77 (transport) in the combined panel. Panel analysis supports the assertion regarding the positive impact of employment income on household expenditure on family public goods for both the presence of female and male decision-makers in households, though the range of coefficients is higher for women than for men.

[Table 17b about here]

### **6.4.3 Total income**

When total income is inserted into the regression function (as a measure of economic bargaining power) together with gender, results vary. The 2008 increases in household

expenditure on health care (R438) and transport (R346) are statistically significant for a household with a female decision maker. Only food expenditure (R88) has a positive and statistically significant sign for 2010, while utilities (R31), insurance (R51), transport (R372) and household items (R412) show statistically significant increases for 2012. On aggregate, only expenditure on utilities (R16), transport (R211) and household items (R876) reflect statistically significant increases when a household has a female decision-maker.

An increase in the total income of a decision-maker in a household impacts positively on all household expenditure categories except for food and health care (2008), in all but food and household items (2010), in all but food (2012), and in all but food, health care, and household items (pooled). The ranges of significant increases are from R1 (utilities) to R45 (household items) in 2008; from R2 (utilities) to R38 (health care) in 2010; from R5 (utilities) to R43 (health care) in 2012, and from R3 (utilities) to R45 (education) in the pooled panel. Again, the marginal effects are relatively small in terms of economic significance.

It is evident from interacting gender and total income that the 2008 household expenditure on health care (R1), transport (R5) and insurance (R25) are positive and significant for households experiencing a R1,000 increase in the female decision-makers' total income. An increase in the male decision-makers' total income by R1,000 has a positive impact on household expenditure on health care (R13), insurance (R18), transport (38), education (R47), and household items (R68). An increase of R1,000 in a decision-maker's total income is associated with statistically significant increases in expenditure on utilities (R1), transport (R5) and food (R6) for females in the 2010 survey, whereas for males, only household items and education are insignificant for the same survey round. The range for the latter significant increases in household expenditure for 2010 is R8 (utilities) to R69 (transport).

The 2012 survey shows that female decision-makers' total income had a statistical significant impact on all categories except household expenditure on health care, household items and education, with significant increases ranging from R2 (utilities) to R54 (insurance). For male decision-makers, only household expenditure on household items does not statistically and significantly respond to a R1,000 increase in total income. The range for the significant household expenditure categories is R24 (utilities) to R66 (transport). In addition, the pooled data reflects an increase in household expenditure for the total income of both female and male decision-makers, which exhibit a statistical significance increase in all categories, except for health care and household items. The magnitude of the increases for the household

expenditure categories that are statistically significant in relation to total income is in line with the gender-based differences in total income, which favours males. Generally, male decision-makers reside in households reporting higher expenditure (and lower poverty) than households with female decision-makers.

[Table 18a about here]

An analysis of the '2008 - 2010' panel's gender and total income, at a longitudinal level, shows that only education expenditure (R274) exhibit a significant positive increase when the household has a female decision-maker. Transport (-R125), however, reports a significant but negative result over this period. The '2010 - 2012' panel shows that household expenditure on utilities (R20), insurance (R44) and education (R211) increases when there is female decision-maker in the household. Finally, the combined three-year panel shows that transport expenditure records a negative change, whereas household expenditure on insurance is higher with a female decision-maker(s) in the household.

An analysis of the impact of a R1,000 increase in the total income of a decision-maker within the household, shows significant increases in all expenditure categories except for insurance and household items for '2008 - 2010', all expenditure categories except household items for '2010 - 2012', and all expenditure categories except insurance and household items for the combined result. However, the coefficients are relatively small, ranging from R1 (utilities) to R8 (transport) in the '2008 - 2010' panel; from R5 (utilities) to R36 (health care) in '2010 - 2012'; and R2 (utilities) to R33 (education) in the combined panel.

Increases in expenditure are significant but very low across the panels when total income of either a female or a male decision-maker in a household increases by R1,000. Only the household items category shows no significant increases for both female and male decision-makers in the '2008 - 2010' panel. Statistical significant increases range from R1 (food) to R16 (health care), while insurance expenditure in a household falls as female decision-makers' total income increase. In '2010 - 2012', only changes in health care and education are insignificant for an increase in the female decision-makers' total income, while household items expenditure is not significant for the male decision-makers' total income. Increases in household expenditure in the '2010 - 2012' resulting from female decision-makers' rise in total income is R2 (utilities) to R219 (household items), and R10 (utilities) to R72 (transport) for male decision-makers. In the combined panel, household items are the only insignificant expenditure category for both the female and male decision-makers' total income, in a

household. Insurance carries a negative and significant sign for increases in a female decision-makers' total income.

[Table 18b about here]

#### **6.4.4 Education**

The result from using gender and the decision-maker's education as key determinants in the analysis of household expenditure show that a household with a female decision-maker(s) witnessed a significantly higher expenditure on only health care (R183) and transport (R145) in 2008. However, these two expenditure categories, together with utilities, carry negative signs in the 2010 survey, with insurance as the only positive and significant category. No expenditure category exhibit any statistical significance in 2012. According to the pooled data, expenditure on insurance (R31) and household items (R663) is significantly higher when the decision-maker(s) is female.

Every one additional year of education within the decision-maker results in household expenditure increases, except for household items (2008; 2010) and health care (2012). The increases in expenditure range from R13 (utilities) to R82 (education) in 2008; R17 (utilities) to R62 (education) in 2010; R18 (utilities) to R192 (household items) in 2012; and R16 (utilities) to R178 (household items) in the pooled data.

The results from interacting gender and the years of education of the decision-maker in the 2008 survey, show that only insurance (R14) and transport (R48) expenditure show significant increases due to a one year increase in years of education of the female decision-maker in a household. The 2010 survey shows increases in utilities (R13), health care (R16) and insurance (R19) expenditure. Only insurance (R12) and education (R47) expenditure show positive and significant increases for the 2012 survey. The pooled data shows statistical significant increases for transport (R46), utilities (R14), insurance (R17) and household items (R96) expenditure.

A one year increase in the male decision-makers' education in a household is associated with increases in all household expenditure categories, except household items (2008; 2010). All household expenditure categories for both the 2012 survey (except health care) and pooled data show significance as a result of an increase in the male decision-maker's level of education in a household. The ranges for expenditure categories that increase significantly, as a result of an improvement in male decision-makers' education in a household, are R14

(utilities) to R93 (transport) in 2008; R21 (utilities) to R85 (health care) in 2010; R18 (insurance) to R226 (household items) in 2012, and from R18 (utilities) to R252 (household items) in the pooled data. Finally, an evaluation of the economic significance shows that male coefficients are greater than female coefficients.

[Table 19a about here]

The panel data analysis of the impact of gender and education on household expenditure shows that significantly more is spent on utilities, insurance, and education (for ‘2008 - 2010’ and ‘2010 - 2012’), when the household has a female decision-maker(s). Only education loses its significance for the combined panel. However, only expenditure on household items does not show a statistically significant increase for all the panels, including the combined panel, as a result of an increase by one year in the decision-maker’s education. Increases in expenditure in response to a rise in the education level of the decision-maker range from R27 (utilities) to R143 (transport) in the ‘2008 - 2010’ panel; R25 (utilities) to R113 (education) in the ‘2010 - 2012’ panel; and R25 (utilities) to R67 (transport) in the combined panel.

A one unit increase in the years of education of a female decision-maker also yields increases in expenditure on utilities (R26), insurance (R48), and transport (R132), only for the ‘2008 - 2010’ panel. However, increasing the education level of a male decision-maker in a household by one year results in a positive and significant impact for all panels and on all the household expenditure categories, with the exception of household items. Increases for the ‘2008 - 2010’ range from R29 (utilities) to R166 (transport); for ‘2010 – 2012’ from R25 (utilities) to R122 (education); and for the combined panel from R27 (utilities) to R75 (transport). Education, therefore, has a greater impact on expenditure on family public goods where male decision-makers in the household are concerned.

[Table 19b about here]

#### **6.4.5 Decision-making power**

Decision-making, as a dimension of economic empowerment, is hypothesised as playing a role in determining levels of household expenditure, with main decision-makers expected to be associated with greater increases in household expenditures in family public goods, unlike the case with joint decision-makers. A 2008 comparison of joint decision-makers and main decision-makers’ status, shows that main decision makers reside in households that spent more on insurance (R58), health care (R243) and transport (R391). It is also evident in 2010

that having a main decision-maker in the household raises expenditure on insurance (R150) and no other category. However, in 2012, only transport (R8) reflect favourably on having a main decision-maker as compared to joint decision-maker, while the pooled data shows that insurance (R93), transport (R147) and household items (R617) receive more expenditure in households where main decision-makers reside.

Having a female main decision-maker(s) in the household in 2008 raises expenditure on insurance (R16) and transport (R22), while having a male main decision-maker(s) in the household raises expenditure on utilities (R47), insurance (R275), transport (R1,302), and household items (R1,347). In addition, the 2010 expenditure on insurance (R57) and transport (R163) was higher in households with a female main decision-maker(s), while households with male main decision-makers had R309 more spent on insurance. In 2012, only transport (R8 for female and R408 for male) shows a significant association with having a main decision-maker in the household. Finally, an analysis of the pooled data shows that having a female main decision-maker in the household raises the amount spent on insurance (R27), transport (R28) and education (R249), while having a male main decision-maker impact on the expenditure on insurance (R248) and transport (R398) by a statistically significant margin.

[Table 20 about here]

The results show that in some cases, economic decision-making agency is translated into expenditure on family public goods, especially, in the expected cases where economic empowerment takes on the form of employment income. However, the economic empowerment of men with economic decision-making agency equally translates into greater expenditure on family public goods.

## **6.5 Headship, joint decision-making and household expenditure**

Additional issues worth interrogating in this study include the prevalence of joint decision-making in male and female headed households, the number of decision-makers in households, the economic bargaining power of household heads who are decision-makers, patterns of household expenditure by gender of the household head, and household-level decision-making and expenditure on family public goods.

The analysis shows that joint decision-making is more prevalent in male-headed households than in female headed households. The differences are significant at the 1% level. In 2008, two thirds of households with male heads had multiple decision-makers, with the figure increasing to 70% in 2010 but dropping to 63% by 2012. This trend about the male-headed household is significant, according to the Pearson Chi2 tests. However, female-headed households show consistently increasing levels of joint decision-making at 30% (2008), 49% (2010), and 51% (2012). The increasing trend regarding female-headed household decision makers is significant and produces Pearson Chi2 values of 235.33 ( $p < 0.01$ ) and 5.70 ( $p < 0.05$ ), respectively.

Joint decision-making in male-headed households is dominated by two decision-makers at 63% (2008), 59% (2010) and 56% (2012). However, a single decision-maker is more common in female-headed households, as shown by the proportions, 69% (2008), 50% (2010) and 48% (2012). The declining trend of the percentage of single decision-makers corresponds to the increase in female-headed households with two decision-makers, which is 27% (2008), 40% (2010) and 43% (2012). Overall, joint decision-making is more common in male-headed households, while single decision-makers are observed more in female-headed households. A possible and plausible explanation for the observed trend is that most male-headed households have resident partners. Female-headed households in turn, are likely to be single mothers staying with their children, and skip generation households, which is a reflection of absent fathers.

[Table 21 about here]

Differences for each gender in economic characteristics were computed for household heads who are decision-makers in comparison to non-decision-makers. The results, as presented in Table 22. The 2008 employment status (0.73 vs 0.53) and employment income (R4,323 vs R2,718) show significant differences between decision-makers and non-decision makers for male household heads. Female household heads had differences on the basis of decision-making responsibility in employment status (0.44 vs 0.05), employment income (R1,161 vs R61), and total income (R1,680 vs R485), which are all statistically significant and stark. There is a gender difference in favour of males in each case of all the economic characteristics. In fact, despite the male household heads who are non-decision-makers fairing poorer than the male household heads who are decision-makers, they are still better off than female household heads across all the characteristics of economic bargaining power.

The differences between decision-making and non-decision-making household heads in 2010 is reported only for employment income (R3,934 vs R4,451) and total income (R4,336 vs R4,366) of male household heads, as well as for employment status (0.35 vs 0.44) and education (7.86 vs 9.14) for female household heads. The 2012 survey reports significant differences between decision-makers and non-decision makers on all the economic characteristics, except education level for male household heads, and total income for female household heads.

[Table 22 about here]

Real household expenditure, by household head, is summarised in Tables 23a-23d. It is evident across the three survey rounds that male-headed households have higher median expenditure than female-headed households. The differences between medians are significant for all categories except on education in the 2010 survey, and household items and education in the 2012 survey. Thus, expenditure on family public goods, as expected, is relatively higher in male-headed households than in female-headed households. In fact, male-headed households almost always spend statistically significantly more on all categories of expenditure. The explanation for the result, as reported elsewhere in this paper, is the fact that male headed households outperform female-headed households in terms of economic standing, including employment and income.

[Tables 23a – 23d about here]

Regression analysis was employed to assess the impact of joint decision-making on household expenditure on family public goods. An assessment of how the presence of a male or female decision maker in the household impacts household expenditure on family public goods is also presented. In addition, the influence of household expenditure on family public goods, and that of the presence of a male and female main and joint decision-maker, is assessed.

Consistently, joint decision-making within the household results in significant increases in expenditure on food. Joint decision-making raises household food expenditure by R205 (2008), R302 (2010), R151 (2012), and R266 (pooled), respectively. The expenditure on transport (R327) and utilities (R50) is raised by joint decision-making, only for the 2010 survey, at the 1% and 5% level, respectively. Other expenditure categories are not impacted upon by joint decision-making. In fact, expenditure on insurance decreases (R42)

significantly in the 2012 survey. Finally, food expenditure depends on joint decision-making within households, while other categories are not driven by joint decision-making per se, but by other factors discussed elsewhere in this paper. An analysis that follows below specifically focuses on gendered decision-making at household level.

*Gender and decision-making:*

An evaluation of the survey data was carried out to determine the levels of expenditure in relation to the presence of a female and a male decision-maker within the household. The 2008 survey shows that having a female decision-maker statistically and significantly raises household expenditure on food (R293) and utilities (R37). The presence of a male decision-maker in turn increases household expenditure on food (R119), transport (R619), insurance (R325) and household items (R1,713). Differences in the coefficients for the female and male decision-maker are statistically significant for food (greater for female), transport, insurance, and partially ( $p < 0.10$ ) for household items (greater for male).

An analysis of the 2010 survey data shows that having a female decision-maker in the household raises expenditure on food (R442), transport (R361) and utilities (R89), while having a male decision-maker impacts positively on insurance (R222) but reports a negative value for health care expenditure (R358). The 2010 survey also shows that the differences in coefficients for the female and male decision-maker are statistically significant for food, health care, insurance, and weak statistically for transport and utilities. The data for the 2012 survey shows a significant increase, only for food, for both female and male decision-makers in the household. Both utilities and insurance show negative values when the household has a female decision-maker. Differences in coefficients for the male and female decision-maker are statistically significant only for utilities (greater for the male) and insurance (greater for the male).

*Gender and main decision-making:*

The 2008 survey reflects that the presence of a female main decision maker within the household leads to food expenditure increases of R188 per month. Yet, expenditure on insurance (R127) and household items (R1,369) has negative values. The results from an analysis of the data regarding male main decision-makers in the household shows an increase in transport (R877) and insurance (R450). Female-male differences in coefficients for these explanatory variables are statistically significant (greater for male) for transport, insurance

and household items. Having a female main decision-maker in the household significantly raises the '2010' expenditure in all categories, except household items, and ranges from R98 (utilities) to R528 (education). However, having a male main decision-maker in the household is associated with an increase in insurance expenditure only. Gender differences in the coefficients are also significant for food, health care, transport and utilities (all greater for female). Finally, with regard to 2012, only the coefficient of having a male main decision-maker in the household is statistically significant for education expenditure, indicating an increase of R321.

*Gender and joint decision-making:*

Households with a female joint decision-maker spent significantly more on food (R125) and insurance (R105) in 2008, while having a male joint decision-maker does not matter. The 2010 survey shows that having a female joint and a male joint decision-maker matters for food and raises household expenditure by R137 and R313, respectively. This gender difference is, however, not statistically significant. Male joint decision-making also significantly increases expenses on utilities, insurance and education. Food expenditure in 2012 also responds positively to having a female (R133) and a male (R130) joint decision-maker within the household. Utilities expenditure, however, has a negative coefficient for female joint decision-making and a positive coefficient for male joint decision-making. Finally, while insurance expenditure reports a negative coefficient for the female joint decision-maker, education expenditure reports a negative coefficient for the male joint decision-maker.

[Tables 24 – 27 about here]

Overall, the results presented in this study suggest that there is a positive connection between economic bargaining power and economic decision-making agency. There is also a positive association between gender economic empowerment and household expenditure on family public goods. Women, however, are still lagging behind in terms of economic bargaining power. Female-headed households also reflect lower levels of expenditure on family-type public goods in comparison to male headed households. Thus, in a manner similar the results noted by Mahmud (2012), joint decision-making is a common phenomenon in South Africa.

## **7. Contribution**

The study makes a contribution on a number of fronts.

It is the first study, within a South African context, to assess the interconnectedness of economic bargaining power, economic decision-making agency and household expenditure on family public goods. The study does so in the spirit of the Capability Approach (CA) and employs both cross-sectional and panel data. The study also draws a distinction between decision-making responsibility and power, thus allowing a more nuanced analysis of economic decision-making agency.

The study also makes a contribution towards the selected indicators of gender economic empowerment. The choice of indicators is consistent and even goes beyond the feminist capability literature which advocates moving beyond proxies for welfare, i.e. over and above income and commodities (Robeyns, 2003; MacPhail & Dong, 2007). Finally, the employment of economic decision-making agency as a determinant of expenditure on family public goods, is novel.

The study appreciates the idea that gender economic empowerment and its impacts on household expenditure cannot and should not only be a “between-spouses” issue given the diversity in household types in South Africa. As such, a broader and more nuanced gendered analysis is carried out at the individual and household levels.

## **8. Limitations**

There are a number of limitations to the study.

The *first* limitation pertains to the difficulty associated with linking the individual income that an adult in the household receives with the expenditure of that particular household. One cannot confirm that the income that an adult has is actually spent on the relevant goods and services. At best, the hypothesis regarding this relationship is an inference about the impact of the individuals’ income on household expenditure, as pointed out by Doss (2013).

The *second* limitation relates to the challenges faced in the measurement of income and expenditure. Interviewees are expected to recall the income that they receive, on the one hand, and the household respondent is expected to recall the expenditure that the household

made in the past thirty days. Recalling all income inflows and all expenses for different expenditure categories is not free from bias (Tsui, 2002; Vyas & Kumaranayake, 2006; Njong & Ningaye, 2008). Measurement error, which can represent a downward or an upward bias, therefore, stands to impact on the study's findings.

*Third*, there are high percentages of zero expenditure recorded for a number of expenditure categories. One may not be sure about whether such high percentages of zeros are the result of infrequent purchases or a reflection of the tastes and preferences of the financial decision-makers within the household (Attanasio & Lechene, 2002). High percentages of zero expenditure may also arise from the way a particular question on expenditure was posed and so is related to the above problem of recall bias. Perhaps for those past thirty days, no expenditure was made for a certain category, but that is not to say the expenditure, though infrequent, is not deemed important in that particular household.

*Fourth*, it is important to point out that the approximation here of various household expenditure categories as family public goods is very crude, although the expenditure classification, as explained elsewhere in the introduction, fits a very broad conceptualization of family public goods. Further in-depth analysis is required to tease out the family public good nature of household expenditures as reported in the National Income Dynamics Study (NIDS).

*Fifth*, Heckert and Fabric (2013) suggest that the measurement of women's empowerment needs to go beyond improvements in economic empowerment and should include knowledge of legal rights and recourse, participation in decision-making, and on attitudes and social norms. The current study only addresses decision-making agency. Thus, the study lacks a more encompassing focus on legal rights as well as attitudes and social norms.

In the *sixth* instance, the significant and negative coefficients on some expenditure categories are counterintuitive and difficult to interpret. For example, it is not clear whether these represent reallocations across expenditure categories, i.e. spending less on some categories and more on others. For this reason, the use of seemingly unrelated regression (SUR) models in the cross-sectional expenditure analysis represent an important avenue for further research.

In the *seventh* instance, joint financial decision-making, at the household level, is measured as a situation where two or more members are reported to be decision-makers. Importantly, the concept 'joint' does not necessarily mean the identified members coming together and

making decisions. In addition, situations of disagreements where two or more members are identified as main decision-makers or joint decision-makers do exist due to the nature of identification of decision-making in this study. Explaining the nature of these disagreements requires further exploration and is an avenue for further research.

*Finally*, decision-making questions were posed with no clear distinction between high-level decisions on the allocation of resources to expenditure categories and instrumental decisions regarding the management of the allocated resources (Holden, 2011; Lauer and Yodanis, 2011; Skogrand et al, 2011). The greater involvement of females in economic decision-making in the current study could reflect women's involvement in the instrumental management of household resources and not an overall allocative control. Economic bargaining power may be directly linked to overall allocative control than to instrumental management. Decision-making agency, as measured here, cannot distinguish instrumental from allocative control. Hence, a more detailed analysis of decision-making is not possible.

## **9. Conclusion**

Economic bargaining power is still a gendered phenomenon in South Africa. Both adult men and male household heads are, as noted across all the economic factors analysed here, more empowered than adult women, which confirms the importance of the United Nations' Sustainable Development Goal (SDG) No. 5. Policies on economic empowerment that focus on female and mostly single-headed households are a priority. There is a great need to work towards closing the existing gap in economic bargaining power between males and females and enhancing egalitarian gender relationships.

The study's concern with decision-making agency reveals that female adults are more likely than male adults, to be identified as economic decision-makers. The upward trend in economic decision-making over time suggests an improvement in women's decision-making agency. There is also some permanency to women's decision-making agency. Women, therefore, hold considerable economic decision-making responsibility.

Economic bargaining power has played an undisputed role in advancing economic decision-making agency, irrespective of gender. Specifically, both employment income and total income, and employment status are key drivers of women's economic decision-making agency and associated with the promotion of women from non-decision-makers to main or

joint decision-makers. Therefore, opportunities that raise both females' employment and total income, enhance gender economic empowerment and are relevant to policy formulation.

The analysis of gender economic empowerment and household expenditure on family public goods, provided a number of insights. *First*, households with female decision-makers, or employed decision-makers, or employed male decision-makers, almost always statistically spend more on a minimum of three family public goods expenditure categories, with food, transport, utilities and insurance featuring most strongly. These results suggest the importance of employment and economic decision-making agency for both men and women with regard to investments in family public goods. The *second* insight is that, irrespective of gender, increases in the employment income of the decision-maker within a household is associated with statistically and significant increases in almost all household expenditure categories. There is some evidence, therefore, that employment income, as an economic empowerment factor, positively influences expenditure on family public goods, more or less equally for women and men. The *third* insight is that joint decision-making consistently and positively influence food expenditure.

At the policy level, Doss (2013) points out the lack of clarity on policies that enhance women's bargaining power, with conventional wisdom suggesting improvements in education, income, and assets as important avenues. Similarly, Zhang, Brauw and Rozelle (2004) assume that the 'taking up of jobs' by women in China could result in women generating employment income and in turn raising their decision-making power within households. Sen (1999) and Iversen (2003) also suggest employment and literacy as means to strengthen women's agency and intra-household bargaining power. Observations in the current study reinforce the importance of policies that enhance economic empowerment factors and economic decision-making agency. All these policies can contribute to the well-being of household members through investments in family public goods.

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**Table 1: Economic bargaining power, by survey round**

Socio-economic factors	Survey round	Male		Female		Total		t-test of mean differences by gender
		Mean	Sample (n)	Mean	Sample (n)	Mean	Sample (n)	
Employed (Y/N)	2008	0.56	6,633	0.35	9,498	0.45	16,131	22.17***
	2010	0.48	7,439	0.31	10,309	0.39	17,748	18.19***
	2012	0.52	8,066	0.34	11,485	0.42	19,551	19.43***
	pooled	0.52	22,138	0.33	31,292	0.42	53,430	34.24***
Employment income (ZAR)	2008	2,845	6,684	958	9,980	1,786	16,664	19.29***
	2010	2,547	7,441	1,246	10,366	1,852	17,807	10.17***
	2012	2,911	7,979	1,290	11,445	2,045	19,424	17.34***
	pooled	2,766	22,104	1,166	31,791	1,898	53,895	25.82***
Total income (ZAR)	2008	3,933	6,684	3,160	9,980	3,499	16,664	4.54***
	2010	2,786	7,441	1,812	10,366	2,266	17,807	3.69***
	2012	3,252	7,979	1,886	11,445	2,522	19,424	6.31***
	pooled	3,299	22,104	2,280	31,791	2,746	53,895	7.88***
Education (years)	2008	9.06	7,420	8.82	10,010	8.93	17,430	5.87***
	2010	9.30	7,897	9.08	10,700	9.18	18,597	5.91***
	2012	9.48	8,331	9.32	11,691	9.39	20,022	6.70***
	pooled	9.28	23,648	9.08	32,401	9.17	56,049	10.62***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Post-stratified weights used in the calculations.

**Table 2: Economic decision-making, by gender and wave**

Decision-making	2008			Chi2 p-value
	Male	Female	Total	
None	33.75	31.68	32.62	<0.01
Joint	9.21	19.23	14.66	
Main	57.04	49.09	52.71	
<b>Total</b>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>	
Yes	66.25	68.32	67.37	<0.01
<b>Sample (n)</b>	6,081	8,797	14,878	
	2010			
None	29.80	25.16	27.30	<0.01
Joint	15.97	15.01	15.45	
Main	54.23	59.83	57.25	
<b>Total</b>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>	
Yes	70.20	74.84	72.70	<0.01
<b>Sample (n)</b>	6,133	8,829	14,962	
	2012			
None	20.06	14.96	17.29	<0.01
Joint	12.33	18.82	15.86	
Main	67.61	66.23	66.86	
<b>Total</b>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>	
Yes	79.94	85.05	82.72	<0.01
<b>Sample (n)</b>	6,125	8,828	14,953	
	Pooled			
None	28.15	24.28	26.05	<0.01
Joint	12.41	17.73	15.30	
Main	59.44	57.98	58.65	
<b>Total</b>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>	
Yes	71.85	75.72	73.95	<0.01
<b>Sample (n)</b>	18,339	26,454	44,793	

Notes: Post stratified weights used in the calculations

**Table 3a: Overall, between and within variation in economic decision-making responsibility, by gender**

<b>2008- 2010</b>									
<b>Decision-maker</b>	<b>Male</b>			<b>Female</b>			<b>Total</b>		
	<b>Overall</b>	<b>Between</b>	<b>Within</b>	<b>Overall</b>	<b>Between</b>	<b>Within</b>	<b>Overall</b>	<b>Between</b>	<b>Within</b>
No	41.22	49.74	82.85	30.97	40.80	75.92	35.07	44.37	79.03
Yes	58.78	67.31	87.33	69.03	78.85	87.54	64.93	74.24	87.46
Total	100.00	117.06	85.43	100.00	119.65	83.58	100.00	118.61	84.31
No. of observations (N)	10,188	5,094	-	15,300	7,650	-	25,488	12,744	-
<b>2010 – 2012</b>									
No	42.06	52.21	80.56	29.41	39.56	74.35	34.46	44.61	77.25
Yes	57.94	68.09	85.09	70.59	80.74	87.43	65.54	75.69	86.59
Total	100.00	120.30	83.13	100.00	120.30	83.13	100.00	120.30	83.13
No. of observations (N)	11,064	5,532	-	16,624	8,312	-	27,688	13,844	-
<b>Combined</b>									
No	44.88	60.47	82.19	33.01	50.88	73.63	37.88	54.97	77.65
Yes	55.12	60.76	82.79	66.99	74.92	83.47	62.12	68.87	83.21
Total	100.00	121.23	82.49	100.00	125.80	79.49	100.00	123.85	80.74
No. of observations (N)	18,351	7,725	-	26,331	10,369	-	44,682	18,094	-

Notes: Results are for individuals with panel weights in each two survey rounds i.e. in 2008 and 2010, and in 2010 and 2012.

**Table 3b: Overall, between and within variation in economic decision-making power, by gender**

<b>2008 - 2010</b>									
<b>Decision-making power</b>	<b>Male</b>			<b>Female</b>			<b>Total</b>		
	<b>Overall</b>	<b>Between</b>	<b>Within</b>	<b>Overall</b>	<b>Between</b>	<b>Within</b>	<b>Overall</b>	<b>Between</b>	<b>Within</b>
None	41.22	49.74	82.85	30.97	40.80	75.92	35.07	44.37	79.03
Joint	11.38	20.46	55.61	16.76	28.97	57.85	14.61	25.56	57.14
Main	47.41	58.95	80.42	52.27	65.50	79.79	50.33	62.88	80.03
Total	100.00	129.95	77.43	100.00	135.27	73.93	100.00	132.82	75.29
No. of observations (N)	10,188	5,094	-	15,300	7,650	-	25,488	12,744	-
<b>2010 - 2012</b>									
None	42.06	52.21	80.56	29.41	39.56	74.35	34.46	44.61	77.25
Joint	13.84	24.66	56.12	17.07	29.09	58.66	15.78	27.32	57.75
Main	44.11	56.58	77.96	53.53	66.39	80.63	49.76	62.47	79.66
Total	100.00	133.44	74.94	100.00	135.03	74.06	100.00	134.40	74.41
No. of observations (N)	11,064	5,532	-	16,624	8,312	-	27,688	13,844	-
<b>Combined</b>									
None	44.88	60.47	82.19	33.01	50.88	73.63	37.88	54.97	77.65
Joint	11.78	23.78	47.64	16.99	33.67	49.02	14.85	29.45	48.55
Main	43.34	51.55	75.61	50.00	62.00	74.24	47.27	57.54	74.76
Total	100.00	135.79	73.64	100.00	146.55	68.24	100.00	141.96	70.44
No. of observations (N)	18,351	7,725	-	26,331	10,369	-	44,682	18,094	-

Notes: Results are for individuals with panel weights in each two survey rounds i.e. in 2008 and 2010, and in 2010 and 2012.

**Table 4: Overall, between and within variation in economic decision-making for a balanced panel, by gender**

<b>Decision-making responsibility</b>	<b>Male</b>			<b>Female</b>			<b>Total</b>		
	<b>Overall</b>	<b>Between</b>	<b>Within</b>	<b>Overall</b>	<b>Between</b>	<b>Within</b>	<b>Overall</b>	<b>Between</b>	<b>Within</b>
No	44.21	65.50	67.29	34.26	55.51	61.63	38.25	59.61	64.17
Yes	55.79	77.75	71.93	65.74	86.35	76.18	61.75	82.84	74.54
Total	100.00	143.86	69.81	100.00	141.86	70.49	100.00	142.45	70.20
No. of observations (N)	18,339	6,134	-	26,454	8,829	-	44,889	14,963	-
<b>Decision-making power</b>									
None	44.21	65.50	67.29	34.26	55.51	61.63	38.25	59.61	64.17
Joint	10.62	26.75	39.72	15.94	37.04	43.05	13.81	32.99	41.86
Main	45.18	68.98	65.67	49.80	73.50	67.82	47.94	71.67	66.89
Total	100.00	161.23	62.02	100.00	166.04	60.23	100.00	164.27	60.87
No. of observations (N)	18,339	6,134	-	26,454	8,829	-	44,889	14,963	-

**Table 5a: Transitions in economic decision-making responsibility, by gender**

<b>Transition</b>			<b>Yes</b>	<b>No</b>	<b>Total</b>	<b>Sample (n)</b>
<b>2008 - 2010</b>	<b>Male</b>	<b>Yes</b>	88.95	11.05	100	2,878
		<b>No</b>	24.86	75.14	100	2,216
	<b>Female</b>	<b>Yes</b>	91.02	8.98	100	4,976
		<b>No</b>	39.49	60.51	100	2,674
	<b>Total</b>	<b>Yes</b>	90.26	9.74	100	7,854
		<b>No</b>	32.86	67.14	100	4,890
<b>2010 -2012</b>	<b>Male</b>	<b>Yes</b>	89.66	10.34	100	2,949
		<b>No</b>	31.67	68.33	100	2,583
	<b>Female</b>	<b>Yes</b>	91.73	8.27	100	5,477
		<b>No</b>	43.53	56.47	100	2,835
	<b>Total</b>	<b>Yes</b>	91.00	9.00	100	8,426
		<b>No</b>	37.87	62.13	100	5,418
<b>Combined</b>	<b>Male</b>	<b>Yes</b>	89.31	10.89	100	5,827
		<b>No</b>	28.53	71.47	100	4,799
	<b>Female</b>	<b>Yes</b>	91.39	8.61	100	10,453
		<b>No</b>	41.57	58.43	100	5,509
	<b>Total</b>	<b>Yes</b>	90.64	9.36	100	16,280
		<b>No</b>	35.50	64.50	100	10,308

Notes: transitions are for individuals with “panel weights”

**Table 5b: Transitions in economic decision-making power, by gender**

Transition			Main	Joint	None	Total	Sample (n)
2008 - 2010	Male	Main	73.88	16.50	9.62	100	2,473
		Joint	51.36	28.89	19.75	100	405
		None	14.53	10.33	75.14	100	2,216
	Female	Main	82.62	10.51	6.86	100	3,614
		Joint	59.84	25.55	14.61	100	1,362
		None	21.77	17.73	60.51	100	2,674
	Total	Main	79.07	12.95	7.98	100	6,087
		Joint	57.89	26.32	15.79	100	1,767
		None	18.49	14.38	67.14	100	4,890
2010 - 2012	Male	Main	81.21	11.83	6.96	100	21,155
		Joint	59.45	21.03	19.52	100	794
		None	19.47	12.20	68.33	100	2,583
	Female	Main	80.21	14.69	5.10	100	4,214
		Joint	47.98	33.17	18.84	100	1,263
		None	24.62	18.91	56.47	100	2,835
	Total	Main	80.55	13.72	5.73	100	6,369
		Joint	52.41	28.49	19.11	100	2,057
		None	22.17	15.71	62.13	100	5,418
Combined	Male	Main	77.29	14.33	8.38	100	4,628
		Joint	56.71	23.69	19.60	100	1,199
		None	17.19	11.34	71.47	100	4,799
	Female	Main	81.32	12.76	5.91	100	7,828
		Joint	54.13	29.22	16.65	100	2,625
		None	23.23	18.33	58.43	100	5,509
	Total	Main	79.82	13.34	6.83	100	12,456
		Joint	54.94	27.48	17.57	100	3,824
		None	20.42	15.08	64.50	100	10,308

Notes: Transitions are for individuals with “panel weights”

**Table 6: Gender as a predictor of economic decision-making responsibility, by survey round**

	2008	2010	2012	Pooled
Female dummy	0.130*** (6.89)	0.133*** (9.09)	0.077*** (7.53)	0.112*** (13.64)
Sample (n)	15,467	17,530	18,623	51,620
Wald chi2	1659.82***	1303.77***	2187.47***	4667.27***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Marginal effects calculated at the mean are reported; Adjusted for age, race, headship, household size and marital status; Coefficients are for independent probit regression models.

**Table 7: Gender as a predictor of economic decision-making power, by survey round**

Predictor	2008			2010		
	Multinomial Probit		Probit	Multinomial Probit		Probit
	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint
Female dummy	0.415*** (5.01)	0.760*** (8.25)	0.287*** (3.70)	0.272*** (4.15)	0.652*** (9.56)	0.339*** (5.02)
Sample (n)	15,467		9,555	17,530		10,082
Wald chi2	2752.94***		992.49***	1815.11***		505.10***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, race, headship, household size and marital status; Coefficients are for independent regression models

**Table 7: Gender as a predictor of economic decision-making power, by survey round (continued)**

Predictor	2012			Pooled		
	Multinomial Probit		Probit	Multinomial Probit		Probit
	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint
Female dummy	0.550*** (7.99)	0.374*** (5.80)	-0.136** (2.47)	0.446*** (10.99)	0.525*** (12.74)	0.074* (1.95)
Sample (n)	18,623		11,831	51,620		31,468
Wald chi2	2574.43***		646.62***	6293.65***		1841.26***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, race, headship, household size and marital status; Coefficients are for independent regression models

**Table 8: Gender as a predictor of economic decision-making responsibility in balanced panel**

Predictor	2008 - 2010	2010 - 2012	combined
Female dummy	0.598*** (19.28)	0.553*** (19.01)	0.525*** (22.83)
No. of observations (N)	23,925	26,409	41,918
Wald chi2	3005.59***	3313.87***	6614.23***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Marginal effects equal to coefficients; Adjusted for age, race, headship, household size and marital status; No weights used in the regression analysis; panel probit functions

**Table 9: Gender as a predictor of economic decision-making power in a balanced panel**

Predictor	2008 - 2010			2010 - 2012			Combined		
	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint
Female dummy	0.450*** (11.88)	0.667*** (16.74)	0.214*** (6.72)	0.515*** (14.66)	0.571*** (15.45)	0.071** (2.57)	0.492*** (18.07)	0.525*** (18.12)	0.039* (1.72)
No. of observations (N)	11,715	20,570	15,565	13,204	22,464	17,150	21,949	36,061	25,826
Wald chi2	1224.63***	1721.84***	1797.38***	1344.99***	1980.26***	1963.50***	2720.14***	4256.53***	3745.49***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Marginal effects equal to coefficients; Adjusted for age, race, headship, household size and marital status; No weights used in the regression analysis; panel probit functions

**Table 10: Economic factors as predictors of economic decision-making responsibility, by survey round and gender**

Economic factors	Economic decision-making responsibility (yes/no)							
	2008		2010		2012		Pooled	
	probits							
	Male	Female	Male	Female	Male	Female	Male	Female
Employed (comparison: not employed)	0.168*** (7.67)	0.147*** (9.46)	0.135*** (4.99)	0.132*** (6.64)	0.213*** (9.82)	0.116*** (10.47)	0.177*** (12.03)	0.139*** (14.91)
Sample (n)	6,157	9,166	7,235	10,165	7,518	11,051	20,910	30,382
Wald Chi2	841.17***	1364.44***	660.69***	857.54***	1053.74***	1800.99***	1963.89***	3448.07***
Employment income (R`000)	0.013*** (2.81)	0.044*** (6.36)	0.005 (1.30)	0.018*** (3.42)	0.022** (2.16)	0.037*** (7.51)	0.008** (2.54)	0.026*** (6.51)
Sample (n)	6,211	9,234	7,270	10,247	7,538	11,085	21,019	30,566
Wald Chi2	857.44***	1297.20***	664.01***	801.41***	855.23***	1742.28***	1988.51***	3154.55***
Total income (R`000)	0.000 (0.55)	0.029*** (10.09)	0.004 (1.27)	0.014*** (3.02)	0.010 (1.04)	0.032*** (8.94)	0.000 (1.02)	0.021*** (6.27)
Sample (n)	6,211	9,234	7,270	10,247	7,538	11,085	21,019	30,566
Wald Chi2	857.81***	1281.68***	665.78***	782.35***	875.09***	1694.19***	1998.64***	3069.08***
Education (years)	0.014*** (4.38)	0.011*** (4.76)	0.011** (2.58)	0.008*** (3.08)	0.017*** (6.36)	0.012*** (7.63)	0.014*** (6.24)	0.010*** (7.71)
Sample (n)	6,211	9,230	7,265	10,240	7,531	11,070	21,007	30,540
Wald Chi2	840.30***	1297.62***	640.70***	769.91***	934.66***	1576.45***	1938.75***	3018.18***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Marginal effects reported; Adjusted for age, race, headship, household size and marital status; Coefficients are for separate, independent regression models. In 2012 survey and for pooled data, convergence were not achieved for employment and total income marginal effects estimations and so coefficients are reported and not marginal effects. In pooled data, survey round is a control variable.

**Table 11a: Economic factors as predictors of economic decision-making power, by gender: 2008 survey**

Economic factors	Male			Female			Aggregate		
	Multinomial Probit		Probit	Multinomial Probit		Probit	Multinomial Probit		Probit
	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint
Employed (yes/no)	0.650*** (5.02)	0.852*** (7.27)	0.197* (1.80)	0.610*** (6.78)	0.914*** (10.06)	0.229*** (3.32)	0.615*** (8.24)	0.876*** (11.19)	0.215*** (3.64)
Sample (n)	6,157		3,550	9,166		5,925	15,323		9,475
Wald Chi2	1118.10***		303.80***	2140.40***		825.93***	2822.26***		971.58***
Employment income (R`000)	0.074*** (2.94)	0.060** (2.39)	-0.010 (0.94)	0.222*** (5.93)	0.224*** (5.98)	-0.000 (0.04)	0.104*** (4.34)	0.086*** (3.57)	-0.013 (1.27)
Sample (n)	6,211		3,583	9,234		5,970	15,445		9,553
Wald Chi2	1230.44***		316.23***	2080.13***		816.58***	2944.11***		1114.71***
Total income (R`000)	0.000 (0.63)	-0.004 (0.02)	-0.003 (0.76)	0.203*** (5.56)	0.219*** (5.98)	0.010 (1.32)	0.001 (0.17)	0.000 (1.39)	0.001* (1.72)
Sample (n)	6,211		3,583	9,234		5,970	15,445		9,553
Wald Chi2	1190.02***		316.03***	2072.21***		821.00***	2855.02***		1061.03***
Education (years)	0.072*** (3.56)	0.064*** (3.61)	-0.006 (0.36)	0.031** (2.54)	0.072*** (5.82)	0.026*** (2.96)	0.045*** (4.24)	0.063*** (6.35)	0.011 (1.42)
Sample (n)	6,211		3,576	9,230		5,964	15,441		9,540
Wald Chi2	1137.36***		312.87***	2113.25***		803.99***	2864.15***		1000.04***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, race, headship, household size and marital status; Coefficients are for separate, independent regression models.

**Table 11b: Economic factors as predictors of economic decision-making power, by gender: 2010 survey**

Economic factors	Male			Female			Aggregate		
	Multinomial Probit		Probit	Multinomial Probit		Probit	Multinomial Probit		Probit
	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint
Employed (yes/no)	0.344*** (3.03)	0.584*** (5.49)	0.276*** (3.53)	0.383*** (3.70)	0.690*** (6.79)	0.302*** (3.94)	0.381*** (4.94)	0.623*** (7.80)	0.257*** (4.43)
Sample (n)	7,235		3,560	10,165		6,456	17,400		10,016
Wald Chi2	905.96***		199.96***	1291.59***		487.47***	1905.57***		538.90***
Employment income (R`000)	0.016 (1.14)	0.021 (1.47)	0.005 (0.57)	0.056** (2.36)	0.080*** (3.46)	0.018 (1.22)	0.030** (2.47)	0.029** (2.35)	0.001 (0.14)
Sample (n)	7,270		3,575	10,247		6,502	17,517		10,077
Wald Chi2	900.00***		174.37***	1303.03***		502.17***	1860.97***		504.71***
Total income (R`000)	0.014 (1.02)	0.022 (1.52)	0.007 (0.73)	0.044** (2.02)	0.065*** (3.07)	0.016 (1.22)	0.027** (2.53)	0.027** (2.52)	0.001 (0.26)
Sample (n)	7,270		3,575	10,247		6,502	17,517		10,077
Wald Chi2	903.37***		174.11***	1283.83***		499.90***	1856.61***		504.74***
Education (years)	0.052*** (2.95)	0.034** (2.07)	-0.012 (1.03)	0.018 (1.49)	0.040*** (3.31)	0.023** (2.41)	0.037*** (3.29)	0.035*** (3.29)	0.002 (0.32)
Sample (n)	7,265		3,574	10,240		6,495	17,505		10,069
Wald Chi2	861.48***		180.01***	1254.24***		487.98***	1806.28***		507.32***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, race, headship, household size and marital status; Coefficients are for separate independent regression models.

**Table 11c: Economic factors as predictors of economic decision-making power, by gender: 2012 survey**

Economic factors	Male			Female			Aggregate		
	Multinomial Probit		Probit	Multinomial Probit		Probit	Multinomial Probit		Probit
	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint
Employed (yes/no)	0.858*** (7.66)	1.315*** (11.47)	0.394*** (4.82)	0.706*** (6.83)	1.104*** (10.94)	0.289*** (3.86)	0.782*** (10.06)	1.220*** (15.63)	0.337*** (5.93)
Sample (n)	7,518		4,126	11,051		7,674	18,569		11,800
Wald Chi2	1003.88***		337.53***	2051.32***		373.85***	2923.49***		632.29***
Employment income (R`000)	0.112* (1.74)	0.121** (1.87)	0.006 (0.52)	0.273*** (5.84)	0.316*** (6.70)	0.029** (2.30)	0.142** (2.28)	0.167*** (2.66)	0.017 (1.58)
Sample (n)	7,538		4,137	11,085		7,694	18,623		11,831
Wald Chi2	946.66***		336.55***	2068.81***		380.50***	2481.98***		639.97***
Total income (R`000)	0.044 (0.90)	0.050 (0.99)	0.003 (0.40)	0.254*** (6.47)	0.290*** (7.37)	0.025** (2.24)	0.070 (1.23)	0.089 (1.52)	0.014 (1.52)
Sample (n)	7,538		4,137	11,085		7,694	18,623		11,831
Wald Chi2	971.62***		336.49***	2009.98***		381.52***	2534.64***		639.80***
Education (years)	0.093*** (5.27)	0.090*** (5.68)	0.001 (0.16)	0.084*** (6.10)	0.089*** (6.81)	0.008 (0.86)	0.086*** (7.79)	0.090*** (8.87)	0.007 (1.05)
Sample (n)	7,531		4,133	11,070		7,686	18,601		11,819
Wald Chi2	1039.62***		347.17***	1924.84***		397.27***	2589.54***		661.38***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, race, headship, household size and marital status. Coefficients are for separate independent regression models.

**Table 11d: Economic factors as predictors of economic decision-making power, by gender: pooled**

Economic factors	Male			Female			Aggregate		
	Multinomial Probit		Probit	Multinomial Probit		Probit	Multinomial Probit		Probit
	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint	Joint-none	Main-none	Main-joint
Employed (yes/no)	0.552*** (7.92)	0.838*** (12.57)	0.285*** (5.69)	0.528*** (9.11)	0.869*** (14.89)	0.284*** (6.70)	0.537*** (11.77)	0.852*** (18.02)	0.279*** (8.35)
Sample (n)	20,910		11,236	30,382		20,055	51,292		31,291
Wald Chi2	2496.38***		680.97***	4607.42***		1281.87***	6360.77***		1779.50***
Employment income (R`000)	0.035** (2.58)	0.035** (2.51)	0.0004 (0.07)	0.113*** (5.39)	0.139*** (6.50)	0.018** (2.33)	0.054*** (4.27)	0.056*** (4.32)	0.002 (0.38)
Sample (n)	21,019		11,295	30,566		20,166	51,585		31,461
Wald Chi2	2489.57***		679.15***	4525.26***		1350.55***	6335.47***		1869.66***
Total income (R`000)	0.000 (0.51)	0.002 (1.31)	0.001 (0.34)	0.096*** (4.73)	0.121*** (5.85)	0.018** (2.48)	Initial values not feasible		0.003 (0.79)
Sample (n)	21,019		11,295	30,566		20,166	-		31,461
Wald Chi2	2484.74***		678.96***	4429.24***		1352.57***	-		1863.08***
Education (years)	0.066*** (5.90)	0.054*** (5.26)	-0.006 (0.83)	0.037*** (4.90)	0.058*** (7.89)	0.019*** (3.46)	0.048*** (7.21)	0.054*** (8.56)	0.007* (1.76)
Sample (n)	21,007		11,283	30,540		20,145	51,547		31,428
Wald Chi2	2462.48***		689.56***	4399.38***		1343.02***	6224.77***		1863.17***

Notes: Data are pooled across all three survey rounds. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, race, headship, household size, marital status and survey round; Coefficients are for separate independent regression models.

**Table 12: Economic factors as predictors of economic decision-making responsibility in a balanced panel, by gender**

Economic factors	Economic decision-making responsibility (yes/no)					
	2008 - 2010		2010 - 2012		Combined	
	Male	Female	Male	Female	Male	Female
Employed (comparison: not employed)	0.537*** (11.30)	0.490*** (12.87)	0.680*** (15.20)	0.572*** (14.39)	0.662*** (18.65)	0.577*** (19.02)
No. of observations (N)	9,188	14,536	10,316	15,964	16,663	24,982
Wald Chi2	987.61***	1965.72***	1253.97***	1978.35***	2410.63***	4111.71***
Employment income (R`000)	0.005*** (0.99)	0.075*** (7.17)	0.036*** (5.33)	0.085*** (8.17)	0.031*** (5.81)	0.107*** (11.68)
No. of observations (N)	9,253	14,649	10,353	16,045	16,753	25,139
Wald Chi2	1009.39***	1968.19***	1289.45***	1982.90***	2431.28***	4078.24***
Total income (R`000)	0.005 (1.09)	0.079*** (7.58)	0.028*** (4.43)	0.090*** (8.68)	0.026*** (5.05)	0.113*** (12.42)
No. of observations (N)	9,253	14,649	10,353	16,045	16,753	25,139
Wald Chi2	1009.67***	1966.64***	1291.67***	1977.48***	2433.29***	4072.63***
Education (years)	0.029*** (4.35)	0.018*** (3.38)	0.052*** (7.97)	0.038*** (6.91)	0.054*** (10.05)	0.040*** (9.41)
No. of observations (N)	9,252	14,637	10,347	16,027	16,746	25,115
Wald Chi2	1013.10***	1955.65***	1302.29***	1964.45***	2418.44***	4033.32***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Marginal effects equal to coefficients; Adjusted for age, race, headship, household size and marital status; No weights used; panel probit functions

**Table 13: Economic factors as predictors of economic decision-making power, by gender: 2008 – 2010 panel**

Economic factors	Economic decision-making power					
	Joint-none		Main-none		Main-joint	
	Male	Female	Male	Female	Male	Female
Employed (comparison: not employed)	0.455*** (7.02)	0.424*** (8.95)	0.521*** (9.33)	0.520*** (11.05)	0.256*** (4.82)	0.221*** (6.20)
No. of observations (N)	4,794	6,815	8,224	12,172	5,358	10,085
Wald Chi2	350.53***	838.56***	604.56***	1109.29***	531.65***	1226.52***
Employment income (R`000)	0.006 (0.85)	0.062*** (5.03)	0.003 (0.70)	0.074*** (6.09)	0.003 (0.80)	0.017*** (2.77)
No. of observations (N)	4,827	6,869	8,282	12,266	5,397	10,163
Wald Chi2	345.00***	850.62***	617.61***	1109.81***	538.84***	1239.35***
Total income (R`000)	0.003 (0.44)	0.061*** (5.17)	0.005 (1.13)	0.078*** (6.46)	0.005 (1.27)	0.021*** (3.40)
No. of observations (N)	4,827	6,869	8,282	12,266	5,397	10,163
Wald Chi2	345.16***	851.72***	618.42***	1109.75***	537.53***	1239.36***
Education (years)	0.028*** (2.92)	0.012* (1.90)	0.022*** (3.01)	0.016** (2.52)	-0.001 (0.21)	0.014*** (3.16)
No. of observations (N)	4,830	6,866	8,281	12,257	5,393	10,151
Wald Chi2	341.78***	848.90***	631.32***	1084.97***	540.74***	1239.70***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Marginal effects equal to coefficients; Adjusted for age, race, headship, household size and marital status. No weights used; panel probit functions

**Table 14: Economic factors as predictors of economic decision-making power, by gender: 2010 – 2012 panel**

Economic factors	Economic decision-making power					
	Joint-none		Main-none		Main-joint	
	Male	Female	Male	Female	Male	Female
Employed (comparison: not employed)	0.546*** (9.92)	0.438*** (8.73)	0.733*** (12.88)	0.652*** (13.40)	0.304*** (6.69)	0.339*** (9.64)
No. of observations (N)	5,784	7,338	9,024	13,332	5,824	11,258
Wald Chi2	534.06***	797.64***	679.17***	1243.30***	621.65***	1382.25***
Employment income (R`000)	0.023*** (3.09)	0.054*** (4.35)	0.032*** (4.38)	0.096*** (8.17)	0.007 (1.62)	0.024*** (4.58)
No. of observations (N)	5,808	7,389	9,055	13,399	5,843	11,302
Wald Chi2	526.54***	794.16***	725.89***	1259.75***	607.23***	1370.29***
Total income (R`000)	0.017** (2.38)	0.058*** (4.77)	0.025*** (3.65)	0.099*** (8.43)	0.004 (1.07)	0.026*** (5.04)
No. of observations (N)	5,808	7,389	9,055	13,399	5,843	11,302
Wald Chi2	527.75***	792.90***	724.66***	1256.40***	608.12***	1371.31***
Education (years)	0.045*** (5.59)	0.050*** (7.11)	0.049*** (6.14)	0.029*** (4.44)	0.010* (1.72)	0.001 (0.33)
No. of observations (N)	5,803	7,381	9,050	13,383	5,841	11,290
Wald Chi2	534.58***	795.61***	722.58***	1243.84***	613.47***	1358.22***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Marginal effects equal to coefficients; Adjusted for age, race, headship, household size and marital status. No weights used; panel probit functions

**Table 15: Economic factors as predictors of economic decision-making power, by gender: combined balanced panel**

Economic factors	Economic decision-making power					
	Joint-none		Main-none		Main-joint	
	Male	Female	Male	Female	Male	Female
Employed (comparison: not employed)	0.517*** (11.48)	0.455*** (12.38)	0.704*** (16.21)	0.643*** (17.26)	0.313*** (8.13)	0.292*** (10.55)
No. of observations (N)	9,462	12,325	14,918	20,905	8,946	16,734
Wald Chi2	908.19***	1771.37***	1498.65***	2700.14***	1153.32***	2586.87***
Employment income (R`000)	0.021*** (3.39)	0.080*** (7.64)	0.026*** (4.73)	0.115*** (10.90)	0.007* (1.87)	0.021*** (4.63)
No. of observations (N)	9,515	12,413	14,997	21,039	8,994	16,826
Wald Chi2	887.20***	1760.17***	1549.06***	2699.37***	1144.57***	2569.58***
Total income (R`000)	0.016*** (2.70)	0.083*** (8.11)	0.023*** (4.34)	0.119*** (11.41)	0.005* (1.67)	0.023*** (5.24)
No. of observations (N)	9,515	12,413	14,997	21,039	8,994	16,826
Wald Chi2	888.19***	1760.88***	1548.42***	2695.06***	1143.97***	2571.84***
Education (years)	0.052*** (7.62)	0.042*** (8.26)	0.044*** (7.05)	0.035*** (6.58)	0.005 (1.08)	0.006* (1.87)
No. of observations (N)	9,513	12,404	14,991	21,019	8,988	16,807
Wald Chi2	882.43***	1736.51***	1535.69***	2669.11***	1149.38***	2560.98***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Marginal effects equal to coefficients; Adjusted for age, race, headship, household size and marital status. No weights used; panel probit functions

**Table 16a: Gender and employment status of decision-makers as predictors of household expenditure**

<b>2008 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities</b>	<b>Insurance</b>	<b>Household items</b>	<b>Education</b>
Female	61** (2.55)	262** (2.30)	244*** (3.46)	20 (1.45)	-33 (1.06)	487 (1.29)	68 (0.94)
Employed	178*** (5.85)	208** (2.02)	505*** (8.36)	48*** (2.93)	125*** (3.46)	263 (0.75)	179* (1.73)
Sample (n)	9,232	9,208	9,160	7,278	4,339	1,278	2,488
F-value/Wald Chi2	70.27***	514.27***	1853.97***	44.39***	17.53***	1.22	2.19**
Employed female	191 (0.69)	122 (0.50)	322*** (2.71)	64 (1.52)	107 (0.82)	106 (0.73)	315** (2.27)
Employed male	157*** (4.27)	260 (1.26)	730*** (6.91)	18 (0.75)	169*** (3.71)	656* (1.73)	-149 (0.93)
Sample (n)	9,232	9,208	9,160	7,278	4,339	1,278	2,488
F-value/Wald Chi2	64.12***	520.37***	1821.53***	40.38***	17.53***	1.64	2.38**
<b>2010 survey</b>	<b>Food</b>	<b>Health care</b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education</b>
Female	61 (1.24)	-378** (2.44)	-103 (1.52)	13 (1.13)	109*** (3.65)	1729 (1.37)	154 (0.61)
Employed	398*** (6.74)	-183 (1.37)	349*** (6.31)	92*** (7.76)	221*** (8.13)	1337 (0.71)	-64 (0.20)
Sample (n)	9,481	1,243	8,818	9,279	8,966	1,395	1,841
F-value/Wald Chi2	20.64***	6.75***	1580.92***	4111.91***	789.72***	0.63	1.88**
Employed female	430 (0.83)	-71 (1.18)	302 (0.90)	75* (1.68)	106*** (4.40)	1477 (0.23)	-153 (0.36)
Employed male	354*** (6.46)	-401 (1.50)	431*** (4.33)	117*** (6.20)	384*** (8.01)	1069 (0.73)	126 (0.32)
Sample (n)	9,481	1,243	8,818	9,279	8,966	1,395	1,841
F-value/Wald Chi2	19.39***	6.13***	1644.59***	4137.23***	776.39***	0.59	2.16**

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status, race and household income; superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS, the F-value is reported. Gender and employment status variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 16a: Gender and employment status of decision-makers as predictors of household expenditure (continued)**

<b>2012 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities</b>	<b>Insurance</b>	<b>Household items</b>	<b>Education</b>
Female	34 (1.48)	20 (0.25)	175*** (2.62)	27* (1.70)	-20 (0.38)	416 (1.50)	93 (0.93)
Employed	138*** (2.93)	91 (1.25)	260*** (4.60)	23 (0.69)	57* (1.89)	614*** (1.98)	-294 (1.47)
Sample (n)	10,716	10,716	10,708	9,485	6,258	1,469	1,902
F-value/Wald Chi2	47.77***	579.11***	1873.60***	39.45***	15.22***	1.58	3.29***
Employed female	187* (1.82)	152 (0.50)	115** (2.29)	21 (0.16)	37* (1.89)	880 (1.56)	-246 (0.14)
Employed male	65 (1.11)	52 (0.33)	444*** (4.38)	27 (0.72)	94 (1.53)	23 (0.07)	-417 (1.45)
Sample (n)	10,716	10,716	10,708	9,485	6,258	1,469	1,902
F-value/Wald Chi2	43.93***	587.29	1853.87***	35.89***	13.98***	1.51	3.79***
<b>Pooled</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities</b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education<sup>h</sup></b>
Female	52** (2.56)	214 (0.79)	88 (1.62)	11 (1.18)	64*** (5.39)	1114* (1.77)	-29 (0.40)
Employed	292*** (6.56)	253 (1.50)	437*** (6.48)	40** (2.27)	165*** (14.56)	1001 (1.27)	-36 (0.54)
Sample (n)	29,429	4,926	10,020	24,201	28,856	4,142	28,707
F-value/Wald Chi2	82.66***	11.00***	29.64***	84.21***	5047.17***	1.80**	608.36***
Employed female	322* (1.71)	478 (1.57)	500 (1.06)	34 (0.71)	92*** (7.33)	1200 (0.74)	156*** (2.87)
Employed male	248** (5.46)	-248 (1.29)	315** (2.39)	51** (2.46)	286*** (13.46)	559 (1.26)	-366** (2.50)
Sample (n)	29,429	4,926	10,020	24,201	28,856	4,142	28,707
F-value/Wald Chi2	76.98***	10.46***	28.02***	79.57***	4943.81***	1.66*	613.93***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status, race and household income; superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS models, the F-value is reported. Gender and employment status variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 16b: Gender and employment status of decision-makers as predictors of household expenditure – panel analysis**

<b>2008 – 2010 panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport<sup>xtt</sup></b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education<sup>xtt</sup></b>
Female	46*** (3.23)	21 (0.43)	66 (1.46)	31*** (3.17)	76*** (3.95)	293 (0.56)	412*** (5.17)
Employed	181*** (13.63)	121** (2.32)	742*** (17.47)	71*** (8.06)	190*** (10.50)	-29 (0.06)	586*** (7.83)
No. of observations (N)	15,475	2,449	14,841	15,281	14,993	2,153	14,858
F-value/Wald Chi2	4729.30***	824.97***	2624.68***	3660.25***	1593.08***	72.26***	650.94***
Employed female	179 (0.23)	151 (0.99)	725 (0.63)	72 (0.25)	172 (1.49)	-270 (0.77)	638 (1.14)
Employed male	186*** (8.53)	48 (0.54)	778*** (10.92)	68*** (4.66)	226*** (7.46)	566 (0.61)	464*** (3.59)
No. of observations (N)	15,475	2,449	14,841	15,281	14,993	2,153	14,858
F-value/Wald Chi2	4729.19***	825.95***	2625.23***	3660.53	1595.02***	72.84***	652.80***
<b>2010 – 2012 panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education<sup>xtt</sup></b>
Female	36*** (2.68)	-7 (0.14)	13 (0.25)	34*** (3.96)	77*** (5.63)	111 (0.22)	303*** (4.42)
Employed	149*** (11.63)	54 (0.99)	297*** (5.61)	60*** (7.61)	171*** (12.99)	-13 (0.03)	469*** (7.15)
No. of observations (N)	17,130	2,402	5,135	16,958	16,679	2,334	16,543
F-value/Wald Chi2	4278.01***	591.59***	1406.20***	4936.49***	1824.22***	6.41***	541.83***
Employed female	152 (0.41)	107 (1.54)	269 (0.85)	71* (1.97)	175 (0.51)	116 (0.43)	608*** (3.30)
Employed male	142*** (6.86)	-58 (0.64)	358*** (4.01)	40*** (3.11)	162*** (7.45)	-316 (0.37)	172 (1.56)
No. of observations (N)	17,130	2,402	5,135	16,958	16,679	2,334	16,543
F-value/Wald Chi2	4278.13***	594.29***	1406.84	4942.33***	1824.69	5.84***	553.31***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status, race and household income. Superscript 'xtt' represent use of random-effect tobit model and all were significant using the likelihood ratio test. Results for food expenditure are from the random-effect OLS model after passing Breusch & Pagan Lagrangian multiplier test for random effects. Otherwise pooled regression results are reported. For random-effect tobit and random-effect OLS, the Wald Chi2 statistic is reported. For pooled OLS, the F-value is reported. Gender and employment status variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 16b: Gender and employment status of decision-makers as predictors of household expenditure – panel analysis (continued)**

<b>Combined panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education</b>
Female	35*** (3.02)	5 (0.13)	24 (0.61)	28*** (3.74)	70*** (5.65)	130 (0.37)	-4 (0.20)
Employed	141*** (13.87)	98** (2.23)	327*** (8.03)	50*** (7.76)	155*** (13.67)	4 (0.01)	13 (0.20)
No. of observations (N)	25,761	3,947	8,151	25,541	25,209	3,445	5,311
F-value/Wald Chi2	6412.39***	104.83***	235.05***	6162.43***	2687.56***	92.66***	357.68***
Employed female	142 (0.06)	131 (1.25)	309 (0.70)	55 (1.19)	151 (0.64)	60 (0.26)	-194 (1.57)
Employed male	141*** (8.40)	22 (0.30)	366*** (5.28)	40*** (3.75)	165*** (8.69)	-129 (0.21)	58* (1.76)
No. of observations (N)	25,761	3,947	8,151	25,541	25,209	3,445	5,311
F-value/Wald Chi2	6412.25***	95.46***	235.08***	6165.35***	2687.74***	92.70***	360.91***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status, race and household income. Superscript 'xtt' represent use of random-effect tobit model and all were significant using the likelihood ratio test. Results for food expenditure are from the random-effect OLS model after passing Breusch & Pagan Lagrangian multiplier test for random effects. Otherwise pooled regression results are reported. For random-effect tobit and random-effect OLS, the Wald Chi2 statistic is reported. For pooled OLS, the F-value is reported. Gender and employment status variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 17a: Gender and employment income of decision-makers as predictors of household expenditure**

<b>2008 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport</b>	<b>Utilities<sup>h</sup></b>	<b>Insurance</b>	<b>Household items</b>	<b>Education</b>
Female	88*** (3.23)	336*** (2.87)	295*** (2.73)	48*** (5.45)	17.27 (0.45)	658* (1.81)	142 (1.48)
Employment income (000)	43*** (6.13)	32*** (4.29)	96*** (4.77)	24*** (24.67)	30*** (4.71)	83* (1.82)	46* (1.80)
Sample (n)	9,309	9,284	3,611	9,283	4,370	1,287	2,508
F-value/Wald Chi2	67.04***	429.02***	9.57***	5184.44***	12.50***	1.19	2.03**
Employment income for a female (000)	69** (2.16)	62* (1.80)	216** (2.50)	43*** (10.26)	53** (2.15)	261* (1.72)	185*** (3.04)
Employment income for a male (000)	37*** (5.08)	28*** (3.86)	66*** (3.32)	19*** (17.71)	26*** (3.83)	48 (1.50)	24 (1.04)
Sample (n)	9,309	9,284	3,611	9,283	4,370	1,287	2,508
F-value/Wald Chi2	60.63***	452.85***	9.85***	5381.48***	14.76***	1.28	4.62***
<b>2010 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance</b>	<b>Household items</b>	<b>Education</b>
Female	153*** (3.77)	-170** (2.10)	-78 (1.12)	17 (1.39)	62 (0.96)	1434 (1.64)	188 (0.87)
Employment income (000)	41*** (4.92)	30.3*** (7.94)	75.9*** (16.91)	10*** (10.90)	39*** (3.94)	1 (0.01)	19 (0.94)
Sample (n)	9,538	8,830	8,873	9,336	4,292	1,405	1,852
F-value/Wald Chi2	21.12***	504.09***	1077.38***	3525.90***	6.12***	0.85	2.13**
Employment income for a female (000)	47 (0.58)	36.6 (0.86)	75 (0.52)	19*** (5.09)	27 (0.98)	28 (0.28)	32 (0.47)
Employment income for a male (000)	37*** (4.28)	29.1*** (6.08)	80*** (14.20)	7*** (7.40)	47*** (3.37)	25 (0.33)	10 (0.54)
Sample (n)	9,538	8,830	8,873	9,336	4,292	1,405	1,852
F-value/Wald Chi2	20.59***	518.26***	1184.98***	3542.32***	8.66***	0.84	1.94**

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status and race; superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS models, the F-value is reported. Gender and employment income variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 17a: Gender and employment income of decision-makers as predictors of household expenditure (continued)**

<b>2012 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education</b>
Female	72*** (2.70)	75 (0.95)	298*** (4.17)	47*** (5.21)	60*** (5.27)	444* (1.86)	195* (1.83)
Employment income (000)	44*** (7.76)	65*** (11.53)	95*** (14.95)	32*** (27.70)	45*** (35.40)	39* (1.71)	17 (1.64)
Sample (n)	10,742	10,742	10,734	10,738	10,730	1,471	1,905
F-value/Wald Chi2	47.95***	448.95***	943.36***	6048.57***	2943.03***	1.48	5.84***
Employment income for a female (000)	63** (2.12)	86** (2.45)	109 (1.62)	38*** (3.80)	61*** (9.05)	110 (1.33)	17 (0.14)
Employment income for a male (000)	38*** (6.46)	54*** (8.23)	89*** (12.06)	29*** (19.42)	37*** (23.64)	19 (1.02)	16.3 (1.49)
Sample (n)	10,742	10,742	10,734	10,738	10,730	1,471	1,905
F-value/Wald Chi2	44.09***	449.56***	960.64***	6095.99***	3027.12***	1.65*	6.22***
<b>Pooled</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities<sup>h</sup></b>	<b>Insurance</b>	<b>Household items</b>	<b>Education<sup>h</sup></b>
Female	72*** (3.62)	232 (0.86)	207*** (3.62)	27*** (4.65)	54* (1.89)	1057** (2.23)	52 (0.73)
Employment income (000)	43*** (10.42)	44*** (4.07)	80*** (9.37)	18*** (31.40)	41*** (6.71)	58* (1.65)	58*** (10.50)
Sample (n)	29,589	4,949	10,079	29,357	14,938	4,163	28,862
F-value/Wald Chi2	81.00***	10.78***	24.05***	13335.04***	17.16***	1.69*	437.46***
Employment income for a female (000)	58** (2.11)	78 (1.06)	118*** (2.87)	30*** (12.25)	44 (0.41)	160 (1.28)	94*** (4.83)
Employment income for a male (000)	37*** (9.01)	30*** (2.76)	65*** (6.65)	14*** (21.29)	39*** (4.94)	12 (0.42)	37*** (5.49)
Sample (n)	29,589	4,949	10,079	29,357	14,938	4,163	28,862
F-value/Wald Chi2	75.51***	10.08***	23.55***	13587.60***	21.20***	1.62*	473.17***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status and race; superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS models, the F-value is reported. Gender and employment income variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 17b: Gender and employment income of decision-makers as predictors of household expenditure – panel analysis**

<b>2008 – 2010 panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport<sup>xtt</sup></b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education<sup>xtt</sup></b>
Female	28* (1.95)	17 (0.34)	-39 (0.83)	25** (2.59)	60*** (3.08)	308 (0.60)	349*** (4.43)
Employment income (000)	24*** (20.60)	24*** (7.70)	56*** (18.10)	11*** (15.12)	25*** (17.85)	28 (1.24)	51*** (9.68)
No. of observations (N)	15,592	2,466	14,955	15,397	15,107	2,170	14,970
F-value/Wald Chi2	3725.39***	559.63***	2002.97***	3242.03***	1170.57***	61.75***	542.59
Employment income for a female (000)	48*** (10.79)	29 (1.12)	117*** (9.90)	23*** (8.48)	48*** (8.38)	175** (2.48)	142*** (8.98)
Employment income for a male (000)	18*** (13.85)	22*** (6.08)	42*** (12.49)	8*** (10.18)	20*** (12.99)	7 (0.32)	28*** (4.92)
No. of observations (N)	15,592	2,466	14,955	15,397	15,107	2,170	14,970
F-value/Wald Chi2	3882.74***	560.94***	2121.08***	3343.22***	1251.20***	68.06***	625.43***
<b>2010 – 2012 panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education<sup>xtt</sup></b>
Female	22 (1.63)	25 (0.46)	47 (0.87)	30*** (3.46)	65*** (4.61)	133 (0.27)	263*** (3.88)
Employment income (000)	23*** (19.65)	35*** (8.90)	86*** (20.29)	13*** (18.09)	25*** (22.60)	25 (1.08)	54*** (11.71)
No. of observations (N)	17,194	2,410	5,154	17,022	16,741	2,341	16,604
F-value/Wald Chi2	3271.59***	347.69***	784.24***	3935.06***	1229.25***	6.36***	440.93***
Employment income for a female (000)	44*** (10.48)	39 (1.14)	83 (0.60)	25*** (9.83)	25*** (9.93)	196*** (2.91)	129*** (9.67)
Employment income for a male (000)	16*** (11.69)	31*** (6.10)	88*** (15.78)	9*** (11.09)	19*** (14.99)	0 (0.01)	29*** (5.45)
No. of observations (N)	17,194	2,410	5,154	17,022	16,741	2,341	16,604
F-value/Wald Chi2	3410.96***	349.03***	784.51***	4071.54***	1341.40***	6.59***	533.71***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status and race. Superscript 'xtt' represent use of random-effect tobit model and all were significant using the likelihood ratio test. Results for food expenditure are from the random-effect OLS model after passing Breusch & Pagan Lagrangian multiplier test for random effects. Otherwise pooled regression results are reported. For random-effect tobit and random-effect OLS models, the Wald Chi2 statistic is reported. For pooled OLS models, the F-value is reported. Gender and employment income variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 17b: Gender and employment income of decision-makers as predictors of household expenditure – panel analysis (continued)**

<b>Combined panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities</b>	<b>Insurance</b>	<b>Household items</b>	<b>Education</b>
Female	23* (1.94)	28 (0.66)	66 (1.56)	26*** (3.44)	62*** (4.87)	163 (0.47)	41 (0.57)
Employment income (000)	24*** (23.62)	31*** (10.75)	84*** (25.54)	13*** (20.40)	26*** (25.26)	28 (1.55)	42*** (7.48)
No. of observations (N)	25,902	3,965	8,197	25,681	25,347	3,464	5,340
F-value/Wald Chi2	4806.29***	716.32***	1417.14***	4849.32***	1852.13***	80.03***	273.36***
Employment income for a female (000)	43*** (11.27)	38* (1.75)	57*** (3.04)	24*** (10.51)	46*** (11.13)	158*** (2.96)	73*** (5.10)
Employment income for a male (000)	17*** (15.47)	28*** (8.12)	77*** (19.01)	9*** (13.36)	20*** (17.58)	7 (0.36)	18** (2.45)
No. of observations (N)	25,902	3,965	8,197	25,681	25,347	3,464	5,340
F-value/Wald Chi2	4967.15***	719.75***	1427.80***	5007.10***	1997.62***	88.96***	300.61***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status and race. Superscript 'xtt' represent use of random-effect tobit model and all were significant using the likelihood ratio test. Results for food expenditure are from the random-effect OLS model after passing Breusch & Pagan Lagrangian multiplier test for random effects. Otherwise pooled regression results are reported. For random-effect tobit and random-effect OLS models, the Wald Chi2 statistic is reported. For pooled OLS models, the F-value is reported. Gender and employment income variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 18a: Gender and total income of decision-makers as predictors of household expenditure**

<b>2008 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities</b>	<b>Insurance<sup>h</sup></b>	<b>Household items<sup>h</sup></b>	<b>Education<sup>h</sup></b>
Female	-8 (0.36)	438*** (3.76)	346*** (4.47)	-6 (0.50)	-23 (0.95)	-79 (0.22)	20 (0.15)
Total income (000)	0.7 (1.20)	1.0 (1.05)	7*** (5.76)	1** (2.42)	18*** (13.02)	45*** (2.60)	42.9*** (4.79)
Sample (n)	9,309	9,284	9,236	7,338	9,262	9,278	9,264
F-value/Wald Chi2	53.17***	391.52***	1025.61***	27.22***	1304.73***	110.60***	179.16***
Total income for a female (000)	0.4 (0.89)	1.0** (2.25)	5*** (6.80)	1 (1.29)	25** (2.00)	27 (1.23)	39 (0.50)
Total income for a male (000)	7 (0.95)	13** (2.52)	38*** (8.18)	7 (1.52)	18*** (11.71)	68*** (2.72)	47*** (3.91)
Sample (n)	9,309	9,284	9,236	7,338	9,262	9,278	9,264
F-value/Wald Chi2	50.17***	419.64***	1121.17***	28.22***	1424.74***	112.70***	180.15***
<b>2010 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance</b>	<b>Household items</b>	<b>Education</b>
Female	88** (2.16)	-146* (1.85)	-129* (1.78)	12 (0.97)	57 (0.89)	1433 (1.55)	222 (1.03)
Total income (000)	10 (1.56)	38*** (10.63)	11*** (6.66)	2*** (5.88)	38*** (4.09)	-4 (0.35)	33* (1.88)
Sample (n)	9,538	8,830	8,873	9,336	4,292	1,405	1,852
F-value/Wald Chi2	18.99***	573.99***	794.75***	3407.07***	5.96***	0.85	1.81*
Total income for a female (000)	6*** (3.12)	31 (1.61)	5*** (11.46)	1*** (6.14)	32 (0.69)	-0.8 (0.71)	66 (1.18)
Total income for a male (000)	34*** (4.27)	43*** (9.73)	69*** (13.01)	8*** (8.20)	43*** (3.38)	-70 (0.69)	8 (0.44)
Sample (n)	9,538	8,830	8,873	9,336	4,292	1,405	1,852
F-value/Wald Chi2	21.18***	595.17***	1067.24***	3473.36***	5.58***	0.80	1.74*

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status and race; superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS models, the F-value is reported. Gender and total income variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 18a: Gender and total income of decision-makers as predictors of household expenditure (continued)**

<b>2012 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education<sup>h</sup></b>
Female	-7 (0.24)	10 (0.13)	372*** (4.97)	31*** (3.28)	51*** (4.39)	412* (1.74)	-22 (0.22)
Total income (000)	8 (1.10)	43*** (9.71)	14*** (5.34)	5*** (10.76)	40*** (34.65)	29* (1.78)	35*** (5.87)
Sample (n)	10,742	10,742	10,734	10,738	10,730	1,471	10,740
F-value/Wald Chi2	36.00***	383.83***	656.51***	4891.54***	2651.51***	1.52	85.82***
Total income for a female (000)	3*** (4.50)	54 (1.38)	6*** (8.42)	2*** (15.96)	54*** (8.41)	122 (1.53)	36 (0.09)
Total income for a male (000)	37*** (5.61)	41*** (7.54)	66*** (9.96)	24*** (19.05)	34*** (24.72)	14 (1.14)	35*** (4.13)
Sample (n)	10,742	10,742	10,734	10,738	10,730	1,471	10,740
F-value/Wald Chi2	37.05***	387.59***	755.03***	5392.96***	2814.69***	1.85**	85.82***
<b>Pooled</b>	<b>Food</b>	<b>Health care</b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education<sup>h</sup></b>
Female	-18 (0.94)	36 (0.15)	211*** (4.86)	16*** (2.73)	10 (0.82)	876* (1.87)	19 (0.27)
Total income (000)	1 (1.22)	2 (1.41)	9*** (10.00)	3*** (14.28)	21*** (26.94)	5 (0.64)	45*** (9.48)
Sample (n)	29,589	4,949	28,843	29,357	29,013	4,163	28,862
F-value/Wald Chi2	65.84***	9.71***	2305.28***	12216.61***	3307.53***	1.66*	406.36***
Total income for a female (000)	0.9* (1.76)	1 (1.27)	5*** (14.90)	1*** (17.24)	29*** (5.26)	8 (0.57)	57** (2.32)
Total income for a male (000)	18* (1.86)	14 (1.45)	54*** (17.34)	12*** (21.26)	20*** (21.65)	-11 (0.35)	35*** (5.41)
Sample (n)	29,589	4,949	28,843	29,357	29,013	4,163	28,862
F-value/Wald Chi2	61.89***	9.50***	2618.09***	12711.69***	3544.54***	1.67*	413.39***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status and race; superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS models, the F-value is reported. Gender and total income variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 18b: Gender and total income of decision-makers as predictors of household expenditure – panel analysis**

<b>2008 – 2010 panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport<sup>xtt</sup></b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education<sup>xtt</sup></b>
Female	0 (0.05)	-48 (0.93)	-125** (2.60)	12 (1.23)	22 (1.13)	250 (0.49)	274*** (3.47)
Total income (000)	2*** (6.00)	2*** (3.78)	8*** (8.95)	1*** (8.07)	0 (1.49)	5 (0.49)	4** (2.20)
No. of observations (N)	15,592	2,466	14,955	15,397	15,107	2,170	14,970
F-value/Wald Chi2	3204.19***	505.64***	1703.89***	2991.73***	799.07***	60.41***	458.52***
Total income for a female (000)	1*** (10.46)	16*** (6.33)	6*** (7.90)	2*** (7.37)	-3*** (13.06)	6 (0.26)	3*** (3.32)
Total income for a male (000)	13*** (11.89)	1*** (5.48)	31*** (10.36)	7*** (9.63)	15*** (11.21)	0 (0.02)	21*** (3.95)
No. of observations (N)	15,592	2,466	14,955	15,397	15,107	2,170	14,970
F-value/Wald Chi2	3347.45***	541.69***	1781.58***	3080.18***	974.42***	60.45***	468.21***
<b>2010 – 2012 panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education<sup>xtt</sup></b>
Female	4 (0.32)	38 (0.71)	-84 (1.51)	20** (2.25)	44*** (3.08)	149 (0.30)	211*** (3.10)
Total income (000)	8*** (11.85)	36*** (10.74)	19*** (9.76)	5*** (11.37)	10*** (14.28)	30 (1.39)	19*** (6.93)
No. of observations (N)	17,194	2,410	5,154	17,022	16,741	2,341	16,604
F-value/Wald Chi2	2949.63***	387.78***	446.44***	3639.86***	898.07***	6.41***	354.86***
Total income for a female (000)	6*** (12.21)	37 (0.03)	10*** (11.61)	2*** (8.39)	6*** (8.35)	219*** (3.31)	18 (1.05)
Total income for a male (000)	16*** (12.21)	37*** (8.58)	72*** (14.64)	10*** (13.27)	18*** (14.90)	5 (0.22)	24*** (4.59)
No. of observations (N)	17,194	2,410	5,154	17,022	16,741	2,341	16,604
F-value/Wald Chi2	3011.06***	387.61***	592.93***	3740.61***	976.56***	6.92***	356.02***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status and race. Superscript 'xtt' represent use of random-effect tobit model and all were significant using the likelihood ratio test. Results for food expenditure are from the random-effect OLS model after passing Breusch & Pagan Langrangian multiplier test for random effects. Otherwise pooled regression results are reported. For random-effect tobit and random-effect OLS models, the Wald Chi2 statistic is reported. For pooled OLS models, the F-value is reported. Gender and total income variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 18b: Gender and total income of decision-makers as predictors of household expenditure – panel analysis (continued)**

<b>Combined panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education</b>
Female	-2 (0.20)	-42 (0.96)	-98** (2.25)	12 (1.59)	28** (2.19)	116 (0.34)	19 (0.27)
Total income (000)	2*** (6.39)	3*** (4.87)	8*** (9.84)	2*** (9.48)	0 (1.15)	8 (0.92)	33*** (6.80)
No. of observations (N)	25,902	3,965	8,197	25,681	25,347	3,464	5,340
F-value/Wald Chi2	4081.79***	610.86***	813.82***	4329.09***	1128.88***	78.43***	263.22***
Total income for a female (000)	1*** (12.32)	2*** (6.82)	5*** (12.59)	1*** (10.86)	-2*** (16.71)	7 (0.10)	48*** (3.46)
Total income for a male (000)	14*** (13.81)	20*** (7.99)	47*** (14.84)	8*** (13.40)	16*** (15.81)	9 (0.51)	16** (2.32)
No. of observations (N)	25,902	3,965	8,197	25,681	25,347	3,464	5,340
F-value/Wald Chi2	4303.70***	664.40***	987.88***	4523.05***	1425.83***	78.42***	275.75***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status and race. Superscript 'xtt' represent use of random-effect tobit model and all were significant using the likelihood ratio test. Results for food expenditure are from the random-effect OLS model after passing Breusch & Pagan Lagrangian multiplier test for random effects. Otherwise pooled regression results are reported. For random-effect tobit and random-effect OLS models, the Wald Chi2 statistic is reported. For pooled OLS models, the F-value is reported. Gender and total income variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 19a: Gender and education level of decision-makers as predictors of household expenditure**

<b>2008 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education<sup>h</sup></b>
Female	14 (0.66)	183* (1.66)	145** (1.99)	8 (0.91)	-1 (0.08)	396 (1.18)	49 (0.39)
Education	39*** (8.70)	35*** (3.02)	73*** (10.94)	13*** (14.93)	23*** (8.70)	-18 (0.22)	82*** (4.20)
Sample (n)	9,296	9,271	9,223	9,270	9,249	1,286	9,251
F-value/Wald Chi2	74.44***	506.24***	1775.50***	6702.48***	2279.39***	1.03	303.08***
Years of education for a female	37 (0.79)	25 (0.41)	48*** (2.78)	12 (0.84)	14*** (3.65)	-15 (0.22)	68 (0.58)
Years of education for a male	42*** (6.93)	36* (1.89)	93*** (9.04)	14*** (10.13)	35*** (7.67)	-23 (0.23)	89** (2.54)
Sample (n)	9,296	9,271	9,223	9,270	9,249	1,286	9,251
F-value/Wald Chi2	67.75***	512.33***	1725.51***	6738.41***	2212.15***	0.95	310.08***
<b>2010 survey</b>	<b>Food</b>	<b>Health care</b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education<sup>h</sup></b>
Female	-26 (0.62)	-324** (2.26)	-151** (2.21)	-20* (1.66)	54* (1.72)	1433 (1.53)	96 (0.68)
Education	60*** (8.33)	46** (1.99)	34*** (5.31)	17*** (14.38)	42*** (12.63)	-245 (0.67)	62*** (2.61)
Sample (n)	9,532	1,253	8,868	9,330	9,017	1,405	8,852
F-value/Wald Chi2	23.78***	10.64***	1657.23***	4240.86***	745.64***	0.91	202.31***
Years of education for a female	60 (0.22)	16* (1.69)	36 (0.07)	13*** (2.76)	19*** (6.04)	-177 (0.86)	44 (1.00)
Years of education for a male	59*** (6.82)	85** (2.14)	37*** (3.11)	21*** (10.70)	66*** (11.29)	-348 (0.79)	84** (2.07)
Sample (n)	9,532	1,253	8,868	9,330	9,017	1,405	8,852
F-value/Wald Chi2	23.49***	11.19***	1686.72***	4178.18***	714.05***	0.90	203.57***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status, race and household income; superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS models, the F-value is reported. Gender and education variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 19a: Gender and education level of decision-makers as predictors of household expenditure (continued)**

<b>2012 survey</b>	<b>Food</b>	<b>Health care</b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items<sup>h</sup></b>	<b>Education<sup>h</sup></b>
Female	0.2 (0.01)	-64 (0.60)	119 (1.17)	5 (0.62)	13 (1.28)	276 (0.96)	58 (0.62)
Education	37*** (4.62)	33 (1.30)	59*** (8.86)	18*** (17.07)	15*** (11.03)	192*** (3.50)	85*** (5.04)
Sample (n)	10,729	1,738	10,721	10,725	10,717	10,728	10,727
F-value/Wald Chi2	61.10***	7.73***	1772.74***	7007.55***	4496.70***	39.39***	160.42***
Years of education for a female	38 (0.29)	39 (0.56)	47 (1.22)	17 (1.40)	12* (1.92)	146 (1.05)	47** (2.26)
Years of education for a male	36*** (3.81)	26 (0.56)	67*** (6.00)	20*** (11.86)	18*** (7.35)	226*** (2.67)	121*** (3.98)
Sample (n)	10,729	1,738	10,721	10,725	10,717	10,728	10,727
F-value/Wald Chi2	55.60***	8.45***	1790.06***	6930.28***	4560.21***	40.38***	164.95***
<b>Pooled</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items<sup>h</sup></b>	<b>Education<sup>h</sup></b>
Female	-15 (0.81)	69 (1.24)	39 (0.95)	-6 (1.03)	31** (2.49)	663** (2.00)	34 (0.48)
Education	55*** (7.93)	34*** (5.47)	57*** (15.02)	16*** (24.79)	32*** (22.45)	178*** (3.81)	67*** (6.55)
Sample (n)	29,557	28,825	28,812	29,325	28,983	28,858	28,830
F-value/Wald Chi2	87.56***	1552.37***	5006.99***	15412.53***	4511.62***	140.02***	649.93***
Years of education for a female	54 (0.83)	26 (0.77)	46** (2.08)	14*** (3.44)	17*** (10.33)	96* (1.75)	54 (1.09)
Years of education for a male	57*** (7.04)	38*** (3.27)	67*** (10.61)	18*** (17.93)	50*** (19.79)	252*** (3.12)	77*** (4.12)
Sample (n)	29,557	28,825	28,812	29,325	28,983	28,858	28,830
F-value/Wald Chi2	81.77***	1562.27***	4980.80***	15318***	4290.48***	140.64***	659.66***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status, race and household income; superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS models, the F-value is reported. Gender and education variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 19b: Gender and education level of decision-makers as predictors of household expenditure – panel analysis**

<b>2008 – 2010 panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport<sup>xtt</sup></b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education<sup>xtt</sup></b>
Female	17 (1.25)	-6 (0.13)	-65 (1.47)	22** (2.44)	46** (2.49)	319 (0.63)	325*** (4.21)
Education	34*** (19.40)	36*** (5.36)	143*** (24.24)	27*** (22.90)	50*** (20.88)	19 (0.29)	122*** (12.46)
No. of observations (N)	15,576	2,463	14,940	15,381	15,093	2,170	14,954
F-value/Wald Chi2	5028.59***	805.94***	2960.41***	4591.20***	1971.91***	72.33***	737.80***
Years of education for a female	34 (0.69)	32 (1.17)	132*** (3.57)	26* (1.89)	48** (2.16)	33 (0.37)	121 (0.53)
Years of education for a male	36*** (13.60)	45*** (4.46)	166*** (18.96)	29*** (16.77)	56*** (15.63)	-10 (0.10)	129*** (8.52)
No. of observations (N)	15,576	2,463	14,940	15,381	15,093	2,170	14,954
F-value/Wald Chi2	5025.28***	807.45***	2975.94***	4595.97***	1976.27***	72.44***	737.59***
<b>2010 – 2012 panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education<sup>xtt</sup></b>
Female	11 (0.86)	-17 (0.33)	-40 (0.79)	24*** (2.98)	47*** (3.56)	143 (0.29)	218*** (3.27)
Education	33*** (19.41)	35*** (5.26)	59*** (8.46)	25*** (22.90)	38*** (21.55)	90 (1.45)	113*** (12.91)
No. of observations (N)	17,179	2,406	5,148	17,007	16,728	2,338	16,589
F-value/Wald Chi2	4625.57***	624.24***	1462.13***	5649.08***	2188.84***	6.73***	648.38***
Years of education for a female	33 (0.73)	32 (0.73)	57 (0.85)	24 (0.36)	38 (0.11)	94 (0.16)	113 (0.08)
Years of education for a male	35*** (13.53)	40*** (4.10)	66*** (6.32)	25*** (15.55)	38*** (14.49)	78 (0.83)	112*** (8.35)
No. of observations (N)	17,179	2,406	5,148	17,007	16,728	2,338	16,589
F-value/Wald Chi2	4625.63***	624.65***	1462.77***	5649.25***	2188.86***	6.12***	648.41***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status, race and household income. Superscript 'xtt' represent use of random-effect tobit model and all were significant using the likelihood ratio test. Results for food expenditure are from the random-effect OLS model after passing Breusch & Pagan Langrangian multiplier test for random effects. Otherwise pooled regression results are reported. For random-effect tobit and random-effect OLS models, the Wald Chi2 statistic is reported. For pooled OLS models, the F-value is reported. Gender and education variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 19b: Gender and education level of decision-makers as predictors of household expenditure – panel analysis (continued)**

<b>Combined panel</b>	<b>Food</b>	<b>Health care</b>	<b>Transport</b>	<b>Utilities<sup>xtt</sup></b>	<b>Insurance<sup>xtt</sup></b>	<b>Household items</b>	<b>Education</b>
Female	12 (1.11)	-16 (0.39)	-34 (0.85)	21*** (3.06)	44*** (3.71)	156 (0.45)	13 (0.19)
Education	33*** (22.58)	36*** (6.53)	67*** (12.30)	25*** (27.34)	41*** (26.07)	67 (1.50)	67*** (7.33)
No. of observations (N)	25,876	3,959	8,184	25,655	25,323	3,461	5,331
F-value/Wald Chi2	6872.79***	1064.00***	2434.91***	7390.00***	3309.78***	94.99***	415.62***
Years of education for a female	33 (1.11)	32 (1.39)	63 (1.37)	25 (1.44)	40 (1.57)	73 (0.22)	66 (0.24)
Years of education for a male	35*** (16.16)	44*** (5.39)	75*** (9.32)	27*** (19.57)	44*** (18.82)	56 (0.82)	69*** (4.89)
No. of observations (N)	25,876	3,959	8,184	25,655	25,323	3,461	5,331
F-value/Wald Chi2	6870.79***	1065.98***	2437.06***	7392.55***	3312.35***	95.02***	415.60***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Adjusted for age, household size, marital status, race and household income. Superscript 'xtt' represent use of random-effect tobit model and all were significant using the likelihood ratio test. Results for food expenditure are from the random-effect OLS model after passing Breusch & Pagan Lagrangian multiplier test for random effects. Otherwise pooled regression results are reported. For random-effect tobit and random-effect OLS models, the Wald Chi2 statistic is reported. For pooled OLS models, the F-value is reported. Gender and education variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 20: Main vs joint decision-making and gender, as predictors of household expenditure**

<b>2008 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education</b>
Female	13 (0.59)	249** (2.12)	229*** (3.13)	26*** (3.11)	0 (0.03)	431 (1.24)	43 (0.58)
Main vs joint decision maker	16 (0.46)	243* (1.73)	391*** (4.70)	4 (0.48)	58* (1.95)	395 (0.91)	35 (0.27)
Sample (n)	9,311	9,286	9,238	9,285	9,264	1,289	2,509
F-value/Wald Chi2	58.05***	506.43***	1766.21***	7194.40***	2200.45***	1.03	1.78*
Main vs joint female decision-maker	13 (0.11)	49 (1.20)	22*** (7.15)	-12** (2.56)	16*** (3.55)	-117 (1.56)	171 (0.81)
Main vs joint male decision-maker	22 (0.36)	453 (1.58)	1302*** (8.40)	47** (2.44)	275*** (4.19)	1347*** (2.65)	-308 (0.59)
Sample (n)	9,311	9,286	9,238	9,285	9,264	1,289	2,509
F-value/Wald Chi2	55.28***	507.92***	1622.22***	7297.43***	2262.79***	1.63*	1.73*
<b>2010 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education</b>
Female	-28 (0.64)	-155** (2.16)	-186*** (2.79)	4 (0.40)	68** (2.37)	1503 (1.56)	179 (0.90)
Main vs joint decision maker	10 (0.21)	-45 (0.63)	31 (0.44)	7 (0.50)	150*** (4.34)	1683 (1.21)	-207 (0.59)
Sample (n)	9,543	8,835	8,878	9,341	9,026	1,405	1,854
F-value/Wald Chi2	18.18***	937.37***	1423.40***	3902.05***	761.05***	0.61	1.98**
Main vs joint female decision-maker	91 (1.47)	41 (0.85)	163* (1.90)	-9 (1.39)	57*** (3.65)	4724 (0.96)	636* (1.93)
Main vs joint male decision-maker	-89 (0.93)	-112 (0.84)	-124 (1.06)	28 (1.33)	309*** (5.27)	-2794 (0.77)	-1358 (1.57)
Sample (n)	9,543	8,835	8,878	9,341	9,026	1,405	1,854
F-value/Wald Chi2	20.15***	935.33***	1391.99***	3906.81***	750.74***	0.56	1.87**

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS models, the F-value is reported. Gender and 'main vs joint decision-making' variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 20: Main vs joint decision-making and gender, as predictors of household expenditure (continued)**

<b>2012 survey</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education</b>
Female	1.34 (0.06)	-15 (0.20)	141** (2.15)	26*** (3.03)	23** (2.23)	293 (1.22)	140 (1.22)
Main vs joint decision maker	-62* (1.74)	-98 (1.01)	164** (2.21)	0 (0.03)	11 (0.84)	440** (2.31)	214*** (2.74)
Sample (n)	10,742	10,742	10,734	10,738	10,730	1,471	1,905
F-value/Wald Chi2	43.19***	553.67***	1868.08***	7812.55***	4618.09***	1.63*	3.57***
Main vs joint female decision-maker	-69 (0.28)	12 (0.78)	8** (2.53)	1 (0.37)	20 (0.68)	536 (0.62)	130 (1.29)
Main vs joint male decision-maker	-49 (0.92)	-156 (0.81)	408*** (3.18)	-6 (0.35)	0 (0.00)	261 (1.00)	368** (2.59)
Sample (n)	10,742	10,742	10,734	10,738	10,730	1,471	1,905
F-value/Wald Chi2	39.29***	560.40***	1848.70***	7748.60***	4642.52***	1.65*	4.19***
<b>Pooled</b>	<b>Food</b>	<b>Health care<sup>h</sup></b>	<b>Transport<sup>h</sup></b>	<b>Utilities<sup>h</sup></b>	<b>Insurance<sup>h</sup></b>	<b>Household items</b>	<b>Education<sup>h</sup></b>
Female	-17 (0.88)	16 (0.29)	37 (0.95)	13** (2.31)	39*** (3.38)	907* (1.89)	-11 (0.17)
Main vs joint decision maker	-12 (0.49)	10 (0.16)	147*** (3.33)	-4 (0.63)	93*** (6.51)	617** (2.01)	75 (0.93)
Sample (n)	29,596	28,863	28,850	29,364	29,020	4,165	28,869
F-value/Wald Chi2	64.64***	1517.90***	4826.25***	16593.75***	5030.37***	1.74*	612.78***
Main vs joint female decision-maker	15 (1.13)	45 (0.45)	28*** (3.86)	-5 (0.23)	27*** (6.94)	1797 (0.63)	249** (2.25)
Main vs joint male decision-maker	-58 (1.13)	-27 (0.20)	393*** (5.06)	-2 (0.18)	248*** (8.90)	-1366 (0.63)	-252 (1.37)
Sample (n)	29,596	28,863	28,850	29,364	29,020	4,165	28,869
F-value/Wald Chi2	65.80***	1515.42***	4867.83***	16601.12***	4960.50***	1.65*	616.80***

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Superscript 'h' shows that heckman selection model results were reported, otherwise the results are from OLS for non-zero expenditure values and post stratified weights are used. For the heckman selection model, the Wald Chi2 statistic is reported. For OLS models, the F-value is reported. Gender and 'main vs joint decision-making' variables are included when interaction of the two is assessed. Regression models are estimated for sub-sample of decision-makers only.

**Table 21: Joint decision-making and number of decision makers in the household, by household head's gender**

		2008			2010			2012			Pooled		
		Head gender		Chi2	Head gender		Chi2	Head gender		Chi2	Head gender		Chi2
		Male	Female		Male	Female		Male	Female		Male	Female	
<b>Joint decision-making</b>		66.55	30.32	861.55	70.19	49.12	264.25	63.40	51.86	90.37	66.62	44.91	921.72
<b>Number of decision makers</b>	<b>1</b>	33.45	69.68	887.07	29.81	50.88	271.53	36.60	48.14	117.77	33.38	55.09	1003
	<b>2</b>	63.53	27.55		59.94	40.69		56.53	43.83		60.34	38.24	
	<b>≥3</b>	3.02	2.77		10.26	8.42		6.86	8.03		6.27	6.67	
	<b>Total</b>	100.00	100.00		100.00	100.00		100.00	100.00		100.00	100.00	
<b>Sample (n)</b>		3,573	3,034		2,526	3,396		2,724	4,308		8,823	10,738	

*Notes: All the Chi2 values are significant at the 1% level. Households with no resident economic decision-makers, i.e. with only non-resident economic decision-makers, were excluded from the dataset, making it possible to construct a variable that captures joint (multiple decision-makers) versus centralised (one decision-maker only) decision-making.*

**Table 22: Economic characteristics of household head, by decision-making responsibility**

Economic Factors	Male				Female			
	Decision maker	Non-decision maker	Total	t-test/ Chi2	Decision maker	Non-decision maker	Total	t-test/ Chi2
<b>2008 Survey</b>								
Employed (Y/N)	0.73	0.53	0.72	4.74***	0.44	0.05	0.43	4.51***
Employment income (ZAR)	4,353	2,718	4,323	1.81*	1,161	61	1,138	2.39**
Total income (ZAR)	5,355	2,944	5,310	1.58	1,680	485	1,656	2.03**
Education (years)	8.95	8.55	8.94	1.15	7.55	6.55	7.53	1.46
<b>2010 Survey</b>								
Employed (Y/N)	0.67	0.701	0.67	0.97	0.35	0.44	0.36	3.01***
Employment income (ZAR)	3,934	4,451	3,981	1.88*	1,450	1,335	1,442	0.93
Total income (ZAR)	4,336	4,674	4,366	1.71*	2,486	1,712	2,430	0.10
Education (years)	9.27	9.50	9.30	1.22	7.86	9.14	7.97	4.66***
<b>2012 Survey</b>								
Employed (Y/N)	0.71	0.27	0.70	8.27***	0.40	0.13	0.39	7.30***
Employment income (ZAR)	4,413	580	4,313	4.18***	1,611	167	1,553	4.56***
Total income (ZAR)	4,905	698	4,795	2.76***	2,573	386	2,484	1.64
Education (years)	9.69	9.02	9.67	0.50	8.93	10.18	8.99	5.46***
<b>Pooled</b>								
Employed (Y/N)	0.70	0.59	0.70	6.57***	0.40	0.29	0.39	5.11***
Employment income (ZAR)	4,241	3,462	4,207	0.56	1,437	751	1,406	2.48**
Total income (ZAR)	4,887	3,665	4,833	0.91	2,300	1,075	2,245	1.24
Education (years)	9.29	9.23	9.29	0.68	8.22	9.23	8.27	6.70

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Post-stratified weights used in the calculation of these summaries.

**Table 23a: Real household expenditures, by household head's gender – 2008 survey**

Category	Male		Female		Total		Relative Diff (%)	Chi2 (median)
	% of zeros (n)	Median	% of zeros (n)	Median	% of zeros (n)	Median		
Food	0.00 (3,595)	715	0.00 (3,053)	606	0.00 (6,648)	661	17.98	68.85***
Healthcare	75.59 (3,580)	500	84.42 (3,048)	200	79.65 (6,628)	360	150.00	39.78***
Transport	56.33 (3,556)	400	69.14 (3,036)	190	62.23 (6,592)	300	110.52	108.58***
Utilities	24.34 (3,578)	150	19.14 (3,046)	100	21.95 (6,624)	120	50.00	66.87***
Insurance	54.08 (3,567)	140	54.99 (3,046)	80	54.50 (6,613)	100	75.00	91.47***
Household items	85.21 (3,576)	422	88.84 (3,047)	310	86.88 (6,623)	400	36.12	11.74***
Education	76.83 (3,573)	400	71.60 (3,039)	320	74.43 (6,612)	360	25.00	14.57***

Notes: \*\*\*p &lt; 0.01, \*\*p &lt; 0.05, \*p &lt; 0.1

**Table 23b: Real household expenditures, by household head's gender – 2010 survey**

Category	Male		Female		Total		Relative Diff (%)	Chi2 (median)
	% of zeros (n)	Median	% of zeros (n)	Median	% of zeros (n)	Median		
Food	0.00 (2,542)	697	0.00 (3,419)	658	0.00 (5,961)	672	5.98	5.57**
Healthcare	84.59 (2,375)	401	88.27 (3,121)	179	86.68 (5,496)	223	124.25	33.29***
Transport	67.62 (2,387)	447	77.50 (3,134)	223	73.23 (5,521)	322	100.00	77.54***
Utilities	22.49 (2,494)	161	20.70 (3,323)	134	21.47 (5,817)	134	20.00	28.10***
Insurance	54.25 (2,424)	134	54.07 (3,183)	97	54.15 (5,607)	107	38.24	34.99***
Household items	83.43 (2,390)	398	86.06 (3,128)	349	84.92 (5,518)	358	14.10	3.67*
Education	80.53 (2,378)	313	79.49 (3,140)	273	79.94 (5,518)	295	14.37	1.12

Notes: \*\*\*p &lt; 0.01, \*\*p &lt; 0.05, \*p &lt; 0.1

**Table 23c: Real household expenditures, by household head's gender – 2012 survey**

Category	Male		Female		Total		Relative Diff (%)	Chi2 (median)
	% of zeros (n)	Median	% of zeros (n)	Median	% of zeros (n)	Median		
Food	0.00 (2,731)	645	0.00 (4,326)	637	0.00 (7,057)	645	1.26	6.88**
Healthcare	81.50 (2,729)	322	86.01 (4,324)	242	84.26 (7,053)	258	33.33	3.21*
Transport	60.03 (2,727)	403	67.65 (4,322)	242	64.70 (7,049)	322	66.66	41.94***
Utilities	17.05 (2,728)	161	10.32 (4,322)	132	12.92 (7,050)	161	21.95	20.43***
Insurance	46.15 (2,726)	121	42.13 (4,320)	96	43.68 (7,046)	104	24.99	29.21***
Household items	85.20 (2,729)	387	88.02 (4,323)	363	86.93 (7,052)	363	6.69	0.43
Education	83.95 (2,729)	250	83.07 (4,323)	242	83.41 (7,052)	242	3.33	0.84

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 23d: Real household expenditures, by household head's gender - pooled**

Category	Male		Female		Total		Relative Diff (%)	Chi2 (median)
	% of zeros (n)	Median	% of zeros (n)	Median	% of zeros (n)	Median		
Food	0.00 (8,868)	675	0.00 (10,798)	635	0.00 (19,666)	645	6.34	79.96***
Healthcare	79.91 (8,684)	438	86.22 (10,493)	201	83.36 (19,177)	286	117.07	75.68***
Transport	60.60 (8,670)	403	71.03 (10,492)	223	66.31 (19,162)	313	80.30	201.73***
Utilities	21.56 (8,800)	161	16.06 (10,691)	121	18.54 (19,491)	134	33.33	101.34***
Insurance	51.65 (8,717)	129	49.45 (10,549)	96	50.44 (19,266)	104	33.32	134.16***
Household items	84.72 (8,695)	400	87.67 (10,498)	350	86.33 (19,193)	363	14.28	11.95***
Education	80.08 (8,680)	350	78.68 (10,502)	290	79.31 (19,182)	310	20.68	12.31***

Notes: Data are pooled across all three survey rounds. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 24: Household level decision-making and household expenditures – 2008 survey**

	<b>Food</b>	<b>F-test</b>	<b>Health care</b>	<b>F-test</b>	<b>Transport</b>	<b>F-test</b>	<b>Utilities</b>	<b>F-test</b>
Joint decision making	205*** (6.89)	-	-33 (0.38)	-	30 (0.29)	-	6 (0.58)	-
Sample (n)	5,822		5,807		5,785		5,805	
F-value/Wald Chi2	68.48***		739.31***		965.16***		4069.40***	
Presence of female decision maker	293*** (6.66)	8.44***	-102 (0.84)	1.39	-165 (1.02)	8.54***	37** (1.99)	0.65
Presence of male decision maker	119** (2.53)		170 (0.93)		619*** (3.22)		13 (0.65)	
Sample (n)	5,842		5,827		5,805		5,825	
F-value/Wald Chi2	63.56***		763.20***		882.94***		4432.63***	
Presence of female main decision maker	188*** (3.17)	2.02	-81 (0.79)	0.85	-156 (1.15)	18.59***	-7 (0.46)	1.22
Presence of male main decision maker	69 (0.83)		114 (0.64)		877*** (4.03)		24 (0.99)	
Sample (n)	5,842		5,827		5,805		5,825	
F-value/Wald Chi2	63.32***		786.01***		790.20***		4266.84***	
Presence of female joint decision maker	125*** (3.51)	0.32	28 (0.32)	0.63	67 (0.66)	0.93	15 (1.25)	2.20
Presence of male joint decision maker	89 (1.56)		-86 (0.69)		-94 (0.62)		-14 (0.79)	
Sample (n)	5,842		5,827		5,805		5,825	
F-value/Wald Chi2	62.84***		736.76***		950.09***		4028.02***	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; All health care, transport and utilities results are from heckman models. Food results are from OLS models. For the heckman selection model, the Wald Chi2 statistic is reported. For the OLS model, the F-value is reported.

**Table 24: Household level decision-making and household expenditures – 2008 survey (continued)**

	<b>Insurance</b>	<b>F-test</b>	<b>Household items</b>	<b>F-test</b>	<b>Education</b>	<b>F-test</b>
Joint decision making	43 (1.30)	-	507 (1.50)	-	-40.62 (0.28)	-
Sample (n)	5,798		741		1,449	
F-value/Wald Chi2	1200.23***		2.47***		4.73***	
Presence of female decision maker	-16 (0.29)	9.40***	-145 (0.32)	3.27*	-131 (0.51)	0.04
Presence of male decision maker	325*** (3.80)		1713** (2.23)		-69 (0.39)	
Sample (n)	5,817		743		1,454	
F-value/Wald Chi2	1057.95***		2.38***		4.83***	
Presence of female main decision maker	-127** (2.56)	26.39***	-1369** (2.23)	7.57***	-264 (1.40)	0.06
Presence of male main decision maker	450*** (4.65)		846 (1.43)		-399 (0.71)	
Sample (n)	5,817		743		1,454	
F-value/Wald Chi2	941.93***		2.31***		4.62***	
Presence of female joint decision maker	105*** (2.98)	4.45**	1005 (1.61)	0.21	81 (0.55)	0.10
Presence of male joint decision maker	-14 (0.29)		513 (0.60)		236 (0.49)	
Sample (n)	5,817		743		1,454	
F-value/Wald Chi2	1174.96***		2.20***		4.36***	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; All insurance results are from Heckman models. Household items and education results are from OLS models. For the heckman selection model, the Wald Chi2 statistic is reported. For the OLS model, the F-value is reported.

**Table 25: Household level decision-making and household expenditures – 2010 survey**

	<b>Food</b>	<b>F-test</b>	<b>Health care</b>	<b>F-test</b>	<b>Transport</b>	<b>F-test</b>	<b>Utilities</b>	<b>F-test</b>
Joint decision making	302*** (5.49)	-	99 (1.11)	-	327*** (3.09)	-	50** (2.11)	-
Sample (n)	5,619		5,178		5,203		4,299	
F-value/Wald Chi2	17.92***		453.18***		827.16***		34.93***	
Presence of female decision maker	442*** (5.30)	11.93***	200 (1.37)	7.29***	361** (2.32)	3.63*	89* (1.82)	2.73*
Presence of male decision maker	70 (1.11)		-358** (2.30)		-36 (0.29)		-7 (0.25)	
Sample (n)	5,634		5,193		5,218		4,312	
F-value/Wald Chi2	16.49***		410.48***		844.88***		33.27***	
Presence of female main decision maker	366*** (3.47)	8.31***	254** (2.10)	7.29***	438*** (3.83)	7.82***	98** (2.03)	5.96**
Presence of male main decision maker	-2 (0.02)		-181 (1.54)		27 (0.24)		-48 (0.97)	
Sample (n)	5,634		5,193		5,218		4,312	
F-value/Wald Chi2	17.11***		424.75***		845.74***		34.34***	
Presence of female joint decision maker	137** (2.13)	1.64	-92 (0.96)	0.77	-71 (0.79)	2.81*	-15 (0.37)	2.08
Presence of male joint decision maker	313*** (2.74)		13 (0.13)		134 (1.32)		79* (1.76)	
Sample (n)	5,634		5,193		5,218		4,312	
F-value/Wald Chi2	18.31***		460.00***		828.92***		33.93***	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; All health care and transport results are from heckman models. Food and utilities results are from OLS models. For the heckman selection model, the Wald Chi2 statistic is reported. For the OLS model, the F-value is reported.

**Table 25: Household level decision-making and household expenditures – 2010 survey (continued)**

	<b>Insurance</b>	<b>F-test</b>	<b>Household items</b>	<b>F-test</b>	<b>Education</b>	<b>F-test</b>
Joint decision making	37 (0.95)	-	-40 (0.03)	-	52 (0.30)	-
Sample (n)	5,287		779		1,036	
F-value/Wald Chi2	497.85***		0.49		2.66***	
Presence of female decision maker	18 (0.26)	4.26**	-1940 (0.69)	0.36	237 (0.73)	0.00
Presence of male decision maker	222*** (3.71)		2395 (0.51)		233 (0.96)	
Sample (n)	5,302		781		1,040	
F-value/Wald Chi2	484.65***		0.48		2.52***	
Presence of female main decision maker	113** (2.13)	0.52	-604 (0.38)	0.32	528** (1.98)	4.00
Presence of male main decision maker	166*** (2.86)		-1817 (0.72)		-985 (1.49)	
Sample (n)	5,302		781		1,040	
F-value/Wald Chi2	526.94***		0.43		2.60***	
Presence of female joint decision maker	-44 (1.15)	6.76***	-1600 (1.05)	0.65	-668** (2.56)	5.22
Presence of male joint decision maker	101** (2.18)		3371 (0.65)		1415** (1.97)	
Sample (n)	5,302		781		1,040	
F-value/Wald Chi2	497.48***		0.55		2.58***	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; All insurance results are from Heckman models. Household items and education results are from OLS models as in wave 1. For the heckman selection model, the Wald Chi2 statistic is reported. For the OLS model, the F-value is reported.

**Table 26: Household level decision-making and household expenditures – 2012 survey**

	<b>Food</b>	<b>F-test</b>	<b>Health care</b>	<b>F-test</b>	<b>Transport</b>	<b>F-test</b>	<b>Utilities</b>	<b>F-test</b>
Joint decision making	151*** (4.70)	-	-238 (1.00)	-	-124 (1.19)	-	-1.98 (0.16)	-
Sample (n)	6,726		1,051		6,721		6,721	
F-value/Wald Chi2	35.18***		7.16***		911.53***		4205.65***	
Presence of female decision maker	151** (2.70)	0.05	-212 (0.50)	0.10	-28 (0.18)	0.39	-48** (2.07)	10.37***
Presence of male decision maker	135** (2.62)		-330 (1.47)		91 (0.72)		41*** (2.69)	
Sample (n)	6,743		1,051		6,738		6,738	
F-value/Wald Chi2	32.05***		6.93***		943.03***		3986.16***	
Presence of female main decision maker	66 (1.03)	0.18	170 (0.51)	1.63	26 (0.22)	0.65	-3 (0.18)	1.35
Presence of male main decision maker	38 (0.58)		-174 (0.71)		148 (1.21)		20 (1.24)	
Sample (n)	6,743		1,051		6,738		6,738	
F-value/Wald Chi2	32.88***		8.05***		935.96***		4125.59***	
Presence of female joint decision maker	133*** (3.02)	0.00	-308 (1.51)	1.13	-107 (1.07)	1.07	-24* (1.89)	9.09***
Presence of male joint decision maker	130** (2.33)		-84 (0.36)		44 (0.35)		33** (2.04)	
Sample (n)	6,743		1,051		6,738		6,738	
F-value/Wald Chi2	33.61***		7.21***		917.15***		4163.37***	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; All transport and utilities results are from heckman models. Health care and food results are from OLS models. For the heckman selection model, the Wald Chi2 statistic is reported. For the OLS model, the F-value is reported.

**Table 26: Household level decision-making and household expenditures – 2012 survey (continued)**

	<b>Insurance</b>	<b>F-test</b>	<b>Household items</b>	<b>F-test</b>	<b>Education</b>	<b>F-test</b>
Joint decision making	-42*** (2.90)	-	-485 (1.32)	-	-152 (1.10)	-
Sample (n)	6,718		872		1,100	
F-value/Wald Chi2	3036.67***		1.31		4.93***	
Presence of female decision maker	-94*** (3.39)	5.96**	985 (1.48)	1.94	-112 (0.36)	0.10
Presence of male decision maker	3 (0.14)		-633 (1.01)		-227 (1.36)	
Sample (n)	6,735		874		1,103	
F-value/Wald Chi2	3084.09***		1.25		5.03***	
Presence of female main decision maker	-24 (1.11)	2.12	785 (1.34)	2.42	213 (0.88)	0.26
Presence of male main decision maker	22 (0.97)		-607 (0.94)		321** (2.21)	
Sample (n)	6,735		874		1,103	
F-value/Wald Chi2	3047.96***		1.31		5.10***	
Presence of female joint decision maker	-44*** (2.97)	0.58	-513 (1.61)	0.01	-300 (1.47)	5.78**
Presence of male joint decision maker	27 (1.47)		-467 (0.83)		-608*** (3.50)	
Sample (n)	6,735		874		1,103	
F-value/Wald Chi2	3027.60***		1.26		5.85***	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; All insurance results are from Heckman models. Household items and education results are from OLS models as in 2008 and 2010. For the heckman selection model, the Wald Chi2 statistic is reported. For the OLS model, the F-value is reported.

**Table 27: Household level decision-making and household expenditures - pooled**

	<b>Food</b>	<b>F-test</b>	<b>Health care</b>	<b>F-test</b>	<b>Transport</b>	<b>F-test</b>	<b>Utilities</b>	<b>F-test</b>
Joint decision making	266*** (9.27)	-	-164 (1.20)	-	110 (1.24)	-	10.01 (1.20)	-
Sample (n)	18,167		2,856		5,863		18,017	
F-value/Wald Chi2	71.69***		21.71***		32.40***		9292.79***	
Presence of female decision maker	333*** (8.36)	12.13***	-209 (1.00)	0.05	128 (0.83)	0.03	5 (0.38)	0.88
Presence of male decision maker	158*** (4.31)		160 (1.34)		100 (0.94)		22** (2.15)	
Sample (n)	18,219		2,858		5,877		18,069	
F-value/Wald Chi2	65.66***		21.19***		31.02***		9283.80***	
Presence of female main decision maker	247*** (4.84)	11.30***	-60 (0.41)	0.00	299* (1.95)	0.26	6 (0.55)	0.28
Presence of male main decision maker	33 (0.54)		-60 (0.45)		223 (1.48)		-1.49 (0.13)	
Sample (n)	18,219		2,858		5,877		18,069	
F-value/Wald Chi2	66.39***		21.16***		29.07***		9604.23***	
Presence of female joint decision maker	147*** (4.80)	2.05	-143 (1.48)	0.19	-84 (0.83)	1.59	-0.19 (0.02)	3.56*
Presence of male joint decision maker	242*** (4.12)		-86 (0.63)		124 (0.83)		22** (2.16)	
Sample (n)	18,219		2,858		5,877		18,069	
F-value/Wald Chi2	69.45***		21.14***		29.62***		9245.79***	

Notes: Data are pooled across all three survey rounds. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; All utilities results are from Heckman. Health care, food and transport results are from OLS. For heckman selection model, Wald Chi2 is reported. For OLS, F-value is reported.

**Table 27: Household level decision-making and household expenditures – pooled (continued)**

	<b>Insurance</b>	<b>F-test</b>	<b>Household items</b>	<b>F-test</b>	<b>Education</b>	<b>F-test</b>
Joint decision making	3.88 (0.23)	-	5.12 (0.01)	-	-23 (0.28)	-
Sample (n)	17,803		2,392		3,585	
F-value/Wald Chi2	2801.82***		1.27		7.62***	
Presence of female decision maker	-61** (2.07)	38.01***	-96 (0.14)	0.20	63 (0.36)	0.26
Presence of male decision maker	208*** (7.44)		882 (0.56)		-47 (0.42)	
Sample (n)	17,854		2,398		3,597	
F-value/Wald Chi2	2586.92***		1.30		7.21***	
Presence of female main decision maker	-35 (1.47)	29.91***	-775 (1.02)	0.41	140 (1.10)	2.57
Presence of male main decision maker	196*** (6.84)		-1319 (1.03)		-478 (1.28)	
Sample (n)	17,854		2,398		3,597	
F-value/Wald Chi2	2685.87***		1.09		7.34***	
Presence of female joint decision maker	6 (0.41)	0.59	-333 (0.70)	0.51	-218** (2.12)	2.95*
Presence of male joint decision maker	26 (1.21)		1598 (0.66)		518 (1.31)	
Sample (n)	17,854		2,398		3,597	
F-value/Wald Chi2	2767.03***		1.26		6.97***	

Notes: Data are pooled across all three survey rounds. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; All insurance results are from Heckman. Household items and education results are from OLS as in wave 1 and 2 and 3. For heckman selection model, Wald Chi2 is reported. For OLS, F-value is reported.

## **CHAPTER 4: PAPER 3**

### **Intra-Household Cooperation in Two Poor South African Communities: A Field Experiment**

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## Abstract

There is a dearth of studies on cooperation within the extended inter-generational family, a common living arrangement in South Africa. Cooperation impacts on families' social and economic fortunes. This paper presents evidence on cooperation in the extended inter-generational family from a framed field experiment, which adopts a Voluntary Contribution Mechanism (VCM) game that was implemented in two poor South African communities. The subjects' contributions to the public accounts measure cooperation and the post-experimental survey, provides thematic data to map out correlates of intra-household cooperation. Random Effect (RE) regression models are employed to explore predictors of cooperation. The failure of household surplus-maximisation is confirmed by limited cooperation. Discussion, as a form of communication, mitigates contribution decay in urban Bloemfontein. Cooperation between parents and grandparents is enhanced by the level of family communication in urban Bloemfontein. The endowment size effect in urban Bloemfontein imply that the benefits of an economic opportunity for one family member, to earn a wage or receive cash transfer, may cascade to all family members as a result of cooperation and sharing. Given the central role played by the family in economic, socialisation and procreation activities, cooperation in extended families and the associated investment in family public goods, in urban informal settings can be augmented by social developmental policies that enhance family communication and cohesion. Examples include preventative and developmental social work programmes, in particular training in parenting and marriage skills.

JEL codes: C90; C93; D03; D19

Key Words: Decision-making, household, family, Voluntary Contribution Mechanism, South Africa



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## 1. Introduction

In society, the family is in general considered the primary institution within which multiple activities of economic, socialisation, procreation and other things are carried out. Mani (2011) describes the family as the basic building block in the edifice of institutions that govern social and economic interactions. The extended family, a common phenomenon in the African context, is one such manifestation of the family as a human institution. The living arrangement where one adult lives alongside other adults, other than their spouses, with whom they make more or less shared decisions on a regular basis deserves attention in understanding the level of cooperation, or lack thereof, in the provision of family public goods. In this context, Burns and Keswell (2006) emphasises the need to look at dynastic or inter-generational influences on families' resource allocation, expenditures on family public goods and on household production.

Experimental work in Economics has facilitated the study of social preferences within households, with many studies (Ashraf, 2009; Iversen et al., 2011; Kebede et al., 2014; Munro et al., 2014) focusing on the preferences of couples. Molina et al. (2016) report that little is known about how cooperative behaviour changes across generations. Yet, the level of cooperation within households plays a pivotal role in explaining inter-generational transfers. It is argued that the study of familial transfers or sharing in general, has some consequences for the design of intra- and inter-generational redistributive programmes (Porter & Adams, 2015).

An in-depth understanding of the way sharing behaviour is influenced by socio-demographics, inter-generational household structures, socio-economic factors, income heterogeneity, decision-making responsibility, communication within households, family circumstances and other social preferences is therefore relevant. In particular, an advance in knowledge about the influences of such factors on the sharing of scarce resources within poor extended families, for reasons explained elsewhere, is important on the theoretical and policy front. Similar questions on factors driving cooperation are raised in the experimental work by Henrich et al. (2004) and the factors focus on whether social preferences for cooperation and others, are stable components of human nature or a function of the economic, social and cultural environments. Non-spousal experiments on cooperation within households facilitate the study of the inter-generational transmission of social preferences based on kinship.

The paper has a number of sections as outlined hereafter. Section 2 presents a discussion on the relevant theory. The empirical evidence is discussed in section 3, while sections 4 and 5 respectively outline the recruitment strategy, and the experimental design and procedure employed in the study. Section 6 focuses on the experimental analysis and presentation of the thematic results, while section 7, as complement to the thematic analyses presented in section 6, provide the results from the aggregated analysis. Sections 8, 9 and 10 respectively cover the contributions, limitations, and the conclusion.

## **2. Theory**

The Voluntary Contribution Mechanism (VCM) has been used in experiments to analyse cooperation as a social preference. Literature defines cooperation as the lack of free-riding, and a situation where economic agents choose to contribute even if there is an opportunity not to do so and probably gain more by not contributing (Andreoni, 1995; Cardenas & Carpenter, 2008). In the VCM, the use of the marginal per capita return (MPCR) makes full contribution to the public pool by all subjects socially optimal. Not contributing when other subjects do actually benefits the free-rider. The VCM thus presents a social dilemma between cooperation and free-riding.

The economic and game theoretic prediction in any VCM does not compel subjects to make contributions, as each and every subject should find it in his/her best interest to free ride. The reality that individual self-interest is at odds with group interest means that free riding becomes the dominant strategy (Ledyard, 1995). The socio-psychological theoretical predictions, according to Ledyard (1995), claim that each subject will contribute something, perhaps the optimal group outcome when driven by altruism, social norms or group identification. Both possibilities of fully altruistic and fully selfish behaviour play out under this theory. These opposing predictions point to the need to learn more about cooperative behaviour in natural institutional settings such as the family.

Arifovic and Ledyard (2012) detail two theoretical approaches to VCM in the literature. The *first* approach involves the characteristics of agents representing their preferences and attitudes, including other-regarding preferences (Fehr & Schmidt, 1999; Bolton & Ockenfels, 2000; Charness & Rabin, 2002; Cox, Friedman & Gjerstad, 2007; Cox, Friedman & Sadiraj, 2008) and reciprocity (Rabin 1993; Dufwenberg & Kirchsteiger, 2004; Wendel &

Oppenheimer, 2010; Ambrus & Pathak, 2011). The reciprocity approach encompasses conditional cooperation in which people are willing to contribute when others contribute, a reflection of an in-kind response to beneficial or harmful acts (Fehr & Gächter, 2000). The *second* approach focuses on the behaviour of the agents observed when playing the games. Agents in the VCM experiment are believed to follow some game theoretic equilibrium behaviour that is either the result of some strategy or of learning (Andreoni & Samuelson, 2006; Arifovic & Ledyard, 2012). The subject's strategy or best-response is based on the availability of a base of common knowledge about rationality and behaviour of others, due to the repeated nature of the game and observability of the behaviour. Learning by the subject is reflected in the way they react to choices made by others in the past in some kind of best response way (Arifovic & Ledyard, 2012).

Another theory of cooperation focuses on the “social interaction effect”. The theory claims that an individual changes his or her behaviour as a function of his or her respective group (family) or social relations' behaviour (Falk, Fischbacher & Gächter, 2013). In other words, when born and groomed in a cooperative family, there is an expectation *a priori* of such subjects to cooperate more.

Molina (2013/2014) suggests kin selection theory as the driver of cooperation dominance despite the fact that selfishness should come naturally with competition. Molina (2013:309) states that, “The model that best explains how natural selection promotes altruistic conduct is based on kin selection: within a family nucleus, altruism takes place among family members who share genes as descendants of common ancestors”. However, the growing experimental economics literature on intra-household decision-making by couples reports a failure in the making of choices that maximise the surplus for the household (Ashraf, 2009; Iversen et al., 2011; Mani, 2011; Munro et al., 2011; Kebede et al., 2014; Munro et al., 2014; Lopez, Munro & Tarazona-Gomez, 2015; Cochard, Couprie & Hopfensitz, 2016). In addition, Molina et al. (2016) also state that kin selection studies do not provide evidence of full cooperation.

Nonetheless, studying cooperation-enhancing factors in public goods games, in naturally occurring institutions such as the family, is an avenue of research that assist in formulating a reliable theoretical framework towards understanding cooperation.

### 3. Experimental evidence

The relevance of experiments in Economics is seen in the upsurge of their application by researchers. Experiments have modified some traits of stylised neo-classical models such as unbounded selfishness, unbounded rationality, and unbounded willpower. Volumes of studies on time, risk and social preferences have seen the light owing to the adoption of experimental approaches in Behavioural Economics. Experimental approaches are preferred in the study of preferences as these methods reduce bias prevalent in less rigorous forms of observations (McDermott, 2002). One aspect of social preferences where the application of experiments in recent decades has grown in breadth and depth is in the studies on cooperation. Many of these studies employ the public goods game, in particular the VCM, the prisoner's dilemma, or modifications to these standard games. However, studies on cooperation within households and families are relatively recent.

The sizeable experimental literature on intra-household cooperation focuses mainly on couples (, the results of which are summarised in Table 1). Ashraf (2009) elicits the causal effects of spousal observability and communication on financial choices by married couples in the Philippines using a modified VCM. Mani (2011) studies the relative importance of factors that influence the efficiency of household investment decisions, focusing on the control over household income and information asymmetry between spouses in Andhra Pradesh, India. Munro et al. (2014) also carry out an experimental study in India that falls within the domain of household decisions. The study by Munro et al. (2014) which employs a variant of the VCM, focuses on couples from two distinct regions in its examination of the impact of the regional contrast in female autonomy with regard to the efficiency of family decision-making. In another case, Cochard et al. (2016) employ a Prisoner's dilemma game within real couples and compare these spouses to strangers in an analysis of the cooperation between spouses in France. The experimental study focuses on testing for cooperation and sharing of income by men and women. Furthermore, the study by Lopez et al. (2015) on married couples from the low income area of Bogota in Colombia applies a repeated VCM to assess the couples' common failure to attain the optimal cooperative solution. Each of the spouses in Lopez et al.'s (2015) experiment also participates in an identical game with a stranger as a way of comparing intra-household versus inter-household cooperation.

There also exist some studies on cooperation within couples in Africa. Iversen et al. (2011) apply some variants of public goods games in rural Uganda in their testing for household

efficiency in relation to control over the allocation of pooled resources, the assortative matching of the couple, and other socio-economic correlates. Munro et al. (2011) play two variants of a VCM which privatise endowments but publicise contributions in their study on polygynous and monogamous households in Northern Nigeria. There are also treatments, in the same study (Munro et al., 2011), regarding equal sharing of proceeds versus husbands allocating proceeds. In another case, Kebede et al. (2014) use couples in Ethiopia to test the assumption of efficiency that is a common feature of many intra-household models. The most common result, which has a bearing on the current study's main focus of intra-household cooperation, is that couples fail to make choices that maximise the surplus of the household in all these studies on intra-household decision-making by couples.

Experimental studies that focus specifically on cooperation within extended, inter-generational families are limited. Precursors to the current experiment, in terms of the study of non-spousal experiments, include the works by Peters et al. (2004), Bauer, Chytilová and Pertold-Gebicka (2014), Jakiela and Ozier (2015), Porter and Adams (2015), and Molina et al. (2016). A summary of the other key experimental studies on cooperation is found in Table 1. Furthermore, a number of non-spousal experiments are discussed briefly below.

Peters et al. (2004) bring family groups consisting of parents and children into a laboratory to participate in a public goods experiment in Ithaca City in the United States of America (USA). The experiment involves two generations and addresses issues on whether parents free-ride less than children and whether parents (children) free-ride less when the group consists of family members than when the group consist of non-family members. The study supports the hypothesis of greater altruism among family members, yet without surplus maximisation.

Bauer et al.'s (2014) study in Prague (Czech Republic), does not entail the inter-generational play of the cooperation game. Instead, minors aged 4-12 years played a simple binary-choice dictator game and were then classified as other-regarding or not. Parents' characteristics are then used as explanatory variables of the minors' behaviour. Thus, Bauer et al. (2014) confirm the important role of socialisation in the formation of other-regarding preferences within two subsequent generations.

The experiment carried out by Jakiela and Ozier (2015) in the Western province of Kenya involves a mixture of friends, relatives and strangers. The experiment is designed to measure social pressure in sharing income with relatives and neighbours, and so has some extended

family dimensions. The results show that women, in particular, adopt an investment strategy that reduces earnings as a trade-off for concealment of the size of their initial endowment.

Furthermore, Porter and Adams' (2015) modified dictator game with subjects from Oxford in the United Kingdom (UK) focuses on child-to-parent transfers to establish whether giving to parents is for love or for reward. This two-generation experiment uncovers heterogeneity in the preferences for giving to parents. It also shows that children exhibit a greater propensity to give when parents, rather than strangers are recipients of transfers.

[Table 1 about here]

There is only one experiment that plays a VCM with three-generation subjects in the study of household cooperation (Molina et al., 2016). Molina et al. (2016) recruit subjects online to play on a web-based experimental platform. Ultimately, the focus by Molina et al. (2016) on the influence of kinship on cooperation among three generations of the same family (youth, parents and grandparents) in Zaragoza (Spain), establishes that kinship influences positively on contributions to the common good.

Communication is employed as a key treatment in the experiment conducted in the current study. A handful of laboratory experiments have indeed studied various forms of communication using the VCM game (Oprea, Charness & Friedman, 2014). Communication ranges from costless, non-binding and non-verifiable communication ("cheap talk") to specific communication including identification, discussion and commitment (Koukoumelis, Levati & Weisser, 2012a/2012b). As a cooperation-enhancing mechanism, "communication does not lead to inefficiencies in the form of destruction of resources inherent with punishment and does not require intervention or enforcement of a regulatory institution" (Oprea et al., 2014:214). An earlier VCM experiment by Isaac and Walker (1988) found active communication to improve group optimality significantly.

Bochet, Page and Putterman (2006) employ communication in various forms, such as face-to-face, verbal but excluding facial expressions, and numerical, as an incentive for cooperation in the laboratory. The study used inexperienced undergraduate students and found that face-to-face communication has strong positive effects on cooperation. Another laboratory experiment with students focuses on how one-way communication in VCM games with heterogeneously endowed players influence contributions (Koukoumelis et al., 2012a), specifically 'one-way communication', a free form text message, is sent by one group

member to her/his co-players before the contribution decision is made. Koukoulis et al., (2012a) report that ‘one-way communication’ increases cooperation, with the leader directing the co-players to the highest pay-offs attainable. Despite ‘one-way communication’ not having a mutual exchange of promises, Koukoulis et al. (2012b) report that the strength of ‘one-way communication’ is in its ability to raise contributions substantially and decrease variation in contributions.

Cason and Khan (1999) adopt two treatments, which are face-to-face verbal communication, and imperfect monitoring, in a laboratory VCM where university student subjects learnt about others’ public contributions every six periods. Cason and Khan’s (1999) results provide evidence of a strong influence of face-to-face communication as compared to imperfect monitoring on cooperation. Specifically, improved contribution monitoring was found not to increase contributions without verbal communication and yet verbal communication without imperfect monitoring did improve efficiency in the provision of public goods. Kumakawa (2013) uses ex-post communication, which is similar to imperfect monitoring, in an experiment where subjects evaluate their co-players’ contributions in the first stage and are given the opportunity to send a free-form written message to their co-player in the second stage. The results suggest that the mere opportunity for ex-post communication does not influence cooperation, but rather it is negative messages that increase the contribution by the co-player.

Oprea et al. (2014) conduct a public goods game in the laboratory in order to study the influence of continuous time strategic interaction and communication on cooperation. The authors found out that communication removes coordination problems and eliminate contribution decay over time. Partial communication, measured by “whether the communication network was connected” and allowing for fast sharing of information by all or a few co-players, was used as treatment in the laboratory VCM by Kinukawa, Saijo and Une (2000). Improved communication, in which all subjects can communicate face-to-face with each other and therefore form a connected communication network, as opposed to partial communication where each subject communicate face-to-face with only one other subject and therefore resulting in no connected communication network, raised the mean investment significantly.

Exploring the effects of external regulatory control of local environmental quality (Cardenas, Stranlund & Willis, 2000) and assessing how the levels of wealth and inequality affect self-

governed solutions to commons dilemmas (Cardenas, 2003), the authors employ a series of experiments in three villages in rural Columbia. The subjects in these two papers are actual commons users from households that depend on local forests (the commons). Face-to-face communication is one of the key treatments in these experiments. Both Cardenas et al. (2000) and Cardenas (2003) find that communication groups made more efficient choices with regard to the exploitation of the common-pool resources as compared to groups with no face-to-face communication, confirming that communication enhances cooperation.

Another small group of laboratory experiments used student subjects to explore the effect of inter-generational advice on cooperation. Here, Chaudhuri, Graziano and Maitra (2006) find that, “common knowledge of advice generates a process of social learning that leads to higher contributions and less free-riding”. In addition, Hillis and Lubell (2015) report that cooperative intergenerational advice has a positive impact on contributions by subsequent generations.

Against this background, the current experiment is motivated by the paucity of literature that focuses on cooperation in inter-generational family settings, while appreciating the full role of diversity in family relations (not just spouses) in household economic decisions. The experiment is also motivated by the intention to conduct further research on communication and cooperation in, most importantly, the real life extended families. In addition, the observation by Munro (2015) that “out of the incentivised intra-household experiments conducted in over twenty different countries, evidence of joint pay-off maximisation within households are thin on the ground” (pp. 35) motivates the current experimental study.

#### **4. Recruitment strategy**

The experimental subjects are from two poor South African communities. One community from the Free State Province, is represented by urban informal townships in Bloemfontein, while the other community from the Eastern Cape Province, is represented by rural villages around Alice. In total, 100 households (50 in urban Bloemfontein and 50 in rural Alice) participated in the experiment. A three-person group of subjects was recruited for each inter-generational extended family. The households were eligible to participate after meeting the expectations that: the household must have three or more people of age sixteen or older residing in the household; in the group of three, there must be a person responsible for

household finances; additional subjects have to be the parent/grandparent or child/grandchild of the person who would be responsible for household finances. A household in which only other relations, such as an uncle or aunt, were available to fulfil the inter-generational requirement was considered eligible for the experiment. In addition, priority was given to household members who were employed or recipients of social grant(s) in the participating households. Hence, the focus is on inter-generational cooperation within an extended family.

Following the guidelines above, a purposive sampling strategy was followed to recruit the subjects. The experimenters went from door-to-door and established the eligibility of the particular household, based on whether the inter-generational criterion holds. The experiment would proceed as and when experimenters go from door-to-door, especially with all the potential subjects available. Appointments were made in a situation where some members were not present at that time and the experimenters visited the household at a later time. The experiment took place in the selected household's yard, provided all the eligible participants were present and agreed to participate.

Visiting families at their own homes, though not common for obvious financial and time constraints, is not new. Carlsson et al. (2012) visit households for an inter-temporal choice household experiment study on spouses in China. Abdellaoui, L'Haridon and Paraschiv (2013) also visit couples in Paris, France to examine couples' time preferences experimentally. The advantages of such an approach include allowing subjects to participate in the game in the comfort of their homes and increasing the response rate as subjects do not have to travel to a selected venue. There is no artificiality introduced such as requesting participants to assemble in a hall or asking them to travel to a (computer) laboratory. Finally, the process allows actual observation of the subjects included in the experiment when visited at their places. Only those households that meet the set criteria, and as confirmed by the experimenters, are interviewed.

## **5. Experimental design and procedure**

A framed field experiment (Harrison & List, 2004) adopting the VCM game is employed to investigate cooperation and free-riding within extended families. This section discusses the design of the experimental task and the experimental procedure followed in the study.

## 5.1 Experimental task

Similar to other studies on cooperation, the current experimental task is a repeated VCM. The task has nine rounds and information on endowments is public in the sense that subjects know each other's initial endowments in each round. For each round, subjects are given initial endowments in real money in form of South African R5 coins. Two modifications are applied to the task. One modification is meant at varying the subjects' endowments while the other introduces two public accounts. The two possible endowments for each subject are R50 (ten R5 coins) and R100 (twenty R5 coins). For each round, subjects have to simultaneously make a decision on how much to keep (private account) and how much to put in each of the two public accounts. Subjects are thus presented with three cups of different colours representing "accounts" in the public goods game language. The white, green and red cups are respectively for "Self – money that the subject decides to keep", "You & Name 1 – pool that the subject shares with name 1" (generation X) and "You and Name 2 – pool that the subject shares with name 2" (generation Y) and labelled as such. The three accounts in this VCM are necessary to measure the inter-generational cooperation within the households between subjects from specific generations.

The subject is then asked to decide on the amount s/he would either keep for herself/himself and the amount s/he would contribute to the joint account with Name 1, the amount s/he would contribute to the joint account with Name 2 (see annexure A2 for the experimental script) and place the coins in the respective cups. Instructions are read aloud to the subject by the experimenter and the procedures are first demonstrated. The contribution earns interest as a way of making the contribution to the joint accounts socially efficient. In this game, members of the household face a disagreement between individual incentives to contribute nothing to any of the joint accounts, thereby presenting free-riding versus the socially optimal outcome that would maximise group earnings by placing all the money in the joint accounts (Peters et al., 2004; Cardenas & Carpenter, 2008). Self-interested family members are hypothesised to free-ride while other-regarding family members would cooperate.

Playing many rounds is important for two reasons. *First*, repeating the rounds removes the aspect of error or confusion as the possible explanation for the observed cooperation or free-riding in the game as that brings in the learning process (Andreoni, 1995). *Second*, as Munro (2015) alludes, families are not merely laboratory-born groups but enduring groups which are involved in repetitive real life decision-making processes. In addition, family decisions are

not just single or once-off events but game-like, with a history and a future. A repeated game structure in this way mimics real life in intra-household decision-making. The schematic structure of the game-play is depicted in Figure 1.

[Figure 1 about here]

The subject has a single endowment while playing two relatives. The decision on MPCR and sharing of the pooled amount is guided by the linear VCM environment presented as follows:

Say the three subjects are  $i = c, p, g$  where  $c = \text{child}$ ,  $p = \text{parent}$ ,  $g = \text{grandparent}$ .

The payoff for the child in the game is determined as follows:

$$\pi^c = (E_c - C_{c,p}^c - C_{c,g}^c) + \lambda(C_{c,p}^c + C_{p,c}^p) + \lambda(C_{c,g}^c + C_{g,c}^g) \dots\dots\dots(i)$$

The payoff for the parent is:

$$\pi^p = (E_p - C_{p,c}^p - C_{p,g}^p) + \lambda(C_{p,c}^p + C_{c,p}^c) + \lambda(C_{p,g}^p + C_{g,p}^g) \dots\dots(ii)$$

And the payoff for the grandparent is:

$$\pi^g = (E_g - C_{g,c}^g - C_{g,p}^g) + \lambda(C_{g,c}^g + C_{c,g}^c) + \lambda(C_{g,p}^g + C_{p,g}^p) \dots\dots(iii)$$

Where  $\pi^i$  = is the payoff for subject  $i$ .

$E_i$  = initial endowment for subject  $i$  in a given round of the game.

$C_{i,j}^i$  = represent individual  $i$ 's contribution to the pool that s/he shares with  $j$ ,  $i \neq j$ .

$\lambda$  = marginal per capita return (MPCR)

$n$  = number of subjects pooling resources, in this case two subjects for each account.

The decision on the value of  $\lambda$  is guided by the following:

If  $\lambda < 1$ , then each  $i$  has a dominant strategy of  $C_{i,j}^i = 0$ ;

if  $\lambda > 1/n$ , then the aggregate payoff is maximised if  $C_{i,j}^i = E_i$ , for every  $i$ .

When  $(1/n) < \lambda < 1$ , then there is a tension between private and public interest and that is the basis of the standard commons dilemma. For each pair ( $n = 2$ ),  $\lambda = 0.75$ .

As indicated in equations (i)-(iii) above, the set-up of the game places a subject simultaneously into two groups with three choices to make. A similar set-up is employed by Falk et al. (2013), although this is not in an extended inter-generational family situation. Molina et al.'s (2016) game structure, has only two accounts, which are 'private' for an individual subject and 'public' for the three subjects of different generations.

In the experimental task, proceeds from the game are shared equally among the two concerned subjects, irrespective of how much the subject contributed and how much they had at the beginning. The equal sharing of the proceeds implies equal per capita payoffs that are socially optimal if everyone contributes all their endowment. If no-one contributes their endowment, then the initial resource distribution that was prevailing at the beginning of the round is preserved. In that case, equal per capita payoffs are not guaranteed as endowments are varied in different rounds and so equality may or may not arise. As is common in VCM games, no information is provided to subjects on the number of rounds except when they play the last round. Subjects are also not provided with feedback between rounds due to impracticality of computing the contributions and rewards for each subject while the game is in progress. The varying endowments ("income heterogeneity") introduced in this study are similar to those in Hofmeyr, Burns and Visser's (2007) experiment with secondary school students.

## **5.2 Experimental procedure**

As is the norm with research involving human subjects, Ethics Committee of the Faculty of Economic and Management Sciences at the University of the Free State granted ethical clearance for this research (UFS-HSD2016/0154). Written informed consent/assent was obtained from each subject. The anonymity of research participants is assured by creating 'personal identity numbers (pid)' to the subjects and 'household identity numbers (hhid)' to households for identification purposes. This ensured that no information can be traced to a specific individual or household.

Another notable component of the experimental procedure involves the translation of the experimental materials, training of the experimenters and piloting of the experimental materials. All the experimental materials (scripts, consent forms, household rosters, and questionnaires) were translated from English to the vernacular languages and back translated from the vernacular languages to English by language experts. The urban Bloemfontein community predominantly speaks Sotho, hence, Sotho speaking experimenters were used. The rural Alice community is Xhosa speaking and likewise, Xhosa speaking experimenters were used. Three days of training was provided to four experimenters (three plus one reserve) in each of the community case studies. The first day was set for the experimenters to study and understand the experimental materials, which were all in vernacular languages. The focus on the second day of training was on the piloting of the experimental materials to gauge the understanding of the subjects. The third day was set mainly for feedback, correction and, where necessary, for the updating of the experimental materials. Finally, the experimenters commenced with field work after the three days of training. The urban Bloemfontein and rural Alice teams spend 15 and 21 days, respectively, in the field, on top of the first three days of training.

The experimenters in urban Bloemfontein, sought permission to do the experiment from the household head. The main financial decision-maker then provided information regarding the relationships that prevail in that particular household. This information enabled the research team to establish the eligibility of the household and to conduct a random selection of subjects in cases where there were multiple three-generational ties (see annexure A1 for the household roster and selection process in case of ties). The experimenters in rural Alice however, first sought permission to visit individual households from the Chief of the relevant villages. The Chief met with the research team together with his village elders and thereafter, permission was granted, paving way for the team to move into the field. Cultural norms and practices were observed at all times. The protocols as well as the processes of selection of households and subjects followed in rural Alice were also similar to those followed in urban Bloemfontein.

The experimenters facilitated the smooth implementation of the experiment in both communities by providing a mobile laboratory toolkit that had portable collapsible tables, foldup chairs and cups. The experiment was purely paper-and-pencil based and subjects could comfortably sit in private while the experiment proceeded. All decisions were made in private.

The execution of the task involved the VCM game adopting two main “treatments”. The first treatment is that of varying the sizes of the endowment that the subjects receive in different rounds. Thus, there are variations in endowments across individuals and across rounds. Table 2 shows the endowments across rounds, with the endowments in Round 9 being exactly the same as those in Round 1. The subjects’ endowments vary for both orders, depending on the VCM round being played. The subject receives more endowments for some rounds, less for some and for others exactly the same as the other subjects. The main reason for introducing this treatment is to ascertain if subjects’ behaviour changes when endowments are different. In addition, different endowment sizes mimic a real life situation. Therefore, one can argue that individuals within the household may receive and have access to different levels of resources at any given point in time. A potential treatment, although it was not adopted in the current study in the interest of time, is to vary endowments only by subjects but not by round so as to determine how a subject’s relative position in the household affects ongoing cooperation.

[Table 2 about here]

Methodological reasons demanded that the rounds in one half of the sample be re-arranged in order to check for any order effects. In Order 2, Rounds 5 – 7 are played immediately after the first round. Rounds 2 – 4 are played afterwards but before Rounds 8 and 9. Orders were played alternately such that fifty percent of the sample (i.e. households and therefore the subjects from that household) played Order 1 and the other fifty percent played Order 2.

The second treatment concerns communication. Subjects from half of the sample are allowed a 5-minute break to come together and discuss anything including the experiment after playing the eighth round (see annexure A2 for the experimental script).<sup>16</sup> This is an important tool to investigate the influence of social learning (Schotter & Sopher, 2003). In addition to social learning, it is thought that communication can facilitate the assumption of common knowledge of Bayesian beliefs, which may hold after communication, as reputation can induce selfish types to cooperate and mimic the altruists (Anderson, Goeree & Holt, 1998; Fehr & Schmidt, 1999; Andreoni & Samuelson, 2006). Household and therefore that household’s subjects, was selected into the communication treatment by playing communication versus no-communication on alternate days. Only in the communication

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<sup>16</sup> The experimental script provided here is for subject 1 – order 1. The scripts for subject 2 and subject 3 read differently following the endowment variations in Table 2. The order 2 scripts differ from order 1 scripts in terms of arrangements of rounds as indicated in Table 2. Copies of these scripts are available on request.

group were subjects allowed to interact during the experiment for the given 5-minute break. Otherwise, no interaction between subjects was allowed (see annexure A2 for the experimental script).

A post-experimental survey was conducted, after all the rounds of the game had been played, with each and every subject who participated in the experiment using a short questionnaire (see annexure A3 for the post-experimental questionnaire). Some key questions in this post-experimental questionnaire focused on gender, age, education level, employment status and marital status of subjects. Information on whether the subject is a decision maker, receives a social grant or is employed, and shares his/her income with family members, was also captured. Another section of the questionnaire uses two 10-item sections from the Family Adaptability and Cohesion Evaluation Scales (FACES IV) to gather information on family communication (FCS) and satisfaction (FSS) (Hamilton & Carr, 2016), and assess the link between family communication and family satisfaction with cooperation within households.<sup>17</sup> Data was also collected on trust in community and family, while a dictator game-like question was used as proxy for altruism. The questionnaire was completed at the end of the experiment to prevent a scenario where reflections on answers would influence game-play, in particular questions on decision-making and sharing of resources. Both the game and post-experimental questionnaire were completed in private and with an individual experimenter/interviewer.

As the experimenters were completing the post-experimental questionnaires with subjects, the team leader captured the information regarding subjects' contributions for each round and calculated the possible pay-offs (in Excel). The subjects were then asked to come together to randomly select the winning round. Nine cards numbered 1 to 9 were shuffled and one of the subjects was asked to pick the winning round. Once that winning round was selected, the subjects went back to their respective stations (tables) to be paid privately as per the selected round. In other words, subjects were paid in real money for actual choices made in a randomly selected round of the game. As alluded to in this section, subjects played the games in private, completed the questionnaires in private and were paid their winnings in private. This approach is thought to have minimised, although not eliminated ex-post conflicts. In addition, experimenters emphasised the privacy of the decisions and responses of the subjects

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<sup>17</sup> The questions relating to FCS and FSS are included in the post-experimental questionnaire in annexure A3.

as articulated in the consent form. However, an undoing of the experimental outcomes by subjects could not be guaranteed as winnings were in cash.

The minimum possible pay-off per subject was R37.50 and the maximum possible pay-off was R250.<sup>18</sup> For practicality of payment purposes, pay-offs were rounded up to the nearest R10. Given that the game and post-experimental questionnaire took approximately 2 hours to complete, the minimum possible pay-off of R40 was a reasonable compensation for a subject's time as it is more than half a day's minimum wage in South Africa. Table 3 presents a summary of actual payments for both communities. The table shows a minimum of R50 per subject for both communities, while urban Bloemfontein reported a higher maximum payment of R150 per subject in comparison to rural Alice's payment of R140 per subject. The average payments per subject are R95 and R90 for urban Bloemfontein and rural Alice, respectively.

[Table 3 about here]

## **6. Thematic analysis and results**

The experimental results for each thematic area are discussed in relation to key themes. The level of cooperation within an extended family is viewed as a function of socio-demographics, inter-generational household structure, socio-economic factors, income heterogeneity, financial decision-making, communication, family circumstances, and other social preferences. *First*, patterns of cooperation are described together with the essence of order effects if any. *Second*, following a three-pronged analytical approach for the main themes, a comparison of the two communities is provided, and this is followed by a bivariate analysis of cooperation across each factor and a multivariate regression analysis establishing whether the specific thematic factor(s) predict cooperation.

A Random Effect (RE) model is employed in the empirical strategy because the nine rounds played by each subject provide the necessary time component needed to estimate a panel data model. The regression function is specified as:

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<sup>18</sup> The minimum figure could only materialise for a subject in a situation where that particular subject started with an endowment of R50 in the round selected for payment, and had placed the whole amount in the public accounts and yet s/he would be playing with fully free-riders. Likewise, a pay-off of R250 could only be achieved if the round selected for payment has initial endowments of R100, with the subject concerned being a fully free-rider and having had both of his/her partners fully cooperative.

$$PC_{ik} = \alpha + \beta_1 \text{ThematicFactor} + \phi X_i + \varepsilon_{ik} \dots\dots\dots(iv)$$

,where  $PC_{ik}$  is the percentage contribution by subject “i” to a specific recipient in Round “k”, and  $\alpha$  represents the constant. The outcome variable in cases that are not specific to sender-recipient pairings is the percentage contribution to the common pool by subject “i” in Round “k”.  $PC_{ik}$  in this case was obtained by summing up each subject’s contributions to the green and red cups (public accounts) and dividing the figure by the specific endowment in that round. The cases that are specific to sender-recipient pairings have  $PC_{ik}$  representing the percentage contribution to the specific cup (public account). The “*ThematicFactor*” corresponds to the determinants of cooperation represented by each of the above themes. The vector  $X_i$  represent control variables (order, round, and socio-demographics: age, gender, and education level). The component  $\varepsilon_{ik}$  represents the random variable (error term) that captures the unmeasured (and unmeasurable) factors that may influence the percentage contribution. As always, it is assumed that  $\varepsilon_{ik} \sim N(0, \sigma^2)$ . Each set of potentially relevant explanatory variables is first analysed separately from the others to establish the relevance of specific factors, using a more parsimonious model specification. Ultimately, all significant factors are examined in a single joint regression function in the aggregated analysis in section 7, this is to assess the robustness of the findings reported in the thematic analysis.

Specifically, the current study, based on the literature, suggests the following hypotheses:

*Hypothesis 1:* contributions decline over time.

*Hypothesis 2:* females are more cooperative than males.

*Hypothesis 3:* the younger generation is expected to be more cooperative in the game, giving more to their elders, while the elders as decision-makers keep more to themselves for family spending.

*Hypothesis 4:* cooperation is higher where social ties are more pronounced and decline with increased social distance.

*Hypothesis 5:* cooperation is positively associated with endowment size

*Hypothesis 6:* communication is expected to boost cooperation.

*Hypothesis 7:* subjects reporting finance pooling are more cooperative

*Hypothesis 8:* cooperation is greater where family trust is greater

*Hypothesis 9:* cooperation increases with altruism

*Hypothesis 10:* cooperation is greater where public trust is higher.

## **6.1 Cooperation**

Each bar in Figure 2 shows the average percentage contribution in a given round for the total sample. The figure shows that the average cooperation across the rounds of the game ranges from 45.8% (Round 8) to 55.2% (Round 1). Cooperation, therefore, is limited. There is a slight downward trend in cooperation as the rounds progress. Subjects tend to give more in the early rounds of the game and less in later rounds, i.e. contributions as expected decay over repeated rounds. Yet, there is no evidence of a drastic end-game effect.

[Figure 2 about here]

Figure 3 shows the contribution level at approximately 50% of the endowment across the rounds for the two sub-samples. This result corresponds with the literature and suggests that cooperation is limited. For instance, Chaudhuri (2011) states that VCM participants contribute an average 40% to 60% of their endowment and that contributions tend to decline steadily when players interact repeatedly over a number of rounds. Except for Round 7, contributions in rural Alice are generally lower than in urban Bloemfontein. The downward trend in contributions as one approaches the end of the game is a common feature in both communities. This, Figure 3 resonates well with the results obtained by Munro et al. (2014) in their study on autonomy and efficiency in couples, in which they report that investment rates are generally higher in urban locations than in rural areas. The differences in the current study are statistically significant for Rounds 2 and 6 only. The cooperation levels reflect a failure of total surplus maximisation by South African families. There is clear evidence, moreover, of limited cooperation. Nevertheless, the data clearly show a level of cooperation that merit attention.

[Figure 3 about here]

In order to assess the Round effects, the categorical variable “Round” was substituted in equation “iv” taking the position of “thematic factor”. Table 4 shows the results for each community as well as for the total sample. The general trend in the results is that contributions decay as subjects proceed with playing the rounds. A consideration of Round 1

as the baseline indicates that the urban Bloemfontein sample's decay is significant from Round 6 onwards. Rural Alice, however, shows the significance of decay for all the rounds, except Round 5 and 7. Controlling for community in the aggregated data shows that contribution decay is significant at 5% for Rounds 2–4 and significant at the 1% level for Rounds 6–9. Only Round 5 fails to achieve statistical significance, although the sign remains negative. VCM games in real-life extended family settings, therefore, support contribution decay, an outcome similar to findings from studies on couples and strangers (Fehr & Gächter, 2000; Croson, 2007; Oprea et al., 2014). When Round effects are adjusted for, the community dummy is statistically insignificant, thus reflecting that cooperation does not differ along community lines.

[Table 4 about here]

**Result 1a:** *Average contributions are limited and vary between 45-57%.*

**Result 1b:** *Contributions decay over rounds in both urban Bloemfontein and rural Alice.*

## **6.2 Design: order**

As indicated in Table 2, the experimental rounds are re-arranged for one half of the sample. The summary tables for the variables of interest, which are compared by order, show a strong balance between the two orders [see Tables B1-B3]. Only the differences between the median values of employment income in urban Bloemfontein, sharing of employment income, and mean and median household size in rural Alice show no balance with differences that are statistically significant, though at only a 10% level. There is also balance on sender-recipient relationship by order in urban Bloemfontein, rural Alice and in the total sample [see Tables B4-B6]. Some order imbalances were reported for the sender-recipient gender pairings in urban Bloemfontein but not in rural Alice [see Tables B7-B8]. Finally, sender-recipient gender pairings show some imbalances in the total sample [see Table B9].

In the RE model however, where Order is the predictor of cooperation, no Order effects were detected for the total sample and sub-samples when controlling for Round and community effects. Table 5, therefore, suggests that there is no evidence in the data to suggest that cooperation is influenced by the order in which rounds were played. Subjects, it seems, were randomly selected into orders and there are no order effects in the data.

[Table 5 about here]

### 6.3 Socio-demographics

The impact of socio-demographics is important in the study of efficiency in households (Cochard et al., 2016). The analysis focused on the age, gender and education of the subject as well as the number of household members 16 years or older. A comparison of both the median and mean of age shows that urban Bloemfontein has younger subjects compared to rural Alice and the differences are statistically significant (at 1%). Significant differences between the two communities are also noted in relation to education, with rural Alice having subjects that are more educated than those in urban Bloemfontein. *A priori*, higher education levels are expected in the urban community. One possible explanation for the difference could be that the educated in urban Bloemfontein were employed and at work and therefore less likely to participate in the experiment. However, it is evident in rural Alice that unemployment is very high with even the educated found at home, hence, they ended up participating in the experiment. Approximately seven in ten subjects in the sample are female and the households have an average number of four members of age sixteen and above.

[Table 6 about here]

The higher percentage of females in both sub-samples reflects that the female to female sender-recipient pairing is dominant in the experiment, at approximately 50%. This is followed by the female to male (male to female) and the male to male pairing, which comprise only 6%. As Table 7 shows, the differences in the distribution of these sender-recipient gender pairings are significant at the 1% level.

[Table 7 about here]

Whilst significantly higher cooperation by males is the norm for both communities, the subjects in urban Bloemfontein are generally more cooperative than those in rural Alice (Table 8). The results are in contrast to those by Molina et al. (2013), which show a higher cooperation by females.

[Table 8 about here]

Interestingly, Table 9 shows that in urban Bloemfontein, male cooperation is on average higher than that of females, irrespective of the gender of the recipient, whereas for females, cooperation is higher only when the recipient is of the same sex. Such behaviour by females, where they cooperate more with same sex subjects, is in line with Ambler's (2016) study on

South African pensions and household decision-making that involve grandmothers. Ambler (2016) found that female eligibility for the old age pension improves the nutritional indicators for girls but not for boys. Nonetheless, cooperation between males in rural Alice is relatively lower than that in urban Bloemfontein.

[Table 9 about here]

The RE model reported in Table 10, where the socio-demographic factors constitute the theme, shows that the gender of the sender stands out as the one statistically significant predictor. The negative signs of the coefficients affirm that women are less cooperative than men. Having tertiary rather than no education in urban Bloemfontein is also reported as positively impacting on the cooperation by the subject, but only at the 10% level. The gender differences in the results are similar to those reported by Iversen et al. (2011) and Munro et al. (2014). Iversen et al. (2011) establishes that females contribute less to the household pool than males. Munro et al. (2014), in their couple experiment, find that males invest more and are more generous to their partners, whereas females are more willing to invest in a common pool only when their income is earned through working and when assets are publicly observable. In this experiment, the gender result may very well also be an artefact of the gender composition of the different generations, with younger generations comprising more males and older generations more females, given that younger generations are shown to be more cooperative.

[Table 10 about here]

Iversen et al. (2011) point out, in their reflection on the gender differences on cooperation that, such an outcome may not be taken as a rejection of Sen's (1990) conjecture that females identify more closely than men with household interests. Rather, the results may be associated with the expected norm in developing economies in which males are expected to be providers of resources while females are responsible for the day-to-day chores in the household. In the current study, that norm augurs well with the higher level of financial decision-making among females, reported at 79.2% compared to that of males which stood at 46.5%.

***Result 2: Males are more cooperative than females in both urban Bloemfontein and rural Alice.***

#### 6.4 Inter-generational household structure

The nature of this study underscores the importance of knowing the subjects' inter-generational relations. Table 11 presents the subjects' average age by family relation. As is expected, age differences tally with inter-generational dynamics, with grandchildren in the total sample being the youngest and having an average age of 21 years, while grandparents are the oldest and with an average age of 67 years. The children's average age is 34 years, while the parents' is 60 years. The "other-family" category constitutes all other relations and the average age in this category is 43 years. The subjects in rural Alice are older than those from urban Bloemfontein across all the relations in the household, and the differences are statistically significant at the 1% level, except with the grandchildren's average age, which is statistically different at the 5% level. This can perhaps be attributed to a cohort effect of the old apartheid custom where the economically active retire in the rural homelands.

[Table 11 about here]

According to Tables 12, 13a and 13b, females are mostly parents or grandparents, while males are mostly grandchildren or children.<sup>19</sup> This pattern is prevalent and statistically significant in both sub-samples. Table 13a also shows that the "other-family" percentage is 38.1% (21.5%) for males and 23.1% (14.6%) for females in urban Bloemfontein (rural Alice). Thus, urban Bloemfontein generally has an "other-family" component that is greater than that of rural Alice, which suggests that families are relatively more extended. One possible explanation for the trend is that the "other-family" relatives migrate to cities and join these families in urban areas in search of better economic opportunities.

[Tables 12; 13a and 13b about here]

Both urban Bloemfontein and rural Alice show that the play between parent and child is dominant, followed by the play between grandchildren and grandparents, and lastly the "other-family" (Table 14). However, the "other-family" play, for reasons noted above, is more pronounced in urban Bloemfontein.

[Table 14 about here]

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<sup>19</sup> The central player in the experiment is the main financial decision-maker. However, the parent and grandparent roles are played mostly by females in both communities due to the 'absent fathers' phenomenon in South Africa, on the one hand, and the reality of females being main financial decision-makers, on the other hand (Table 13b).

A disregard of the “other-family” in Table 15, shows that grandchildren generally have greater proclivity for sharing with grandparents, followed by children sharing with parents, then parents with children, and lastly grandparents with grandchildren. The gap between the cooperation shown by children and parents for both urban Bloemfontein and rural Alice is narrower than that between grandparents and grandchildren, particularly in rural Alice. This heterogeneity in inter-generational cooperation is statistically significant at both community-specific analysis and the total sample.

[Table 15 about here]

Molina et al. (2016) report similar results in their experiment, which shows that all the age groups cooperate more when playing with relatives, although this was more evident for the youth and for parents than for grandparents. One may argue, from a comparison of the grandparents’ cooperation with grandchildren and vice versa, that the evolution of social norms is guided by the fact that minors are taught or encouraged to give more to elders, whose responsibilities within the household include decision-making. Elders, however, keep more to themselves as they have to spend for and on behalf of the family. This is not surprising in South Africa and particularly in this sample where grandparents and parents often receive child support grants on behalf of minors. One may argue that the societies in these two communities have created and pass on social conventions that respect guardians and here it is shown by cooperating more with guardians and thereby giving guardians financial responsibilities.

The results in Table 16 from an application of the RE model to test the significance of sender-recipient relationship pairings when controlling for order, round effects and socio-demographics, and where parent-child pairing is the comparison group, show significantly lower cooperation between grandparents and grandchildren for both urban Bloemfontein and rural Alice. The results also reveal a lower cooperation by the “other-family” to the “other-family” for rural Alice. Nonetheless, the rural Alice results attest to a positively and statistically significantly greater cooperation between grandchildren and grandparents, as well as between children and parents than that between parents and children. The sender-recipient relationship pairings for the whole sample are statistically significant and the signs of the coefficients are in tandem with *a priori* expectations of social conventions passed on to younger generations by older generations. Minors are taught to respect and trust their elders and guardians, while the elders keep more to themselves to safeguard the resources and put

them to uses that potentially benefit the whole family. Higher cooperation in grandchildren and children in comparison to that between grandparents and parents, is in contrast to that of Peters et al. (2004), where parents are more altruistic whether playing with their own children or other youngsters. Nonetheless, children in Peters et al. (2004) exhibit higher cooperation when playing with family members, an outcome similar to the current study.

[Table 16 about here]

That the “other-family” to “other-family” player pairing shows a statistically significantly lower cooperation (in rural Alice and the total sample) in comparison to other relations, is no surprise as one would expect lower contribution with less ties and increased social distance.

**Result 3a:** *Proclivity for sharing is highest for grandchildren, followed by children, then parents and then grandparents in both urban Bloemfontein and rural Alice.*

**Result 3b:** *The gap in cooperation is wider between grandparents and grandchildren as compared to parents and children.*

**Result 3c:** *There is lower cooperation with increased social distance in rural Alice.*

## 6.5 Socio-economic circumstances

The socio-economic factors considered in this study include employment status; income from employment; social grant status; grant type; grant income; number of children being supported by the subject; number of employed household members, and the number of grant recipients in the household. The descriptive statistics for each community are reported in Table 17. The unemployment levels in these poor communities are high. Although urban Bloemfontein reported a higher percentage of economically active subjects, more are unemployed (34.2%) than employed (24.1%). Rural Alice, as expected, has a higher percentage of not economically active subjects (67.3) than urban Bloemfontein (41.6%). These differences are significant at the 1% level. On average, 54% of all the subjects receive predominantly old age pensions and child support grants, with rural Alice having a higher percentage of old age pensions and urban Bloemfontein having a higher coverage of child support grants. The difference in grant type between the two communities is significant at the 1% level. As expected, median employment income is higher in urban Bloemfontein than in rural Alice. However, it is evident, with regards to the other socio-economic factors that there are no statistically significant differences between rural Alice and urban Bloemfontein.

[Table 17 about here]

The RE model reveals that socio-economic factors, as in Table 18, do not explain differences in rates of cooperation. These results are perhaps a consequence of the lack of variation in the sample with regard to these socio-economic factors.

[Table 18 about here]

## 6.6 Endowment

A key component of the current experiment is the endowment and its size. Every subject is endowed with some amount of real money at the beginning of every round and so too are the other two players. Table 19 shows the average cooperation by endowment size and draws a distinction between “endowment matching” and “endowment differentials”. Overall, cooperation, surprisingly, is not associated with differences in endowment size. However, the differences in cooperation by endowment are significant at the 1% and 5% levels, in urban Bloemfontein, and at the 10% level in rural Alice. The results from focusing firstly on the “matching” variable, in urban Bloemfontein, exhibit a pattern of highest contribution when the sender has a higher endowment than the receiver (20:10); followed by equal but lower endowments (10:10); when the sender has a lower endowment (10:20), and lastly when the players’ endowments are equal but higher (20:20). The results are different for rural Alice. Here, having a lower endowment (10:20) has the highest contribution; followed by the matching of equal and lower endowment (10:10); equal and higher endowment (20:20), and lastly when the sender has a higher endowment (20:10). The result, however, is only significant at the 10% level.

A clear-cut sign of the effect of the size of the endowment is shown in urban Bloemfontein with the results, as expected, showing that when the sender has a larger endowment, s/he gives more compared to a situation of equal endowment. The equal endowment situation in turn shows higher cooperation compared to the condition when the sender has a smaller endowment. The pattern that can be discerned in rural Alice for both of these endowment variables, though not clear, is more cooperation by the less endowed than those with higher endowments.

[Table 19 about here]

The results in Table 20 are obtained when RE models are used to assess how endowment size influences cooperation. The urban Bloemfontein results correspond with *a priori* expectations in almost all cases. The coefficients for the sender's endowment and recipient's endowment carry the expected signs and are statistically significant ( $p < 0.01$ ). As the sender's endowment increases, cooperation increases, but when the recipient's endowment increases, cooperation by the sender falls. Compared to an equal endowment (comparison group), lower endowment holders show significantly lower cooperation. The same behaviour, i.e. lower endowments translating into lower cooperation, is confirmed with the 'sender-recipient endowment pairing' variable. The sender with a lower endowment than the recipient exhibits less cooperation.

The above results from urban Bloemfontein clearly illustrate the endowment size effect. The subjects' cooperation varies in accordance to differences between their own and their partner's endowment. The endowment size effect plays out in a situation where individuals with less (more) give less (more) to those with more (less) (Fehr & Schmidt, 1999). This outcome supports arguments regarding aversion to unfairness or inequality. According to Fehr and Schmidt (1999), when subjects with more give more, then there is some evidence of an inequality effect or more specifically, an aversion to unfairness or inequality. Fehr and Schmidt (1999) also explain that subjects may be "inequity averse", i.e. they experience "guilt" if they receive a payoff that is higher than others (advantageous inequity), while they experience "envy" if they receive payoffs that are lower (disadvantageous inequity). In general, the results for urban Bloemfontein are at variance with Hofmeyr et al. (2007) who found that differences in endowment size do not matter among secondary school children.

It is observed that when the recipient's endowment increases in rural Alice, the sender's cooperation in turn increases. Having a larger endowment results in less cooperation compared to equal endowments and this is significant at the 1% level. Senders with higher endowments exhibit less cooperation when compared with "equal endowments at a lower value". A possible explanation could be that the lower endowed actually cooperate more hoping and expecting cooperation from the highly endowed, which will result in raising the surplus for all. The highly endowed could however, be finding it difficult to let go of more as their endowment affords them substantial earnings.

[Table 20 about here]

**Result 4:** *The endowment size effect is observed in urban Bloemfontein, but not in rural Alice. There is evidence of inequity aversion among urban Bloemfontein subjects only.*

## **6.7 Financial decision-making**

Table 21 provides an overview of financial decision-making and sharing of income and money, with a comparison being drawn between urban Bloemfontein and rural Alice. The nature of decision-making dynamics is very different in urban Bloemfontein and rural Alice. The percentage of main decision-makers in the sub-samples is approximately the same (33%). Rural Alice reported a higher percentage of joint decision-makers (43.6%), while urban Bloemfontein has a higher percentage of non-decision makers (37.3%). The differences between the two sub-samples are significant at the 1% level. The other variable exhibiting a 1% level of significance is the “grant income share”, with urban Bloemfontein reporting a higher percentage of sharing of grant income, possibly due to the larger share of child support grants. “Money sharing” exhibits no discernible pattern. Finance pooling in urban Bloemfontein shows that more than 90% of the subjects are of the view that there is pooling of all or some of the household finances, whereas approximately 60% of rural Alice contemplate that there is pooling of all or some of the finances within their households. For the small percentage of subjects who are employed, all urban Bloemfontein subjects reported sharing that money, while in rural Alice, 84% reported on sharing their employment income, the difference being significant at the 5% level. All in all, there is a significantly greater degree of sharing of resources in urban Bloemfontein than in rural Alice.

[Table 21 about here]

A consideration of the cooperation and decision-making responsibility shows that the main decision-makers in urban Bloemfontein (Table 22) reported the highest average cooperation followed by non-decision-makers and finally the joint decision-makers. Non-decision-makers in rural Alice, as expected, reported the highest cooperation, followed by main decision-makers and lastly joint decision-makers. These differences in each community are respectively significant at the 10% and 1% level. The reports regarding “money sharing”, although varied in both communities, indicate that affirmative sharing (everything, most, some) shows more cooperation than those that reported little or no sharing at all. The differences are significant at the 1% level. Although the differences in cooperation between subjects who reported pooling all, some or none of the finances are significant at the 1% level in both communities. Hence, the results conflict with the *a priori* expectation of a positive

correlation between cooperation and income pooling, for those that reported no pooling are more cooperative than those that reported some pooling.

[Table 22 about here]

When the financial decision-making and sharing variables are entered into the RE model as explanatory variables (Table 23), the results show that being a financial decision-maker in urban Bloemfontein raises the cooperation of the sender, possibly being a sign of leading by example (Potters, Sefton & Vesterlund, 2007). However, statistically speaking, the result is weak ( $p < 0.10$ ). In rural Alice, the data suggests the opposite, as it shows that a subject who is a financial decision-maker shows less cooperation. The financial decision-maker could be keeping more to herself/himself as s/he has the responsibility to make decisions on expenditures. So, *a priori*, it is expected of the decision-maker to keep more to herself/himself. However, the subject's cooperativeness, as expected, increases when the subject is playing with the financial decision-maker in rural Alice. With regard to finance pooling, only in rural Alice, where those that perceived pooling of all rather than no finance pooling, is cooperation greater and with a difference that is significant at the 5% level. "Money sharing" by senders is in line with *a priori* expectations for urban Bloemfontein, i.e. those who reported sharing more are more cooperative.

[Table 23 about here]

**Result 5a:** *In rural Alice, more is kept by financial decision-makers and more given to financial decision-makers. In urban Bloemfontein, financial decision-makers are cooperative and give more than non-decision-makers.*

**Result 5b:** *Subjects in rural Alice are more cooperative when the household's financial resources are pooled.*

**Result 5c:** *In urban Bloemfontein, subjects who share more of their money with the household are more cooperative.*

## 6.8 Communication

The requirement in studies of an experimental nature is that balance be achieved between the treatment and control groups and in this study it was achieved completely in urban Bloemfontein [Table B10]. The other variables show balance in rural Alice, save for gender and mean giving in the dictator game where there is minimal bias (i.e. differences are only

significant at the 10% level) [Table B11]. In the combined sample, there is more females than males in the treatment group. The difference, however, is weakly significant ( $p < 0.10$ ) [Table B12]. With regard to the sender-recipient relationship, urban Bloemfontein reported balance as shown in Table 24. However, Tables 25 and 26 show a weak balance in rural Alice and for the total sample ( $p < 0.10$ ). The treatment group include fewer parent-child player pairs and more grandparent-grandchild player pairs than the control group, potentially underestimating cooperation in the treatment group as cooperation between grandchildren and grandparents are lower than between children and parents.

[Tables 24-26 about here]

Tables 27-29 show that there is no balance, in both communities, between the treatment and control group in the sender-recipient gender pairings. Female-to-female pairings are more prevalent in the treatment than in the control group. Correspondingly, the male-to-male pairings and the discordant pairings are more common in the control group. Therefore, the fact that there is no balance with regard to the gender of sender-recipient pairings means that the regression results require special scrutiny.

[Tables 27-29 about here]

A comparison of cooperation observed in the treatment and control groups, drawn between Round 1 and Round 9 of the VCM game, was made to investigate the communication effect. The two rounds (Rounds 1 and 9) are used for comparison because the three subjects have the same endowment (R50 or ten R5 coins). In addition, Round 9 follows on the communication treatment.

The total sample (Figure 4), as is expected on *a priori* grounds, has no difference between the treatment and control groups in Round 1. The average cooperation and the 95% confidence intervals for both groups are almost identical. The test for equality of means show no significant differences. There is balance, therefore, between the communication and no-communication groups.

A comparison of cooperation in Round 1 and Round 9 in the treatment group shows a sign of marginal contribution decay. The test for differences between the means gives a p-value of 0.025. The control group shows a much more marked and significant decline in contributions between rounds 1 and 9. The test for equality between the two means report a 1% level of significance. The presence of a communication effect is supported by the comparison

between the treatment and control groups in Round 9. The average contribution for the treatment group is greater than that of the control group and the difference between the two is significant at the 1% level. Therefore, an examination of the total sample shows that communication reduces contribution decay, as found by Oprea et al. (2014), and promotes sustained cooperation.

[Figure 4 about here]

An analysis of the treatment effect by community illustrates that only the results for urban Bloemfontein mirror those of the total sample. The baseline balance is reflected in Figure 5 through the levels of average cooperation and their confidence intervals in Round 1. The test for differences show a p-value of 0.180. The comparison of the treatment group (Round 1 vs Round 9), reflects a considerable overlap of confidence intervals. Average cooperation is similar ( $p = 0.299$ ). In this regard, as reported by Oprea et al. (2014), communication again reduces contribution decay. A different scenario is witnessed with the control group, where contribution decay by Round 9 is significant ( $p < 0.01$ ). A comparison of the treatment and control groups in Round 9 provides support for a treatment effect. The difference between the two groups is substantial and the control group exhibits a very low level of cooperation. The test for equality of means between the treatment and control groups is thus, statistically significant ( $p < 0.01$ ).

[Figure 5 about here]

Figure 6 draws the same comparison for rural Alice. The figure confirms that there is balance in Round 1 between the treatment and control groups ( $p = 0.184$ ). The confidence intervals clearly overlap. However, cooperation declines within the treatment group (Round 1 vs Round 9). The decline is significant at a p-value of 0.036. The decline is also significant for the control group but at the 1% level. Unlike in urban Bloemfontein, there is no evidence of a treatment effect in rural Alice. The treatment group's average contribution rate and the control group's average contribution rate are not significantly different in Round 9. In other words, contribution decay occurs in both the treatment and control groups.

[Figure 6 about here]

Related to the communication treatment is the FACES IV Family Communication Scale (FCS) that elicits self-reported perceptions of family communication [see annexure A3]. The two outcomes, one continuous and the other categorical, are reported in Table 30. The

difference in the mean communication scale (%) between the two communities is statistically significant. The subjects in rural Alice reported higher levels of family communication than those in urban Bloemfontein. The differences in the median communication scale and communication type are not significant. Generally, both communities reported relatively high levels of perceived family communication.

[Table 30 about here]

The results from entering communication variables into the RE models show that communication is a key driver of cooperation in urban Bloemfontein. These results are as expected. Cooperation increased by 6.1% after the subjects had been given the opportunity to take five minutes to discuss their decisions at the penultimate round of the experiment. Positive perceptions of family communication also had a positive impact on cooperation. The urban Bloemfontein sample also reflects a positive and significant difference between those who perceive that family communication is “moderate” and those that perceive that family communication is “more than moderate” when compared to “less than moderate”. Cooperation in urban Bloemfontein, therefore, is positively associated with communication on all three measures of communication, including the experimental treatment. The results for rural Alice, where family communication was better, however, were not found significant.

[Table 31 about here]

***Result 6a:*** *Communication inhibits contribution decay in urban Bloemfontein.*

***Result 6b:*** *In urban Bloemfontein, family communication enhances cooperation.*

Disaggregated RE regression results are presented in Tables 32-34 in order to explore further how communication, both as an experimental treatment and as a self-reported scale, impact on cooperation among different generations. Table 32 shows that the Family Communication Scale (FCS) in urban Bloemfontein is positively and significantly associated with cooperation across all relationship pairings, the one exception being children and parents. However, the results from rural Alice reveal that communication has a negative and significant association with cooperation, especially for the grandparent and grandchild sender-recipient pairs as well as for the “other-family” pairs. The negative coefficients for communication in rural Alice can be linked with the experimental results from Jakiela and Ozier (2011), which show that women were especially willing to pay to hide endowments and winnings, particularly when relatives were in the same session. The experimenters emphasised the privacy of earnings to

subjects, hence, the experiment in Alice could offer an opportunity to hide resources in an environment where family communication is very high. Chen (2006), Ashraf (2009), and Castilla and Walker (2013) explored and found the possibilities, among spouses, of a Pareto sub-optimal allocation of resources as a result of asymmetric information.

The aggregate results for the different sender-recipient relationships do not paint a clear picture. This is because the results for the two communities are at odds, i.e. communication impacts positively on cooperation in urban Bloemfontein, but negatively in rural Alice.

[Tables 32-34 about here]

A plausible explanation for the urban Bloemfontein result (Table 32; see also Table 15), i.e. communication leading to higher cooperation between parents and children, between grandparents and grandchildren and not vice versa, could be the social ties and closeness that exist between parents and their children, as well as between grandparents and grandchildren. Communication as a proxy of social ties and closeness, in an inter-generational context, works downward rather than upward. Despite children and grandchildren being more cooperative as reflected in Table 15, their cooperation does not depend on communication. Probably the social conventions to trust elders, as explained earlier in the paper, are stronger and by itself explain cooperation by the children and grandchildren. No plausible explanation exists for the rural Alice results (Table 33), except the hiding effect alluded to by Jakiela and Ozier (2011). Hiding is quite likely given that parents and grandparents are predominantly female financial decision-makers, who may keep more money for other useful expenditures and given the privacy of the experimental outcomes.

***Result 6c:*** *Where family communication is more favourable, cooperation by parents and grandparents with children and grandchildren is high, but only in urban Bloemfontein.*

## **6.9 Family circumstances**

The average household has 5 to 6 members, which is relatively large but expected given the inter-generational nature of the households in the study. Forty percent (twelve percent) of the subjects in Alice (Bloemfontein) are married and the difference between the two communities is significant at the 1% level. The mean and median FACES IV Family Satisfaction Scale (FSS) scores in both communities are considerably high [see annexure A3]. Extended families in rural Alice, however, appear more “glued-together” than extended families in urban Bloemfontein, thus reporting higher self-reported levels of family satisfaction. As a

categorical variable, family satisfaction shows the same trend between both communities, i.e. family satisfaction being higher in rural Alice than urban Bloemfontein. The latter difference in family satisfaction between the two communities again is significant at the 1% level.

[Table 35 about here]

A regression analysis of the relation between cooperation and family circumstances, using the Random Effects (RE) model (Table 36), suggests that cooperation is raised by a margin of 9.5% when the sender in urban Bloemfontein and not rural Alice is married, an impact that is significant at the 1% level. The results may be a reflection of increased social ties with marriage. Family satisfaction is, however, not associated with cooperation in either community.

[Table 36 about here]

**Result 7:** *In urban Bloemfontein, marital status impacts positively on cooperation.*

## **6.10 Trust and altruism**

Two questions on trust were posed in the post-experimental questionnaire (see annexure A3). One question, using a 7-point scale, focused on the subjects' perceived trust of the general public. The other question focused on trust within the family, with the four categories collapsed into two, i.e. 'completely' and 'not completely'. The post-experimental questionnaire also posed a question on how much the subject would give to a stranger if they were given R100 by someone. The response to the question was used as a proxy measure of altruism.

The summary of the trust and altruism variables are presented in Table 37. Trust in the family is extremely high. Ninety four percent (94%) of the subjects in urban Bloemfontein reported that they completely trust their fellow family members in comparison to the 78% in rural Alice. The differences between the two communities in median public trust and in family trust are significant ( $p < 0.05$ ). Interestingly, public trust is higher in the rural than urban area, but family trust is lower. Such differences are expected when one considers the striking differences between rural and urban life in the African context. In rural communities, an individual is part of the whole society, with the community to which the individual belongs being able to influence the individual's own being and responsibilities. Thus, public trust is expected to be high in rural communities. The situation is different with urban life, where

close family, i.e. the members of the household, form the base of social and economic activities. Under such circumstances, family trust is expected to be higher.

[Table 37 about here]

Table 38 shows that there is a significant but negative association between cooperation and family trust in rural Alice. The subjects that were more trusting of their family members exhibited lower cooperation. However, the urban Bloemfontein results do not show a significant association between the two outcomes.

[Table 38 about here]

RE regression models were employed (Table 39) in order to gain some sense of the influence of trust and altruism on cooperation. The results show that there is, in urban Bloemfontein, a positive and significant association of public trust and altruism with the level of cooperation as observed in the experiment. The association is significant at the 1% level and the results in line with *a priori* expectations. Although the results show a weak significance ( $p < 0.10$ ) in rural Alice, the link between altruism and cooperation is in line with expectations, i.e. positive. However, the negative and significant public trust result in rural Alice does not fit with *a priori* expectation.

[Table 39 about here]

**Result 8a:** *The association between cooperation and altruism is positive, both in urban Bloemfontein and rural Alice.*

**Result 8b:** *Cooperation is positively associated with public trust in urban Bloemfontein, but negatively so in rural Alice.*

The experiment, therefore, highlights the importance of a wide array of factors in explaining cooperation. These factors vary with each community and, among others, emphasise the relevance of inter-generational relations and communication.

## 7. Aggregate analysis and results

In order to assess the robustness of the above results, three joint regression functions that include all the reported statistically significant explanatory variables in any of the two sub-samples or the pooled sample were estimated (Table 40).

In the case of the urban Bloemfontein sub-sample, the results that confirm the output of the parsimonious thematic analyses include female senders being less cooperative (*Result 2*); grandparent-to-grandchild play reflecting a significant and negative effect on cooperation as compared to the parent-to-child play (baseline) (*Result 3a*), and cooperation declining with lower endowment size (*Result 4*). The joint regression function for the urban Bloemfontein sub-sample also maintained significant results of communication enhancing cooperation (*Result 6a*); higher cooperation among married senders (*Result 7*), and altruism and higher public trust among senders enhancing cooperation (*Result 8a and 8b*).

For the joint regression function for the rural Alice sub-sample, the relation differential ‘other family to other family’ exhibits less cooperation with increased social distance (*Result 3c*) and less cooperation from senders when they have larger endowments as compared to having equal endowments (*Result 4*). In addition, the financial decision-making responsibility of the receiver remained a statistically significant positive driver (*Result 5b*) and the sender’s public trust remained a statistically significant negative driver, of cooperation (*Result 8b*).

Putting the sub-samples together, the results show that being a female sender lowers cooperation (*Result 2*). Relational differentials are confirmed to influence levels of cooperation in that, compared to parent-to-child play, child-to-parent play and grandchild-to-grandparent play have positive coefficients, whereas grandparent-to-grandchild play has a negative coefficient (*Result 3a*). Other confirmed results in the pooled sample include less cooperation by the less endowed (*Result 4*), more cooperation by married senders (*Result 7*), and more cooperation by senders who are more altruistic (*Result 8a*).

## 8. Contribution

The study is novel and contributes to the body of knowledge in this field in a number of ways.

*First*, the study experimentally disentangles the sources of cooperation in an inter-generational setting. Specifically, the study reveals the characteristics of, and drivers of cooperation within a real-world three-generation setting. The study recruits real-world subjects related as grandchildren, children, parents, grandparents or other family, to play a Voluntary Contribution Mechanism (VCM) game. The only comparable research is that of Peters et al. (2004) and Molina et al. (2016). This study, however, is the first one to be conducted in a developing country.

*Second*, the three-generation subjects who were recruited to play the VCM reside at one place and share food from the same pot. Each household's subjects stay together and share resources, not only because it was a pre-condition for selection into the experiment, but also because the experiment was carried out in the subjects' backyard. This is different from Molina et al. (2016) who recruited subjects online for a web-based experiment.

*Third*, the experiment is relatively high in realism. The study employs a "mobile lab-in-the-field" experiment where subjects from one household play at their home. The experimenters moved from one household to another, with their apparatus ready, thus enabling them to play the game if and when they get to a household that presents a three-generational arrangement. The experiment does not use conventional subjects (students) but subjects from a naturally existing setting of households that have three or more generations. Playing at the subjects' home and within a natural setting of extended family eliminates the contamination associated with the artificiality of being away from home and playing in the (computer) laboratory. Relatives in the game are not artificial laboratory relatives but real-life relatives with a social bond.

The *fourth* novelty relates to the type of subjects. The subjects were recruited from two poor urban and rural communities, with each trio of household subjects including a financial decision-maker. The other two subjects, where possible, were selected on the basis of receiving a social grant and/or being employed. In other cases, the other subjects were selected solely based on their relationship with the main financial decision-maker. The inclusion of the financial decision-maker and other resource earners allows the assessment of cooperation levels of financial decision-makers and whether or not, none-financial decision-makers cooperate with financial decision-makers in poor extended families.

The *fifth* novelty of the study relates to the use of real money. In addition to following the convention in Economics experiments where the subjects receive real pay-offs in accordance

with the principle of incentive compatibility (Hertwig & Ortmann, 2001), the experimental subjects used real money and not experimental currency or tokens, during the play.

*Finally*, the study investigates a communication treatment in a VCM beyond the laboratory, the first in the South African context. The results drawn from a study of urban Bloemfontein show that communication as a treatment matters in the field. Such an outcome, is to some extent, a confirmation of results travelling from the lab to the field.

## **9. Limitations**

The study has various limitations. *First*, one may consider that the endowment sizes of R50 and R100 are not incentive compatible. However, giving such an amount to poor South Africans for engaging in an experiment that takes approximately two hours, can be argued as sufficient enough for the subjects to reveal their real preferences. Fifty rand (R50) is more than half a day's minimum wage in South Africa.

Experimenter effects and experimenter demand effects are the *second* potential limitation to the study. The field experiment in each community was conducted by a different team of experimenters, which may, due to inconsistencies in implementation, explain in part the differences observed between communities. Using different experimenters, however, could not be avoided given that the two communities speak two different languages. The nature of the experiment also meant that for every game played by three subjects from each selected household, three experimenters had to read the script to their respective subjects. Thus, the presence of experimenter-subject effects, when the experimenter, knowingly or unknowingly, gives cues to the subjects during task construal (Zizzo, 2010), could not be ruled out. In addition, playing VCM with extended families may have subject-subject effects, especially when the subject's behaviour is guided by how s/he believes her/his relatives expect herself/himself to behave (Zizzo, 2010). The nature of the game and its implementation may, therefore, have compounded the likelihood of experimenter demand effects. The subject-subject effects, however, could in the context of this experiment, be considered a strength rather than a weakness, as it reflects better the reality of inter-generational choices of this nature.

The experiment, in the *third* instance, gave only a general instruction of communication to the treatment group and not what to discuss exactly during the five minutes communication

break [see annexure A2]. Neither did the experimenters observe the kind of communication that took place in order to gather qualitative feedback, this to ensure privacy. That the instruction is not specific enough may have reduced the impact of communication. The treatment effect detected in this study may therefore be underestimated. It also is important to mention that information on average group contributions was not shared with subjects during each round as it confounds the effects of the communication treatment.

The *fourth* limitation to the study pertains to low literacy and especially the low numeracy levels among subjects (see Table 6). As a result, subjects may not have been knowledgeable enough to follow the instructions read out by the experimenters.

A *fifth* possible limitation of the current study is the “time effect”. The reality that the experiment adopted a “mobile lab-in-the-field” approach means that each household played the game at a different time. Households also participated in the experiment on different days, with an average of three households interviewed per day. Playing in the morning may have different effects on subject behaviour than playing in the afternoon. Playing early in the week may also have different effects on subject behaviour compared to playing towards or during the weekend, as may playing in the middle or toward the end of the month. Such variations of time of play and days of play, however, could not be avoided as subjects from each household played the game within the household’s yard. Finally, the other limitation related to the “time effect”, relates to the playing of the game over a period of 2-3 weeks, where the possibility of contamination or spill-over exists as the word about the experiments may have spread in the community and influenced subjects’ responses.

In the *sixth* instance, the experimental results may be influenced by social desirability bias (SDB), which is the tendency of research subjects to give socially desirable responses that are not reflective of their true feelings (Grimm, 2010). SDB may impact on the contributions made by subjects to the public accounts in expectation of what the experimenters and other family members believe they should contribute. More specifically, the degree of cooperation may be overestimated as the subjects may expect the experimenters to anticipate their contributions to be made into the common pool. For example, the responses to the FCS and FSS questions, and those to the “dictator game” question, may also be influenced by SDB, when subjects present a ‘desirable image’ of their families and themselves to the experimenter.

A *seventh* possible limitation of the current study is its inability to bring the ex-post sharing rule that exists in these families to the fore. For instance, if it is the case that the grandchild knows that the parent and the grandparent will share their earnings equally after the fact, the grandchild may be more inclined to cooperate, not because s/he is inherently cooperative, but because s/he is relying on an ex-post sharing rule. In such case, there is a suspicion that participants may be playing a meta-game. Though one could have posed questions on these matters to subjects, the amount of time required to play the game as well as completing the post-experimental questionnaire, precluded the collection of such information in this experiment.

*Finally*, there is a limitation to the generalisation of the current results for three reasons. One reason is that the study focuses only on two poor communities in a large country. The second reason is that the sample size of three hundred subjects from one hundred households may be considered too small a sample to allow generalisation. Financial constraints, however, precluded a bigger sample and inclusion of more communities. The last reason is the presence of potential selection bias, i.e. the fact that the households and their three selected subjects need not be fully representative of households, specifically so of the negotiation processes in larger households. For example, as the experiment was conducted during the day and for the main part during the week, household members who are employed or occupied otherwise during the day or weekend, may be underrepresented.

## **10. Conclusion**

The experiment documented evidence of a lack of surplus maximisation in extended families, an outcome common to VCM studies with couples (Ashraf, 2009; Iversen et al., 2011; Mani, 2011; Munro et al., 2011; Kebede et al., 2014; Munro et al., 2014; Lopez et al., 2015; Cochard et al., 2016). Complete selfishness, however, is also not the dominant outcome as average contributions lie between 45% and 57% of the endowment. Such results are in line with literature on public goods games (Chaudhuri, 2011).

The South African context, in both the urban and the rural setting, suggested the power of an inter-generational transmission of social conventions. Grandchildren and children showed higher appetite for sharing as compared to grandparents and parents. The gap in cooperation increases as inter-generational distance increases both in urban Bloemfontein and rural Alice.

Communication emerged as a key factor. First, by inhibiting contribution decay (Andreoni, 1995; Ledyard, 1995; Fehr & Gächter, 2000; Croson, 2007; Oprea et al., 2014), and second, by raising parents and grandparents' cooperation where family communication is more favourable, especially in urban Bloemfontein. Further research is needed to establish why communication enhanced cooperation in urban Bloemfontein but not in rural Alice. More robust results in this regard may support policies that enhance family communication and cohesion, such as preventative and developmental social work programmes more generally, and in particular training in marriage and parenting skills, as is evidenced from a range of meta-analysis studies (Hawkins et al., 2008; Kaminski et al., 2008; Schrodtt, Witt & Messersmith, 2008; Blanchard et al., 2009;).

An experimental test for income heterogeneity produced interesting results. An endowment size effect was observed in urban Bloemfontein. However, this is not the case in rural Alice. One may argue that, since family trust is higher in the urban than in the rural area, urban subjects accede to inequity aversion (Fehr & Schmidt, 1999). The results imply that the benefits of an economic opportunity (e.g. earning income or receiving a social grant) by one family member may cascade to all family members as the economically empowered family member succumb to the "advantageous inequity" associated with such an economic opportunity to earn income. In contrast, rural Alice does not show inequity aversion. Rather, subjects with higher endowments tend to keep more whereas those with low endowment give more. These results are in line with the role of the financial decision-maker who tends to keep more and is given more. The role played by the financial decision-makers in rural Alice, as household heads and recipients of social grants, point to the fact that there is trust placed in the financial decision-maker. That the financial decision-makers in urban Bloemfontein give more may also not be a misnomer as it may be indicating a game choice where giving is construed as expenditure on others.

The current study provides a basis for further studies. Only one form of communication was adopted, the "discussion" form. A variety of communication forms has so far been applied in the conventional laboratory setting. An improvement in the instruments developed thus far, to allow application of other forms of communication such as imperfect monitoring, identification and commitments in the field, is called for. In addition, there is a need to assess if the communication that was allowed in the current experiment had positive or negative effects (Kumakawa, 2013). What's more, the data does not allow the development of a detailed typology of different family communication strategies, aspects that may play a

significant role in understanding cooperative behaviour within family groups. Further research that focuses on these complexities in extended families is therefore called for.

The results established the importance of social ties for grandparents and parents, social conventions for grandchildren and children, and that financial decision-makers are less cooperative in rural Alice, but more cooperative in urban Bloemfontein. Further studies that allow an in-depth analysis of the association between financial decision-making and trust may shed light on the complexities of intra-household decision-making in the extended family.

Although the current experimental design has the advantage of playing the game at the subjects' backyard, the design does not clearly extricate inter-generational factors from familial effects. Further studies that add a treatment where inter-generational strangers play against each other would allow one to separate out any familial/genetic effect from an inter-generational effect. This can only be possible when different family members are brought to one place and paired accordingly, an artificiality that the current study attempted to avoid.

Socio-economic circumstances were found not to play any role in explaining cooperation within extended families. This may not come as a surprise given that the poor households which were selected by design into the study are very homogenous. Further studies should include middle and higher income households. A replication of the current study, with larger sample sizes and in different communities and possibly different countries provides another avenue for future research. A field experiment that compares subjects' perceptions of other co-players' contributions and the actual contributions made in the game, is relevant in advancing the work presented in this paper.

Another avenue of future research involves the influence on cooperation, of social value orientations (SVO), i.e. "the weights people assign to their own and others' outcomes in situations of interdependence" (Bogaert, Boone & Declerck, 2008; Balliet, Parks & Joireman, 2009). There is a need, therefore, to adopt mechanisms that measure the influence of SVOs into the methodology, as a way of separating the 'prosocials' and the 'proselfs' by personal trait. Such an approach is especially relevant in the field setting, with natural subjects.

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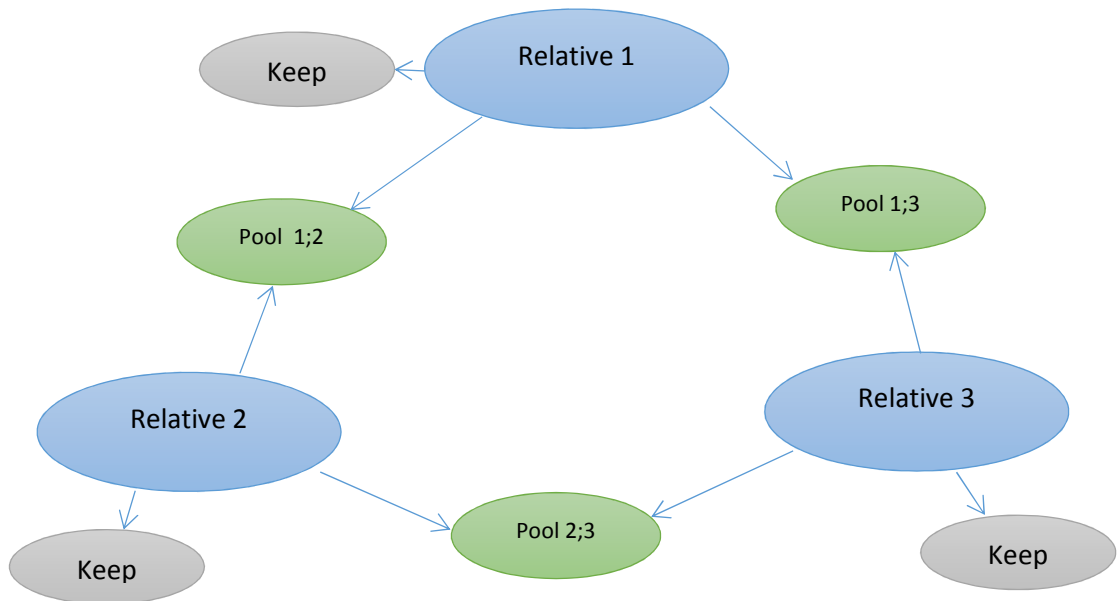
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**Table 1: Summary of key published studies on cooperation**

<b>Author, (year)</b>	<b>Place and Country</b>	<b>Experiment and game type</b>	<b>Subjects &amp; sample sizes</b>	<b>currency</b>	<b>Aims/Objectives</b>	<b>Main findings</b>
Ashraf, (2009)	Mindanao, Philippines	Framed field; Modified VCM varying privacy, communication, negotiations	146 couples	Real money (Pesos)	Eliciting causal effects of spousal observability and communication on financial choices	In line with the model of a contract about financial management of the household; Men more likely to deposit money into their own private accounts in Private or commit it to consumption in Public; Negotiation condition: money turned over to spouse responsible for savings decisions.
Iversen et al., (2011)	Rural areas of Uganda	Framed field; Variants of Public Goods Games/VCM	240 couples	Real money (Ugandan shilling)	Whether total surplus is maximized, location makes difference, household efficiency is independent of the person in control of resources, women contribute more, spouses behave opportunistically	Spouses do not maximize surplus from cooperation; spouses perform better when women are in charge of allocating the common pool; women contribute less to the common pool than men and opportunism is widespread.
Mani (2011)	Andhara Pradesh, India	Modified Public Goods game	300 couples	Real money (Rupees)	Measuring relative importance of key factors that influence efficiency of household investments decisions	For both men and women, their spouse's access to information does not affect efficiency. Partners are willing to sacrifice efficiency for greater personal control over household income. Non-economic factors e.g. identity, have a role in explaining behaviour by partners.

Kebede et al., (2014)	(Rural & urban areas: Ethiopia	Framed field; Variants of VCM: varying initial endowments, power to allocate, information level.	1200 couples	Real money (Birr – Ethiopia)	Examining household efficiency among married couples	Efficiency decisively rejected in all treatments; information improves efficiency in some treatments; doubts on pareto efficiency in household models.
Munro et al., (2014)	North & South of India	Framed field; Modified VCM with treatments mimicking earning endowments, public endowments, responsibility for allocation.	1200 couples	Real money (Rupees)	Examining efficiency of family decision-making	Large-scale and robust evidence of inefficiency and hiding of assets when possible; Men invest more and more generous to their partners; Women into the common pool when their income is earned through working and when assets are publicly observable.
Lopez et al., (2015)	Bogota, Colombia	Repeated VCM	60 couples	Real money (Pesetas)	Examine the salience of family versus outsiders; analyse if cooperation in the family is affected by the nature of opportunities for cooperation outside family	Efficiency is not obtained; when spouses contribute from the same budget, they converge on the strategy that invest everything to household pool and little to stranger pool; Subjects still contribute more to household pool than stranger pool when using separate non-fungible budget.
Cochard et al., (2016)	Toulouse, France	Framed field; Prisoner's dilemma spouses and between strangers	100 couples	Experiment currency converted to Euros	Testing willingness to cooperate and share income men and women	Defection of 1 out 4 participants; lack of preferences for joint income maximization, having children and being married lead to higher defection rates in the social dilemma

**Figure 1: Game Structure**



*Source: Author's schematic presentation of the game*

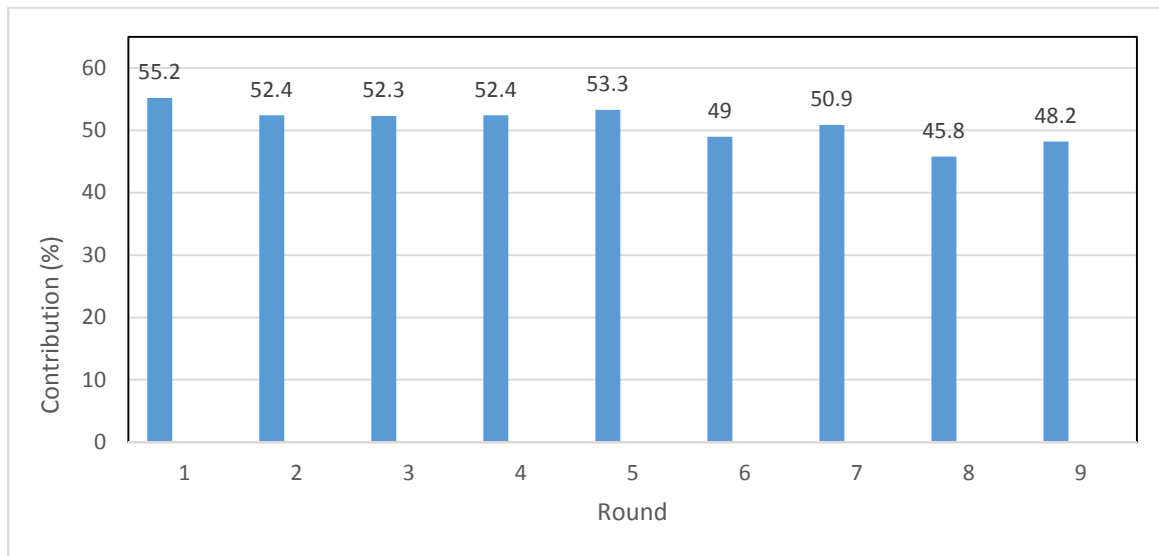
**Table 2: Endowment (Rand), by round and order**

Order 1					Order 2			
Round	Subject 1	Subject 2	Subject 3		Round	Subject 1	Subject 2	Subject 3
1	50	50	50		1	50	50	50
2	100	50	50		5	100	100	50
3	50	100	50		6	100	50	100
4	50	50	100		7	50	100	100
5	100	100	50		2	100	50	50
6	100	50	100		3	50	100	50
7	50	100	100		4	50	50	100
8	100	100	100		8	100	100	100
9	50	50	50		9	50	50	50

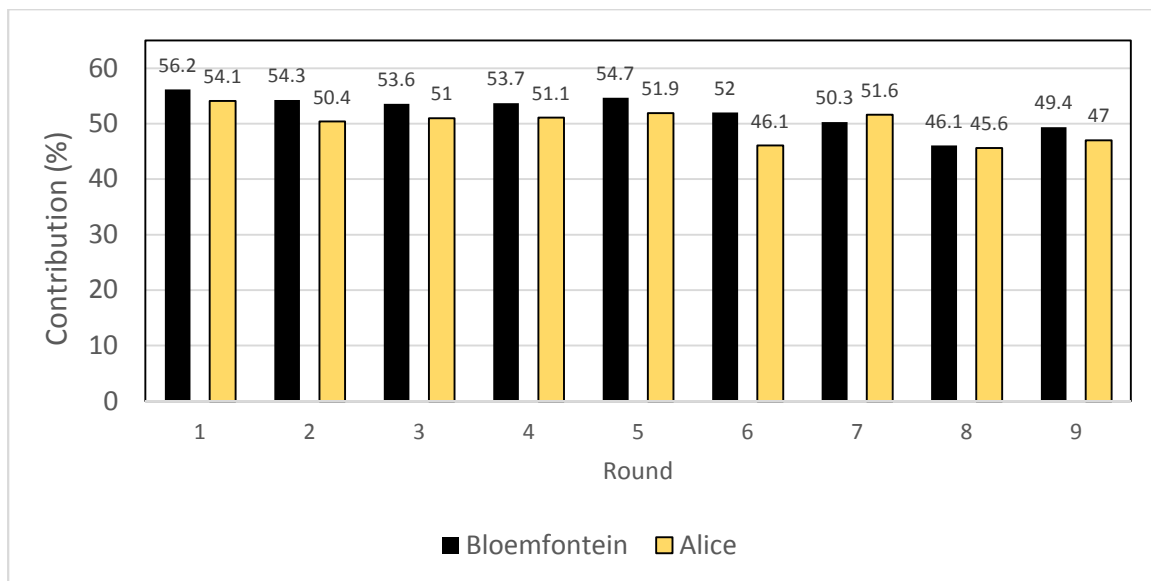
**Table 3: Actual pay-off per subject**

Community	Pay-offs (ZAR)				Sample size (n)
	Mean	Median	Minimum	Maximum	
Bloemfontein	95.06	90	50	150	150
Alice	90.80	80	50	140	150
Total	92.93	90	50	150	300

**Figure 2: Average cooperation by round – total**



**Figure 3: Average cooperation by round and by community**



**Table 4: Round as a predictor of cooperation**

<b>Explanatory variables</b>	<b>Bloemfontein</b>	<b>Alice</b>	<b>Total</b>
Community	-	-	-2.35 (1.12)
Round effect (baseline: round 1)			
Round 2	-1.93 (1.17)	-3.66** (1.97)	-2.80** (2.25)
Round 3	-2.66 (1.38)	-3.06* (1.76)	-2.86** (2.22)
Round 4	-2.53 (1.42)	-3.00* (1.79)	-2.76** (2.27)
Round 5	-1.56 (0.95)	-2.16 (1.35)	-1.86 (1.63)
Round 6	-4.26** (2.37)	-7.96*** (4.49)	-6.11*** (4.81)
Round 7	-5.96*** (3.15)	-2.46 (1.42)	-4.21*** (3.26)
Round 8	-10.16*** (4.28)	-8.46*** (4.29)	-9.31*** (6.06)
Round 9	-6.86*** (3.10)	-7.13*** (4.07)	-7.00*** (4.98)
<i>No. of observations</i>	2,700	2,700	5,400

*Notes:* RE regression results; z-values in parentheses; \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; cooperation is measured as the sum of percentage contributions into the public accounts for each round; community is a dummy variable; 'round' is a categorical variable.

**Table 5: Order as a predictor of cooperation**

	<b>Bloemfontein</b>	<b>Alice</b>	<b>Total</b>
Community	-	-	Yes
Round	Yes	Yes	Yes
Order	2.23 (0.70)	0.66 (0.24)	1.45 (0.69)
<i>No. of observations</i>	2,700	2,700	5,400

*Notes:* RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; cooperation is measured as the subject's sum of percentage contributions into the public accounts for each round; community is a dummy variable; 'round' is a categorical variable; 'order' is a dummy variable representing two different arrangements of rounds as shown in Table 2.

**Table 6: Socio-demographic characteristics**

		Community			Total
		Bloemfontein	Alice	t-value/Chi2	
Age (years)	Mean	39.46	48.16	3.45***	43.81
	Median	35.00	47.00	7.68***	42.5
Gender	female	0.72	0.70	0.25	0.71
Education level	None	6.67	2.67	11.73**	4.67
	Grade 1-7	27.33	29.33		28.33
	Grade 8 - 11	46.00	35.33		40.67
	Grade 12	18.00	24.67		21.33
	Tertiary	2.00	8.00		5.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Household members aged 16 <sup>+</sup>	Mean	4.22	4.42	0.77	4.32
	Median	4.00	4.00	0.17	4.00
<i>Sample (n)</i>		<i>150</i>	<i>150</i>		<i>300</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 7: Sender-recipient gender pairings, by community**

	Community (%)			
	Bloemfontein	Alice	Chi2	Total
Male-male	7.33	4.67	42.94***	6.00
Male-female	20.67	24.67		22.67
Female-male	20.67	24.67		22.67
Female-female	51.33	46.00		48.67
Total	100	100		100
<i>No. of observations</i>	<i>300</i>	<i>300</i>		<i>600</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1;

**Table 8: Cooperation level, by gender**

Gender		Bloemfontein	n	Chi2	Alice	n	Chi2	Total	Chi2
		Male	57.75	42	9.91***	54.41	44	6.37***	56.04
Female	50.13	108	48.05	106		49.10			

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; cooperation level is the average of subjects' sum of percentage contributions into the public accounts for nine rounds.

**Table 9: Average Cooperation, by sender-recipient gender pairings**

Sender-recipient	Community					
	Bloemfontein	F-test	Alice	F-test	Total	F-test
Male-male	29.31	24.11***	23.17	14.71***	26.92	33.05***
Male-female	28.70		27.97		28.30	
Female-male	22.34		23.05		22.73	
Female-female	26.20		24.54		25.42	
Total	26.15		24.95		25.55	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; each pair creates 18 observations as subjects reciprocate and the game has 9 rounds. Frequency of pairs can be calculated from Table 7. Cooperation is measured as the percentage contribution into a specific public account for each round.

**Table 10: Socio-demographic characteristics as predictors of cooperation**

Socio-demographic factors	Bloemfontein	Alice	Total	
Community	-	-	Yes	
Order	Yes	Yes	Yes	
Round	Yes	Yes	Yes	
Age of the sender (years)	-0.07 (1.04)	-0.03 (0.43)	-0.06 (1.18)	
Gender of the sender: female	-6.51** (2.06)	-6.40* (1.90)	-6.41*** (2.88)	
Education level of the sender	baseline: None			
	Grade 1-7	2.32 (0.43)	-11.19 (1.31)	-2.41 (0.52)
	Grade 8 - 11	-0.15 (0.03)	-6.56 (0.73)	-1.67 (0.37)
	Grade 12	2.68 (0.39)	-3.99 (0.40)	1.00 (0.18)
	Tertiary	9.52* (1.92)	0.49 (0.05)	6.42 (1.29)
<i>No. of observations</i>	2,700	2,700	5,400	

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Breusch and Pagan Langrangian multiplier tests are significant at 1%. All models reported here are Chi2 significant at 1%. Cooperation is measured as the sum of percentage contributions into the public accounts for each round; community is a dummy variable; 'round' is a categorical variable.

**Table 11: Average age, by relation**

Relation	Bloemfontein		Alice		t-tests for averages	Total
	Average age (years)	No. of observations	Average age (years)	No. of observations		
Grandchild	20.63	60	21.39	64	2.00**	21.05
Child	31.08	60	36.78	64	7.02***	34.02
Parent	57.55	49	63.92	61	7.09***	60.83
Grandparent	62.08	49	71.86	61	13.82***	67.50
Other family	30.10	82	46.32	50	15.59***	36.25
<i>Total</i>	<i>39.46</i>	<i>300</i>	<i>48.16</i>	<i>300</i>	<i>14.70***</i>	<i>43.81</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 12: Gender, by relation - total**

Relation	Male	Female	Chi2
Grandchild	25.00	15.65	310.07***
Child	24.42	19.16	
Parent	9.88	25.00	
Grandparent	11.05	21.26	
Other family	29.65	18.93	
<i>Total</i>	<i>100.00</i>	<i>100.00</i>	
<i>Sample (n)</i>	<i>86</i>	<i>214</i>	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 13a: Percentage of each relation, by gender and by community**

Relation	Bloemfontein			Alice		
	Male	Female	Chi2	Male	Female	Chi2
Grandchild	21.43	14.35	181.4***	28.41	16.98	136.25***
Child	23.81	18.52		25.00	19.81	
Parent	8.33	24.54		11.36	25.47	
Grandparent	8.33	19.44		13.64	23.11	
Other family	38.10	23.15		21.59	14.62	
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>	<i>100.00</i>	
<i>Sample (n)</i>	<i>42</i>	<i>108</i>		<i>44</i>	<i>106</i>	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 13b: Percentage of each gender, by relation and by community**

Relation	Bloemfontein			Alice		
	Male	Female	Total	Male	Female	Total
Grandchild	36.73	63.27	100.00	40.98	59.02	100.00
Child	33.33	66.67	100.00	34.38	65.63	100.00
Parent	11.67	88.33	100.00	15.63	84.38	100.00
Grandparent	14.29	85.71	100.00	19.67	80.33	100.00
Other family	39.02	60.98	100.00	38.00	62.00	100.00
<b>Chi2</b>	181.40***			136.25***		

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 14: Sender-recipient relationship pairing, by community**

	Community (%)			
	Bloemfontein	Alice	Chi2	Total
Parent-child	20.00	21.33	95.70***	20.67
Child-parent	20.00	21.33		20.67
Grandparent-grandchild	16.33	20.33		18.33
Grandchild-grandparent	16.33	20.33		18.33
Other family	27.33	16.67		22.00
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
<i>No. of observations</i>	<i>300</i>	<i>300</i>		<i>600</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 15: Average cooperation, by sender-recipient relationship**

Sender-recipient relation	Community					
	Bloemfontein	F-test	Alice	Chi2	Total	Chi2
Parent-child	25.47	13.72***	24.19	42.27***	24.81	48.44***
Child-parent	28.07		27.41		27.73	
Grandparent-grandchild	23.78		22.25		22.93	
Grandchild-grandparent	29.29		30.01		29.69	
Other family-other family	24.78		19.92		22.94	
Total	26.15		24.95		25.55	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; cooperation is measured as the percentage contribution into a specific relational public account for each round.

**Table 16: Inter-generational household structure as a predictor of cooperation**

	Bloemfontein	Alice	Total
Community	-	-	Yes
Order	Yes	Yes	Yes
Rounds	Yes	Yes	Yes
Socio-demographics	Yes	Yes	Yes
Relation differential: (parent-child)			
Child-parent	1.98 (0.93)	4.15** (2.13)	2.71** (1.98)
Grandparent-grandchild	-1.71** (2.07)	-2.20* (1.74)	-1.90** (2.49)
Grandchild-grandparent	3.20 (1.50)	7.29*** (3.48)	4.74*** (3.16)
Other family-other family	-1.43 (0.67)	-3.65** (2.05)	-2.42* (1.82)
<i>No. of observations</i>	<i>2,700</i>	<i>2,700</i>	<i>5,400</i>

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Breusch and Pagan Langrangian multiplier tests are significant at 1%. Cooperation is measured as the percentage contribution into a specific relational public account for each round.

**Table 17: Socio-economic circumstances**

		Community			
		Bloemfontein	Alice	t-value/ Chi2	Total
Employment status	Employed	24.16	16.67	21.03***	20.40
	Unemployed	34.23	16.00		25.08
	Not active	41.61	67.33		54.52
	Total	100 (149)	100 (150)		100
Employment income	Mean	3,178 (36)	1981 (25)	0.78	2,687
	Median	1,800 (36)	600 (25)	4.54**	1,200
Grant recipient	Yes	0.53 (149)	0.56 (145)	0.60	0.54
Grant income	Mean	1,230 (79)	1260 (81)	0.24	1,245
	Median	1,400 (79)	1500 (81)	0.08	1,500
Grant type	Old age	40.51	65.00	13.68***	52.83
	Child support	46.84	33.75		40.25
	Other	12.66	1.25		6.92
	Total	100 (79)	100 (81)		100
Children supported	Mean	2.04 (147)	2.18 (150)	0.55	2.11
	Median	2.00 (147)	2.00 (150)	1.42	2.00
Household members employed	Mean	0.80 (50)	0.52 (50)	1.65	0.66
	Median	1.00 (50)	0.00 (50)	0.64	0.00
Household members receiving social grants	Mean	1.74 (50)	1.92 (50)	0.96	1.83
	Median	1.00 (50)	2.00 (50)	0.93	2.00

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; sample size for each characteristic is included in brackets

**Table 18: Socio-economic circumstances as predictors of cooperation**

Regression		Bloemfontein	Alice	Total
1,2	Community	-	-	Yes
	Order	Yes	Yes	Yes
	Rounds	Yes	Yes	Yes
	Socio-demographics	Yes	Yes	Yes
1	Employment status: (unemployed)			
	Not economically active	0.78 (0.20)	3.74 (0.78)	2.47 (0.82)
	Employed	1.79 (0.43)	0.90 (0.16)	1.58 (0.47)
	<i>No. of observations</i>	2,628	2,700	5,328
2	Financially dependent children	0.89 (1.36)	-0.87 (0.91)	0.10 (0.17)
	Grant recipient	-3.25 (0.94)	6.60 (1.14)	1.06 (0.34)
	<i>No. of observations</i>	2,628	2,610	5,238

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Breusch and Pagan Langrangian multiplier tests are significant at 1%. Cooperation is measured as the subject's sum of percentage contributions into the public accounts for each round. 'Financially dependent children' represents number of children supported by the subject. 'Grant recipient' is a dummy for receiving a grant or otherwise.

**Table 19: Average cooperation, by endowment size**

Endowment		Community					
		Bloemfontein	F-test	Alice	F-test	Total	F-test
Matching (number of R5 coins)	10:10	26.81	4.73***	25.27	2.11*	26.04	1.79
	10:20	25.18		25.83		25.50	
	20:10	27.36		23.85		25.60	
	20:20	24.92		24.71		24.82	
	Total	26.15		24.95		25.55	
Differential (in number of R5 coins)	Smaller	25.18	3.77**	25.83	2.90*	25.50	0.01
	Equal	26.05		25.05		25.55	
	Larger	27.36		23.85		25.60	
	Total	26.15		24.95		25.55	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Cooperation is measured as the percentage contribution into a specific public account as determined by the endowment size combination for each round.

**Table 20: Endowment as a predictor of cooperation**

Regression		Bloemfontein	Alice	Total
1,2,3,4	Community	-	-	Yes
	Order	Yes	Yes	Yes
	Rounds	Yes	Yes	Yes
	Socio-demographics	Yes	Yes	Yes
1	Sender's endowment	0.17*** (3.46)	-0.08 (1.44)	0.04 (1.18)
	No. of observations	2,700	2,700	5,400
2	Recipient's endowment	-0.15*** (2.71)	0.21*** (3.08)	0.03 (0.65)
	No. of observations	2,700	2,700	5,400
3	Endowment differential (baseline: equal)			
	Smaller	-2.01*** (2.71)	-0.10 (0.13)	-1.05** (1.99)
	Larger	0.16 (0.29)	-2.08*** (3.71)	-0.95** (2.33)
	No. of observations	2,700	2,700	5,400
4	Sender-recipient endowment comparison (baseline: equal at lower value)			
	Sender endowment is lower	-1.80* (1.95)	1.25 (1.23)	-0.27 (0.39)
	Sender endowment is higher	0.37 (0.51)	-0.72 (0.96)	-0.17 (0.33)
	Equal at higher value	0.41 (0.41)	-2.71** (2.29)	1.56** (2.00)
	No. of observations	2,700	2,700	5,400

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Breusch and Pagan Langrangian multiplier tests are significant at 1%. Cooperation is measured as the percentage contribution into a specific public account as determined by the endowment size combination for each round.

**Table 21: Financial decision-making**

		Community			
		Bloemfontein	Alice	t-value/ Chi2	Total
Decision-making	None	37.33	22.82	9.42***	30.10
	None-main	29.33	43.62		36.45
	Main	33.33	33.56		33.44
	<i>Total</i>	<i>100.00 (150)</i>	<i>100.00 (149)</i>		<i>100.00</i>
Employment income sharing	Yes	1.00 (36)	0.84 (25)	2.57**	0.93
Employment income sharing category	Everything	22.22	14.29	2.38	19.30
	Most	38.89	28.57		35.09
	Some	25.00	28.57		26.32
	Little	13.89	28.57		19.30
	<i>Total</i>	<i>100.00 (36)</i>	<i>100.00 (25)</i>		<i>100.00</i>
Grant share	Yes	0.97 (76)	0.85 (81)	2.72***	0.91
Grant sharing category	Everything	32.43	34.78	3.69	33.57
	Most	33.78	30.43		32.17
	Some	22.97	28.99		25.87
	Little	10.81	4.35		7.69
	None	0.00	1.45		0.70
	<i>Total</i>	<i>100.00 (76)</i>	<i>100.00 (81)</i>		<i>100.00</i>
Money sharing	Everything	20.67	13.33	48.59***	17.00
	Most	39.33	28.00		33.67
	Some	14.67	48.67		31.67
	Little	24.00	6.67		15.33
	None	1.33	3.33		2.33
	<i>Total</i>	<i>100.00 (150)</i>	<i>100.00 (150)</i>		<i>100.00</i>
Finance pooling	All	40.67	18.67	49.03***	29.67
	Some	52.00	40.67		46.33
	None	7.33	40.67		24.00
	<i>Total</i>	<i>100.00 (150)</i>	<i>100.00 (150)</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; sample size for each characteristic is included in brackets

**Table 22: Average cooperation, by financial decision-making factors**

		<b>Bloemfontein</b>	<b>F-test</b>	<b>Alice</b>	<b>F-test</b>	<b>Total</b>	<b>F-test</b>
<b>Decision-making</b>	None	52.68	2.82*	59.08	176.87***	55.10	116.83***
	None-main	50.66		40.89		44.84	
	Main	53.21		55.74		54.47	
	<b>Total</b>	52.27		50.02		51.95	
<b>Money sharing</b>	Everything	53.67	26.89***	50.77	2.86**	52.53	16.78***
	Most	56.79		49.33		53.69	
	Some	47.80		50.83		50.13	
	Little	47.17		44.94		46.69	
	None	37.77		47.88		45.00	
	<b>Total</b>	52.27		49.91		51.09	
<b>Income pooling</b>	All	53.74	4.69***	53.84	8.55***	53.77	15.00***
	Some	50.96		48.85		50.03	
	None	53.33		49.18		49.81	
	<b>Total</b>	52.27		49.91		51.09	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; Cooperation is measured as the subject's sum of percentage contributions into the public accounts for each round.

**Table 23: Financial decision-making and money sharing as predictors of cooperation**

Regression		Bloemfontein	Alice	Total
1,2,3,4,5	Community	-	-	Yes
	Order, Rounds, Socio-demographics	Yes	Yes	Yes
1	Sender is a financial decision-maker	2.98* (1.73)	-5.04** (2.44)	-0.32 (0.23)
	<i>No. of observations</i>	2,700	2,664	5,364
2	Recipient is a financial decision-maker	0.57 (0.58)	6.37*** (5.80)	2.94*** (3.70)
	<i>No. of observations</i>	2,700	2,664	5,364
3	Finance pooling perception by sender (None)			
	Some	0.29 (0.07)	-0.08 (0.03)	0.34 (0.14)
	All	1.98 (0.47)	6.88** (2.15)	4.08 (1.49)
	<i>No. of observations</i>	2,700	2,700	5,400
4	Sender's money sharing with household in general (None)			
	Little	10.45*** (2.90)	-0.96 (0.12)	2.41 (0.55)
	Some	13.32* (1.88)	5.25 (0.90)	7.69* (1.72)
	Most	19.74*** (4.03)	4.36 (0.71)	9.81** (2.15)
	Everything	20.11*** (6.48)	5.84 (0.83)	11.27** (2.39)
	<i>No. of observations</i>	2,700	2,700	5,400
5	Employment or grant income sharing	9.29 (1.63)	-4.57 (0.96)	-1.28 (0.33)
	<i>No. of observations</i>	1,782	1,854	3,636

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Breusch and Pagan Langrangian multiplier tests are significant at 1%. Cooperation is measured as the subject's sum of percentage contributions into the public accounts for each round.

**Table 24: Sender-recipient relationship, by communication – Bloemfontein**

Relationship	Communication (%)			Total
	Yes	No	Chi2	
Parent-child	19.33	20.67	4.94	20.00
Child-parent	19.33	20.67		20.00
Grandparent-grandchild	17.33	15.33		16.33
Grandchild-grandparent	17.33	15.33		16.33
Other family	26.67	28.00		27.33
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
<i>No. of observations</i>	<i>150</i>	<i>150</i>	<i>300</i>	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 25: Sender-recipient relationship, by communication – Alice**

Relationship	Communication (%)			
	Yes	No	Chi2	Total
Parent-child	20.00	22.67	7.87*	21.33
Child-parent	20.00	22.67		21.33
Grandparent-grandchild	21.33	19.33		20.33
Grandchild-grandparent	21.33	19.33		20.33
Other family	17.33	16.00		16.67
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
<i>No. of observations</i>	<i>150</i>	<i>150</i>	<i>300</i>	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 26: Sender-recipient relationship, by communication – total**

Relationship	Communication (%)			
	Yes	No	Chi2	Total
Parent-child	19.67	21.67	11.11**	20.67
Child-parent	19.67	21.67		20.67
Grandparent-grandchild	19.33	17.33		18.33
Grandchild-grandparent	19.33	17.33		18.33
Other family	22.00	22.00		22.00
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
<i>No. of observations</i>	<i>300</i>	<i>300</i>	<i>600</i>	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 27: Sender-recipient gender pairings, by communication – Bloemfontein**

Gender pairings	Communication (%)			
	Yes	No	Chi2	Total
Male-male	6.67	8.00	23.54***	7.33
Male-female	18.67	22.67		20.67
Female-male	18.67	22.67		20.67
Female-female	56.00	46.67		51.33
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
<i>No. of observations</i>	<i>150</i>	<i>150</i>		<i>300</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 28: Sender-recipient gender pairings, by communication – Alice**

Gender pairings	Communication (%)			
	Yes	No	Chi2	Total
Male-male	1.33	8.00	147.30***	4.67
Male-female	21.33	28.00		24.67
Female-male	21.33	28.00		24.67
Female-female	56.00	36.00		46.00
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
<i>No. of observations</i>	<i>150</i>	<i>150</i>		<i>300</i>

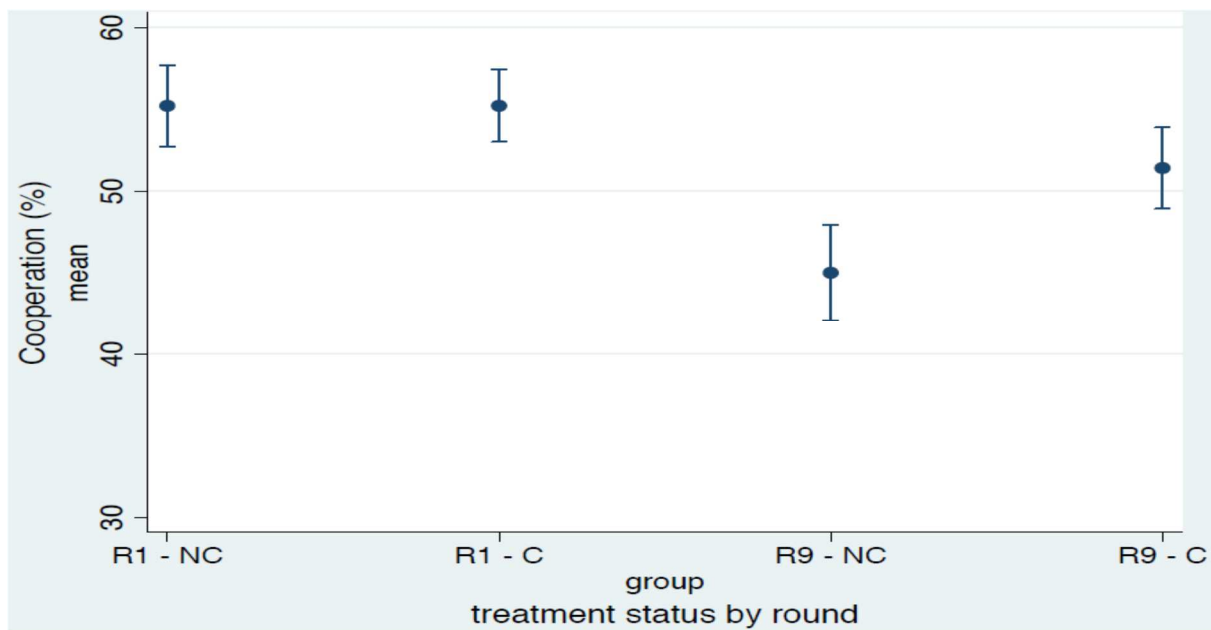
Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 29: Sender-recipient gender pairings, by communication – total**

Gender pairings	Communication (%)			
	Yes	No	Chi2	Total
Male-male	4.00	8.00	129.55***	6.00
Male-female	20.00	25.33		22.67
Female-male	20.00	25.33		22.67
Female-female	56.00	41.33		48.67
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
<i>No. of observations</i>	<i>300</i>	<i>300</i>		<i>600</i>

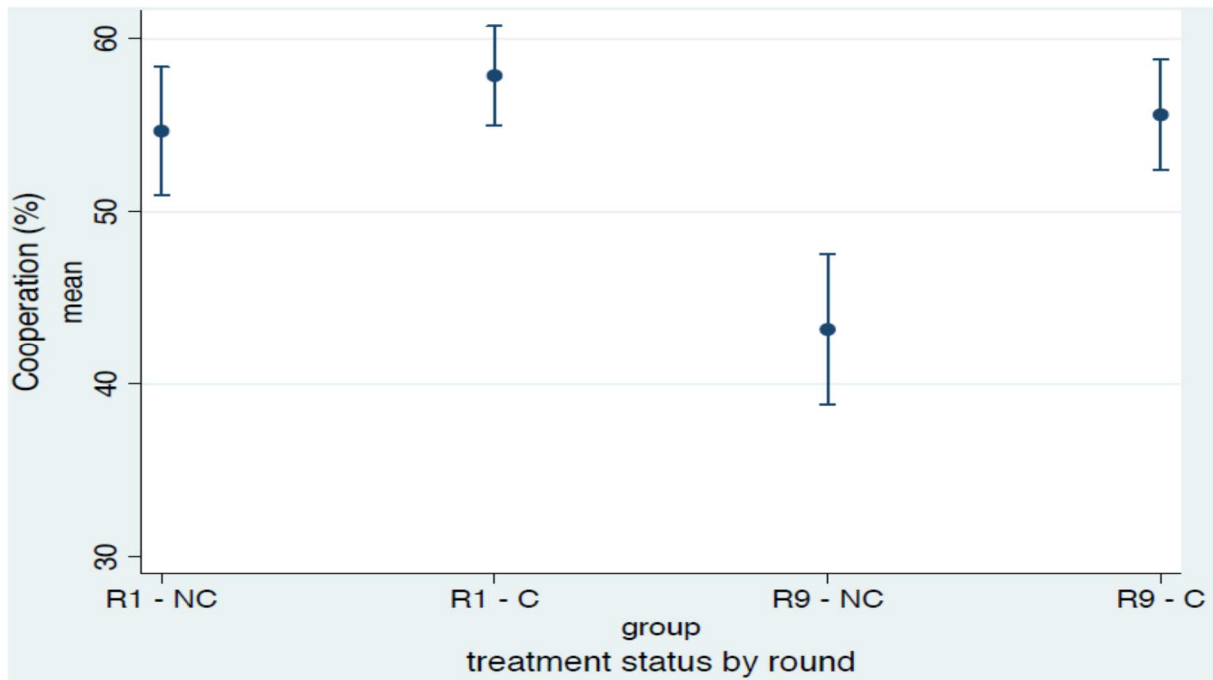
Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Figure 4: Cooperation, by communication: Round 1 vs Round 9 - total**



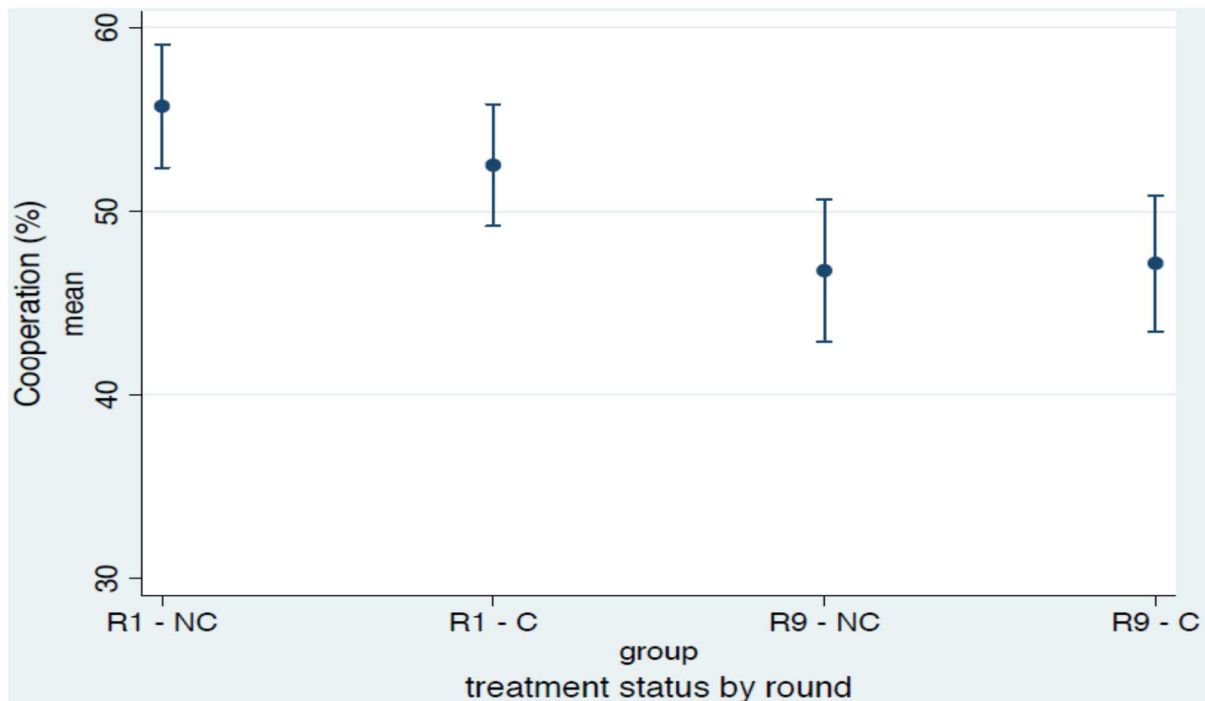
Notes: R1-NC = Round 1 in no-communication group; R1-C = Round 1 in communication group; R9-NC = Round 9 in no-communication group; R9-C = Round 9 in communication group.

**Figure 5: Cooperation, by communication: Round 1 vs Round 9 – Bloemfontein**



Notes: R1-NC = Round 1 in no-communication group; R1-C = Round 1 in communication group; R9-NC = Round 9 in no-communication group; R9-C = Round 9 in communication group

**Figure 6: Cooperation, by communication: Round 1 vs Round 9 - Alice**



Notes: R1-NC = Round 1 in no-communication group; R1-C = Round 1 in communication group; R9-NC = Round 9 in no-communication group; R9-C = Round 9 in communication group.

**Table 30: Family communication**

		Community			
		Bloemfontein	Alice	t-value/Chi2	Total
FACES IV - FCS scale (%)	Mean	77.35	82.19	1.97**	79.77
	Median	86.00	88.00	2.29	88.00
Family communication type	Less than moderate	4.67	5.33	7.78	5.00
	Moderate	15.33	7.33		11.33
	More than moderate	80.00	87.33		83.67
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
<i>Sample (n)</i>		<i>150</i>	<i>150</i>		<i>300</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1;

**Table 31: Communication as a predictor of cooperation**

Regression	Communication factors	Bloemfontein	Alice	Total
1,2,3	Community	-	-	Yes
	Order	Yes	Yes	Yes
	Rounds	Yes	Yes	Yes
	Socio-demographics	Yes	Yes	Yes
1	Communication as a treatment	6.17* (1.93)	-1.11 (0.39)	2.51 (1.19)
	<i>No. of observations</i>	<i>2,700</i>	<i>2,700</i>	<i>5,400</i>
2	FACES IV- FCS scale (%)	0.20*** (2.65)	-0.07 (1.31)	0.05 (1.11)
	<i>No. of observations</i>	<i>2,700</i>	<i>2,700</i>	<i>5,400</i>
3	Family communication type (baseline: less than moderate)			
	Moderate	13.08* (1.89)	-10.00 (1.34)	0.81 (0.15)
	More than moderate	15.52** (2.12)	-7.71 (1.62)	2.85 (0.55)
	<i>No. of observations</i>	<i>2,700</i>	<i>2,700</i>	<i>5,400</i>

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Breusch and Pagan Langrangian multiplier tests are significant at 1%. Cooperation is measured as the subject's sum of percentage contributions into the public accounts for each round.

**Table 32: Communication as a predictor of cooperation, by relationship - Bloemfontein**

Regressions and Communication		Parent-child	Child-parent	Grandparent-grandchild	Grandchild-grandparent	Other family
1,2 3	Order	Yes	Yes	Yes	Yes	Yes
	Rounds	Yes	Yes	Yes	Yes	Yes
	Socio-demographics	Yes	Yes	Yes	Yes	Yes
1	Comm <sup>T</sup>	2.14 (0.90)	4.79 (1.56)	3.86 (1.65)	2.46 (1.11)	2.72 (1.16)
	<i>No. of observations</i>	540	540	441	441	738
2	FACES IV-FCS scale	0.13** (2.50)	0.09 (1.25)	0.12* (1.82)	0.08* (1.72)	0.08* (1.94)
	<i>No. of observations</i>	540	540	441	441	738
3	Family communication type (baseline: less than moderate)					
	Moderate	11.17** (2.07)	1.43 (0.16)	17.91*** (2.64)	4.14 (1.27)	10.57*** (3.67)
	More than moderate	15.48*** (3.33)	6.07 (0.67)	18.90*** (3.29)	4.93* (1.65)	7.07** (2.53)
	<i>No. of observations</i>	540	540	441	441	738

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Comm<sup>T</sup> = communication as treatment. Cooperation is measured as the percentage contribution into a specific relational public account for each round.

**Table 33: Communication as a predictor of cooperation, by relationship - Alice**

Regressions and Communication		Parent-child	Child-parent	Grandparent-grandchild	Grandchild-grandparent	Other family
1,2 3	Order	Yes	Yes	Yes	Yes	Yes
	Rounds	Yes	Yes	Yes	Yes	Yes
	Socio-demographics	Yes	Yes	Yes	Yes	Yes
1	Comm <sup>T</sup>	-0.30 (0.13)	0.85 (0.30)	-5.25* (1.86)	1.06 (0.49)	-1.32 (0.41)
	<i>No. of observations</i>	576	576	549	549	450
2	FACES IV-FCS scale	-0.02 (0.82)	-0.01 (0.30)	-0.14*** (3.47)	0.06 (1.47)	-0.09 (1.21)
	<i>No. of observations</i>	576	576	549	549	450
3	Family communication type (baseline: less than moderate)					
	Moderate	2.16 (0.50)	0.56 (0.10)	0.84 (0.28)	-5.15 (0.85)	-14.00* (1.96)
	More than moderate	-2.54 (0.82)	0.95 (0.17)	-10.77*** (4.58)	1.43 (0.37)	-14.02*** (4.14)
	<i>No. of observations</i>	576	576	549	549	450

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Comm<sup>T</sup> = communication as treatment. Cooperation is measured as the percentage contribution into a specific relational public account for each round.

**Table 34: Communication as a predictor of cooperation - total**

Regressions and Communication		Parent-child	Child-parent	Grandparent-grandchild	Grandchild-grandparent	Other family
1,2,3	Community	Yes	Yes	Yes	Yes	Yes
	Order	Yes	Yes	Yes	Yes	Yes
	Rounds	Yes	Yes	Yes	Yes	Yes
	Socio-demographics	Yes	Yes	Yes	Yes	Yes
1	Comm <sup>T</sup>	0.48 (0.28)	3.11 (1.55)	-1.96 (1.04)	2.00 (1.21)	1.66 (0.84)
	<i>No. of observations</i>	1,116	1,116	990	990	1,188
2	FACES IV-FCS scale	0.02 (0.86)	0.04 (0.79)	-0.05 (1.35)	0.07** (2.12)	0.03 (0.76)
	<i>No. of observations</i>	1,116	1,116	990	990	1,188
3	Family communication type (baseline: less than moderate)					
	Moderate	-3.21 (0.70)	-0.74 (0.11)	-1.40 (0.31)	-2.30 (0.64)	6.29 (1.54)
	More than moderate	-0.41 (0.13)	3.12 (0.46)	-5.97* (1.95)	2.35 (0.80)	4.02 (1.07)
	<i>No. of observations</i>	1,116	1,116	990	990	1,188

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Comm<sup>T</sup> = communication as treatment. Cooperation is measured as the percentage contribution into a specific relational public account for each round.

**Table 35: Family circumstances**

		Community			
		Bloemfontein	Alice	t-value/ Chi2	Total
Household size	Mean	6.04 (50)	6.34 (50)	0.67	6.19
	Median	5.50 (50)	6.00 (50)	0.64	6.00
Marital status	Yes	0.12 (150)	0.40 (150)	5.63***	0.26
FACES IV – FSS scale (%)	Mean	67.53 (150)	76.96 (149)	3.14***	72.22
	Median	71.00 (150)	87.00 (149)	17.82***	79.00
Family satisfaction type	< moderate	14.67	12.75	19.38***	13.71
	Moderate	22.00	6.04		14.05
	> moderate	63.33	81.21		72.81
	<i>Total</i>	100.00 (150)	100.00 (149)		100.00

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; sample size(n) in brackets

**Table 36: Family circumstances as a predictor of cooperation**

Regression	Family circumstance	Bloemfontein	Alice	Total
1,2	Community	-	-	Yes
	Order	Yes	Yes	Yes
	Rounds	Yes	Yes	Yes
	Socio-demographics	Yes	Yes	Yes
	Household size	0.46 (0.60)	-0.69 (1.26)	-0.13 (0.29)
	Marital status for the sender	9.54*** (2.66)	8.17 (1.56)	8.04** (2.58)
1	FACES IV – FSS scale (%)	0.05 (0.79)	-0.06 (1.23)	-0.004 (0.11)
	<i>No. of observations</i>	2,700	2,682	5,382
2	Family satisfaction type (baseline: less than moderate)			
	Moderate	1.42 (0.33)	-8.58 (1.18)	-1.74 (0.52)
	More than moderate	2.01 (0.46)	-4.46 (1.33)	-1.20 (0.44)
	<i>No. of observations</i>	2,700	2,682	5,382

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Breusch and Pagan Langrangian multiplier tests are significant at 1%. Cooperation is measured as the sum of percentage contributions into the public accounts for each round.

**Table 37: Trust and altruism**

		Community			Total
		Bloemfontein	Alice	t-value/ Chi2	
Public trust	Mean	4.56	4.70	0.52	4.63
	Median	5.00	6.00	4.33**	5.00
Family trust	Completely	0.94	0.78	4.18***	0.86
Dictator game	Mean	16.82	13.57	1.60	15.20
	Median	10.00	10.00	1.11	10.00
<i>Sample (n)</i>		150	150		300

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 38: Average cooperation, by family trust**

		Bloemfontein	Chi2	Alice	Chi2	Total	Chi2
Family trust	Completely	52.77	0.98	49.34	2.42**	51.21	0.98
	Not completely	43.26		52.04		50.29	
	Total	52.27		49.91		51.09	
<i>No. of observations</i>		1,350		1,350		2,700	

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1; cooperation is measured as the sum of percentage contributions into the public accounts for each round.

**Table 39: Trust and altruism as predictors of cooperation**

	<b>Bloemfontein</b>	<b>Alice</b>	<b>Total</b>
Community	-	-	Yes
Order	Yes	Yes	Yes
Rounds	Yes	Yes	Yes
Socio-demographics	Yes	Yes	Yes
General public trust by sender	2.08*** (3.66)	-2.59*** (3.81)	-0.32 (0.60)
Family trust by sender	7.96 (1.45)	-2.84 (0.84)	-0.54 (0.18)
Measure of altruism (dictator game)	0.16** (2.49)	0.14* (1.86)	0.17*** (3.38)
<i>No. of observations</i>	2,700	2,700	5,400

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Breusch and Pagan Lagrangian multiplier tests are significant at 1%. Cooperation is measured as the sum of percentage contributions into the public accounts for each round.

**Table 40: Determinants of intra-household cooperation**

Explanatory variable		Bloemfonte in	Alice	Total
Community		-	-	Yes
Order; Rounds		Yes	Yes	Yes
Gender of sender		-3.84** (2.57)	-2.39 (1.60)	-2.47** (2.09)
Relation differential (baseline: parent-child)	Child-parent	5.53*** (3.50)	2.48 (1.21)	3.56*** (2.93)
	Grandparent-grandchild	-1.69* (1.86)	-0.65 (0.42)	-2.19*** (2.67)
	Grandchild-grandparent	6.56*** (4.39)	2.97 (1.24)	5.83*** (4.61)
	Other family-other family	1.51 (0.84)	-4.44** (2.39)	-1.63 (1.27)
Endowment differential (baseline: equal)	Smaller	-2.01*** (2.71)	0.008 (0.01)	-1.01* (1.89)
	Larger	0.16 (0.29)	-2.10*** (3.68)	-0.95** (2.30)
Sender is a financial decision-maker		1.80 (0.99)	-1.04 (0.51)	-0.34 (0.27)
Recipient is a financial decision-maker		-0.32 (0.31)	4.41*** (3.07)	0.74 (0.97)
Finance pooling perception by sender (baseline: none)	Some	-0.40 (0.19)	-0.56 (0.41)	-0.67 (0.55)
	All	2.15 (1.15)	1.80 (1.24)	0.92 (0.79)
Sender's money sharing with household in general (baseline: none)	Little	2.21 (0.44)	-0.25 (0.07)	-0.41 (0.19)
	Some	3.10 (0.58)	2.09 (0.74)	2.76 (1.36)
	Most	6.82 (1.46)	2.38 (0.78)	3.37 (1.62)
	Everything	6.27 (1.35)	0.78 (0.24)	3.63* (1.75)
Communication		2.79** (2.04)	-0.92 (0.65)	0.90 (0.89)
FACES IV – FCS scale (%)		0.03 (0.94)	0.006 (0.17)	0.02 (1.15)
Marital status of sender		4.59*** (3.01)	3.44* (1.65)	3.58*** (2.64)
General public trust by sender		0.99*** (3.34)	-0.94** (2.41)	-0.10 (0.38)
Altruism (dictator game)		0.05* (1.76)	0.04 (1.03)	0.06** (2.41)
<i>Sample (n)</i>		2,700	2,646	5,346

Notes: RE regression results; z-values in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1. Breusch and Pagan Lagrangian multiplier tests are significant at 1%. Cooperation is measured as the percentage contribution into a specific public account.

11. Annexure A:

Annexure A1: Household roster

<b>RECRUITMENT</b>		HH-number
<b>Intra-Household Decision-Making Study</b>		
<i>Fieldworker: Record the unique household number in the space to the right:</i>		
	<p><b><u>Introduction:</u></b></p> <p>We are researchers from the Department of Economics at the University of the Free State and we are doing research on how families make decisions with money. Can we ask you a few questions about your family [obtain permission for screening]?</p>	
	<p>How many persons who are 16 years or older currently live in this household?</p>	[record number]
	<p><b><u>Instruction:</u></b></p> <p>If &lt; 3 persons, say the following: “We are looking at conducting our research with larger households, but thank you for having spoken to us.” [conclude interview]</p> <p>If ≥ 3 persons, say the following: “Can you tell us more about your household? We need this information to determine if the household qualifies to participate in the research and which specific members of the family will participate in the study.” [complete Section 2: household roster]</p>	

SECTION 1: ADMINISTRATIVE INFORMATION															FOR OFFICE USE ONLY:																										
<b>1. Name:</b>																																									
<b>2. Telephone number:</b>																																									
<b>3. Address:</b>																																									
<b>4. Visits:</b>																																									
<u>Visit 1:</u>															<u>Visit 2:</u>			<u>Visit 3:</u>																							
4.1 Interviewers' names:															1.			1.			1.																				
2.															2.			2.			2.																				
4.2 Date:															D	D	M	M	2	0	Y	Y	D	D	M	M	2	0	Y	Y	D	D	M	M	2	0	Y	Y			
4.3 Outcome:															Completed			1	Completed			1	Completed			1															
															Not at home			2	Not at home			2	Not at home			2															
															Postponed or rescheduled			3	Postponed or rescheduled			3	Postponed or rescheduled			3															
															Partly completed			4	Partly completed			4	Partly completed			4															
															Refused			5	Refused			5	Refused			5															
															Moved from study area			6	Moved from study area			6	Moved from study area			6															
															Vacant dwelling			7	Vacant dwelling			7	Vacant dwelling			7															
															Other (specify below)				Other (specify below)				Other (specify below)																		
4.4 Other comments:																																									

SECTION 2: HOUSEHOLD ROSTER											SELECTED (FIRST CHOICE) SUBJECT:		
<i>Instruction:</i> The household includes ALL those persons who meet ALL THREE of the following criteria: (a) They lived under this 'roof' or within the same structure at least 4 NIGHTS PER WEEK out of the past FOUR WEEKS (b) When they are together they share food from a common source, i.e. they EAT TOGETHER (c) They CONTRIBUTE to or SHARE in the common RESOURCE POOL													
ID	1.1 List the FIRST names ONLY of all those individuals 16 years and older who are part of the household according to the above definition of a household, <u>STARTING</u> with the person in charge of household finances:	1.2 What is [NAME'S] relationship to [NAME of person in charge of household finances]?	1.3 Is [NAME] employed?		1.4 Does [NAME] receive a social grant(s)?		1.5 What is [NAME's] age?	1.6 Is [NAME] eligible to participate in the experiment?		Note: For criteria for the selection of first choice subjects, see information, below.			
		1 = Self 2 = Spouse/partner 3 = Child (own/adopted) 4 = Sibling (brother/sister) 5 = Parent 6 = Grandparent 7 = Grandchild 8 = Other family member (e.g. uncle) 9 = Maid/servant 10 = Lodger 11 = Other non-related persons						1.2 relation =  1 / 3 / 5 / 6 / 7  NOTE: For eligibility requirements, see information below.					
01.			Y	N		Y	N		Y	N		Y	N
02.			Y	N		Y	N		Y	N		Y	N
03.			Y	N		Y	N		Y	N		Y	N
04.			Y	N		Y	N		Y	N		Y	N
05.			Y	N		Y	N		Y	N		Y	N
06.			Y	N		Y	N		Y	N		Y	N
07.			Y	N		Y	N		Y	N		Y	N
08.			Y	N		Y	N		Y	N		Y	N
09.			Y	N		Y	N		Y	N		Y	N
10.			Y	N		Y	N		Y	N		Y	N

Total household size (including persons younger than sixteen years.	
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<p style="text-align: center;"><b>RECRUITMENT</b></p> <p style="text-align: center;"><b>Intra-Household Decision-Making Study</b></p>	<p style="text-align: center;">HH-number</p>
<p><i>Fieldworker: Record the unique household number in the space to the right:</i></p>	
<p><b><u>Eligibility requirements:</u></b></p> <p>In order to be eligible to participate in the experiment, a person has to:</p> <p><b>(i) be the person in charge of household finances</b></p> <p>The additional subjects need to fulfil the following minimum requirement:</p> <p><b>(ii) be of the following relation to the person in charge of household finances</b>  parent [=5] / grandparent [=6] OR child [=3] / grandchild [=7]</p> <p><b>(iii) selected/preferred subjects from (ii) should fulfil the following additional requirement:</b>  be employed AND / OR receive a social grant(s)</p> <p><b>NOTES:</b></p> <p>If there are &lt; 3 eligible members, explain that we cannot continue with the research and thank the participants for their time.</p> <p>If multiple household members fulfil the criteria, randomly select one person from among the qualifying members using the cards with the relevant household member number as per the household roster completed in Section 2.</p> <p>If on the day of the experiment, the person in charge of household finances (see Section 2) is absent, schedule another appointment with the subjects. If the person is absent again, explain that we cannot continue with the research and thank the participants for their time.</p> <p>If on the day of the experiment, one of the two other selected subjects (see Section 2) are absent, (randomly) select a participant from among the other eligible members. If there are no additional eligible members, explain that we cannot continue with the research and thank the participants for their time.</p>	
<p><b>NOTES</b></p>	

## 12. Annexure A2: Experimental script

### Decision-Making Experiment Script – order 1 – subject 1

[following completion of recruitment and selection process]

Greetings.

**[STEP 1: All 3 participants confirmed present. Introduction]**

Thank you for allowing us into your home today. **[Introduce EXPERIMENTERS and the assistants.]** You can ask any of us questions during today's programme.

**[STEP 2: Label the three cups with subjects' names. Assign each of the experimenters to one of the subjects and separate the pairs of experimenters and subjects as you fill the Experimenter – Subject name sheet. Set chairs and tables. Subjects get seated. Experimenters to take the three cups and twenty R5 coins to the tables]**

**[STEP 3: Obtain written informed consent – experimenter or assistant give the subject an informed consent form and read out the informed consent to the subject – if the subject had consented, ask the subject to sign the relevant form and collect a copy of the signed form – where a subject refuses to participate, first establish if there are any other eligible subjects present within the household, then replace the person with another eligible subject – update the name sheets accordingly. If there are no eligible persons present or no other eligible subjects, then continue to play as if the original subject was participating in the experiment.]**

**[STEP 4: Start on the script]**

We have visited you today because we want to learn about how people in your family take decisions. We will ask you to make decisions about money. Whatever money you win today will be yours to keep.

You will be asked simple questions. Questions that do not have a correct/wrong answer, they are just about the way you think. For example, what is your favourite colour **[ask the subject]**? We cannot say that this answer is right or wrong. It is just your opinion and it can be different from the opinion of others. However it is important to think seriously about your answers because they will affect how much money you will make.

What you need to do will be explained fully in a few minutes. But first we want to make a couple of things clear.

First of all, this is not our money. We belong to a research organization, and this money has been given to us for research.

Second, this is a study about how *you* make decisions. Therefore you should not talk with others unless we tell you to. This is very important. Please be sure to obey this rule because it is possible for one person to spoil the activity for everyone. I'm afraid that if we find you talking with others, we will have to abandon the game, and all of you will not be able to earn any money here today. Of course, if you have questions, you can ask one of us.

Finally, make sure that you listen carefully. You will be able to make money here today, and it is important that the instructions are clear for you so that you can follow them.

**[Step 5: Begin the explanation.]**

You are going to play a game with several rounds today. At the end of the experiment, we will choose one of these rounds at random **[show the cards to be shuffled]**. Whichever round is chosen will determine what money you will get. At the moment you don't know which round is the real one so it's important to pay attention for all the rounds. The details of each round differ and we will explain them as we go along.

**[Let's talk about the selection of a round for payment]**

We will come together with other players and randomly select one round of play from the list of rounds. The outcome for the selected round will inform the payment for each of you. Which round will be chosen is a matter of chance. What we are sure about is that you will receive some money no matter what. How each of you decides in the game will influence the payment. It is therefore encouraged that you make decisions in this game the way you would in real life.

**[Round 1]**

**[These are the instructions for the first round of the game.]**

In a moment we will give you each ten R5 coins like this **[show the R5 coin]** to use for the first round of the game.

**[Pass to the subject the ten R5 coins and three cups with labels: Self; You & name 1:.....; You & name 2:..... See name sheet]**

**[Name 1:.....]** and **[name 2:.....]** will both receive ten R5 coins. So the same goes for everyone in this game.

In front of you are three cups: white – **[with your name]**, green **[with You & name 1:.....]** and red **[with You & name 2:.....]**. You have to divide your ten R5 coins (your R50) between the three cups.

Let's talk about the cups.

The white cup is your personal cup. We call that ‘**Self**’.

The green cup refers to you and [name 1:.....]. We call that ‘**You & name 1:.....’s pool**’.

The red cup is about you and [name 2:.....]. We call that ‘**You and name 2:.....’s pool**’.

The cups are labelled as such.

What happens then depends on which cup you put the coins and which cup everyone else puts their coins.

Any coins you put in the white cup are yours. That’s why we call it ‘Self’. If you put one R5 coin in the white cup, you will get R5 from this cup for the round. If you put two R5 coins you will get R10 and so on. If you put all ten R5 coins in the white cup you will receive R50.

The other cups are different. We call them ‘pool’s because you will be pooling your coins with other people.

Let’s look at the green cup. Any coins you put in this cup will be added to the coins put in the same cup by [name 1:.....]. Then we will add half of the sum of those coins again and split the amount equally between you and [name 1:.....]. So if each of you put in one R5 coin, that makes two R5 coins in total in the green cup. We then add one more to get three R5 coins in total [**experimenter should show this with his or her hands – take one coin in each hand bring them together and then add a third coin**]. At the end of the experiment round, you will have R15 to share equally with [name 1:.....] or R7.50 each. If you put in two R5 coins each, that makes four R5 coins in total. We will add 2 more and you will share the R30 equally with [name 1:.....] or R15 each. And so on.

The red cup is similar to the green cup. However, the person you are sharing with is different. Any coins you put in red cup will be added to the coins put in the same cup by [name 2:.....]. We will add half again and split the amount equally between you. So if each of you put in one R5 coin, that makes two R5 coins in total. We add one more to get three coins. At the end of the experiment you will have R15 to share equally with [name 2:.....] or R7.50 each. If you put in two R5 coins each that makes four R5 coins in total. We will add 2 more and you will share the R30 equally with [name 2:.....] or R15 each. And so on.

[**Experimenter ask if the subject has any questions**] Any questions?

So, you can put your coins any way you want: all of them in one cup or split between cups. Just remember that [name 1:.....] and [name 2:.....] will be doing the same decision.

Now before we proceed there are two other important things I need to tell you:

*First*, if this round is chosen at the end of the session, then the money you get will be the money from the coins that you have kept **PLUS** the money from the pool with [name 1:.....], **PLUS** the money from the pool with [name 2:.....].

*Second*, you will get the money for you as one amount. We won't break it down into the money you kept, the money from the pool with [name 1:.....] and the money from the pool with [name 2:.....]. It will just be one total. So you won't be able to tell how other people behaved in the experiment. You won't know how they placed their coins. And, other people won't know how you placed your coins.

In a moment I will ask you to place your coins. But first let me ask some questions to check whether you understood the instructions so far.

**[STEP 6: Control Questions – recorded on the control questions sheet]**

**[First set of control questions]**

**Question 1:** If you put one R5 coin in the cup you share with [name 1:.....] and [name 1:.....] puts three R5 coins in the same cup you share, how many R5 coins will we add?

**Answer:** .....two R5 coins or R10.....

**Question 2:** How much will you get if there is R30 in total in the common cup with [name 1:.....]?

**Answer:**.....R15.....

**[Record each answer on the control sheet, correct participant if necessary]**

**[ask the second set of control questions if the subject had answered one or both of the first control questions incorrectly]**

**[Second set of control questions]**

**Question 3:** If [name 1:.....] puts three R5 coins in the cup you share and you put in three R5 coins, how many R5 coins will we add?

**Answer:** .....three R5 coins or R15.....

**Question 4:** How much will you get if there is R10 in the common cup with [name 2:.....]?

**Answer:**.....R5.....

**[Record each answer on the control sheet, correct participant if necessary]**

**[Now round 1 to be played]**

**[STEP 7: Now ask the subject to place coins as he/she wishes]**

Please now place the number of coins you like in each of the cups, as you wish, and we will record the answers. Please remember that there is no right or wrong answer, just place the coins where you like.

**[Allow some time then record the amount of coins in each cup on the record sheet; check that the sum is 10. Experimenter collect the cups and empty the coins from the cups]**

Thank you for playing this round. We are going to play several more rounds. In round 1, all of you started with the same number of coins. The rounds to come are very similar to the one you have just done, but sometimes you will have more coins than other players and sometimes less.

**[Round 2]**

**[Instructions for the second round are:]**

We will give you twenty R5 coins while **[name 1:.....]** and **[name 2:.....]** will still both receive ten R5 coins. **[see name sheet]**

Now who has the most coins? **[answer: .....]**

And who has the least coins? **[answer: .....]**

**[If answer is wrong correct the subject]**

Otherwise the rules are the same. As before, you have to choose how to place your coins. The rules are exactly the same. You can place them whichever you like. The choice is yours.

**[Pass to the subject the twenty R5 coins and three cups with labels]**

Any coins you put in the green cup will be added to the coins put in the same cup by **[name 1:.....]**. Then we will add half of the sum of those coins again and split the amount equally between you and **[name 1:.....]**.

And any coins you put in the red cup will be added to the coins put in the same cup by **[name 2:.....]**. Then we will add half of the sum of those coins again and split the amount equally between you and **[name 2:.....]**.

Please now place the number of coins you like in each of the cups, as you wish, and we will record the answers. Please remember that there is no right or wrong answer, just place the coins where you like.

**[Allow some time then record the amount of coins in each cup on the record sheet; check that the sum is 20. Experimenter collect the cups and empty the coins from the cups]**

Thank you for playing this round.

**[Round 3]**

**[Instructions for the third round are:]**

We will give you ten R5 coins while **[name 1:.....]** will receive twenty R5 coins and **[name 2:.....]** will still receive ten R5 coins **[see name sheet]**.

Now who has the most coins? **[answer: .....**]

And who has the least coins? **[answer: .....**]

**[If answer is wrong correct the subject]**

Otherwise the rules are the same. As before, you have to choose how to place your coins. The rules are exactly the same. You can place them as you did before or in a completely different way. The choice is yours.

**[Pass to the subject the ten R5 coins and three cups with labels]**

Any coins you put in the green cup will be added to the coins put in the same cup by **[name 1:.....]**. Then we will add half of the sum of those coins again and split the amount equally between you and **[name 1:.....]**.

And any coins you put in the red cup will be added to the coins put in the same cup by **[name 2:.....]**. Then we will add half of the sum of those coins again and split the amount equally between you and **[name 2:.....]**.

Please now place the number of coins you like in each of the cups, as you wish, and we will record the answers. Please remember that there is no right or wrong answer, just place the coins where you like.

**[Allow some time then record the amount of coins in each cup on the record sheet; check that the sum is 10. Experimenter collect the cups and empty the coins from the cups]**

Thank you for playing this round.

**[Round 4]**

**[Instructions for the fourth round are:]**

We will give you ten R5 coins while **[name 1:.....]** will receive ten R5 coins like you and **[name 2:.....]** will now receive twenty R5 coins **[see name sheet]**.

Now who has the most coins? **[answer: .....**]

And who has the least coins? **[answer: .....**]

**[If answer is wrong correct the subject]**

Otherwise the rules are the same. As before, you have to choose how to place your coins. The rules are exactly the same. You can place them as you did before or in a completely different way. The choice is yours.

**[Pass to the subject the ten R5 coins and three cups with labels]**

Please now place the number of coins you like in each of the cups, as you wish, and we will record the answers. Please remember that there is no right or wrong answer, just place the coins where you like.

**[Allow some time then record the amount of coins in each cup on the record sheet; check that the sum is 10. Experimenter collect the cups and empty the coins from the cups]**

Thank you for playing this round.

**[Round 5]**

**[Instructions for the fifth round are:]**

We will give you twenty R5 coins while **[name 1:.....]** will receive twenty R5 coins like you and **[name 2:.....]** will receive ten R5 coins **[see name sheet]**.

Now who has the most coins? **[answer: .....**]

And who has the least coins? **[answer: .....**]

**[If answer is wrong correct the subject]**

Otherwise the rules are the same. As before, you have to choose how to place your coins. The rules are exactly the same. You can place them as you did before or in a completely different way. The choice is yours.

**[Pass to the subject the twenty R5 coins and three cups with labels]**

Please now place the number of coins you like in each of the cups, as you wish, and we will record the answers. Please remember that there is no right or wrong answer, just place the coins where you like.

**[Allow some time then record the amount of coins in each cup on the record sheet; check that the sum is 20. Experimenter collect the cups and empty the coins from the cups]**

Thank you for playing this round.

**[Round 6]**

**[Instructions for the sixth round are:]**

We will give you twenty R5 coins while **[name 1:.....]** will receive ten R5 coins and **[name 2:.....]** will now receive twenty R5 coins **[see name sheet]**.

Now who has the most coins? **[answer: .....**

And who has the least coins? **[answer: .....**

**[If answer is wrong correct the subject]**

Otherwise the rules are the same. As before, you have to choose how to place your coins. The rules are exactly the same. You can place them as you did before or in a completely different way. The choice is yours.

**[Pass to the subject the twenty R5 coins and three cups with labels]**

Please now place the number of coins you like in each of the cups, as you wish, and we will record the answers. Please remember that there is no right or wrong answer, just place the coins where you like.

**[Allow some time then record the amount of coins in each cup on the record sheet; check that the sum is 20. Experimenter collect the cups and empty the coins from the cups]**

Thank you for playing this round.

**[Round 7]**

**[Instructions for the seventh round are:]**

We will give you ten R5 coins while **[name 1:.....]** will receive twenty R5 coins and **[name 2:.....]** will receive twenty R5 coins **[see name sheet]**.

Now who has the most coins? **[answer: .....**

And who has the least coins? **[answer: .....**

**[If answer is wrong correct the subject]**

Otherwise the rules are the same. As before, you have to choose how to place your coins. The rules are exactly the same. You can place them as you did before or in a completely different way. The choice is yours.

**[Pass to the subject the ten R5 coins and three cups with labels]**

Please now place the number of coins you like in each of the cups, as you wish, and we will record the answers. Please remember that there is no right or wrong answer, just place the coins where you like.

**[Allow some time then record the amount of coins in each cup on the record sheet; check that the sum is 10. Experimenter collect the cups and empty the coins from the cups]**

Thank you for playing this round.

**[Round 8]**

**[Instructions for the eighth round are:]**

We will give you twenty R5 coins while **[name 1:.....]** will receive twenty R5 coins and **[name 2:.....]** will receive twenty R5 coins **[see name sheet]**.

Otherwise the rules are the same. As before, you have to choose how to place your coins. The rules are exactly the same. You can place them as you did before or in a completely different way. The choice is yours.

**[Pass to the subject the twenty R5 coins and three cups with labels]**

Please now place the number of coins you like in each of the cups, as you wish, and we will record the answers. Please remember that there is no right or wrong answer, just place the coins where you like.

**[Allow some time then record the amount of coins in each cup on the record sheet; check that the sum is 20. Experimenter collect the cups and empty the coins from the cups]**

Thank you for playing this round.

**[Determine if communication is included in this game – communication is played alternately between households. Proceed to STEP 8 if so. Otherwise jump to STEP 9 if communication is not included in the game]**

**[STEP 8: Treatment: Communication]**

Thank you for playing all the previous rounds.

The ninth round will be a repeat of the first round. Each of you will be given ten R5 coins. You will have to make the same decision about how to place your ten R5 coins. But before that, we will allow you 5 minutes to discuss these decisions with [name 1:.....] and [name 2:.....]. During these 5 minutes you can say anything you wish to them. Just remember that at the end of the experiment, we will not reveal to you how they chose to place the coins.

**[Begin 5 minutes when all subjects are ready; warn when only 1 minute left.]**

**[Ask subjects to go back to their assigned seats; When the subject is seated and quiet, the experimenter proceeds with the instructions below]**

**[Round 9]**

**[STEP 9: Ninth round of the game]**

The ninth round will be a repeat of the first round. Each of you will be given ten R5 coins. You will have to make the same decision about how to place your ten R5 coins. The rules are exactly the same. You can place them as you did before or in a completely different way. The choice is yours. There is no right or wrong answer.

Please place your coins in the cups as you wish.

**[Allow some time; record the amount of coins in each cup on the record sheet; check that the sum is 10. Experimenter collect the cups and empty the coins]**

Thank you, we have now completed the ninth and final round of the game.

**[STEP 10: Conduct individual interviews with subjects using post-experimental questionnaire while record & spread sheets are used to calculate earnings.]**

While calculations to determine your winnings are being done, we would like to conduct a short survey about yourself and your family.

**[Post experiment questionnaire completed]**

**[Resolution]**

Thank you. We now have to decide which round is for real [shuffle the rounds cards and one of the experimenters picks one card].

**[Announce the round to be used for payment]**

**[Ask the subjects to get their payments in private and in envelopes]**

**[Complete and sign the acknowledgement of payment form in duplicate]**

Once again thank you for your time. We have come to the end of the experiment.

**13. Annexure A3**

**Post-experimental Questionnaire**

	H	H	H	S	S
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**Experiment – Individual Subject Questionnaire**

1. How old are you?

	years
--	-------

2. What is your gender?

Male	Female
------	--------

3. What is your highest level of education?

None	1
Grade 1-7	2
Grade 8-11	3
Grade 12	4
Diploma/degree	5

NOTE: Circle one option only.

4. To what population group do you belong?

African	1
Coloured	2
Asian	3
White	4

NOTE: Circle one option only.

5. How are you related to [ NAME ]?

Player/subject:      

1
---

2
---

3
---

Spouse/partner	1
Child	2
Sibling	3
Parent	4
Grandparent	5
Grandchild	6
Other family	7

NOTE: Record [NAME's] subject number.

Circle one number only.

6. How are you related to [ NAME ]?

Spouse/partner	1
Child	2

Player/subject:

Sibling	3
Parent	4
Grandparent	5
Grandchild	6
Other family	7

NOTE: Record [NAME's] subject number.

Circle one number only.

7. Are you married?

Yes	No
-----	----

8. Do you make decisions regarding day-to-day household expenditure?

Yes	No
-----	----

9. If so, are you the main decision-maker?

Yes	No
-----	----

10. How many children do you have depending on you for financial support?

	H	H	H	S	S
--	---	---	---	---	---

11. Which of these best describes your current situation?

Self-employed	1
Employed full-time	2
Employed part-time	3
Student	4
Unemployment	5
Looking after the home full-time	6
Retired	7
Unable to work due to sickness or disability	8
Other (please specify) _____	9

NOTE: Read out all the options. Circle one option only.

12. If you are self-employed or employed full-time or part-time, what is your monthly take home income?

Rand

13. Do you share some of this employment income with this household?

Yes	No
-----	----

14. If yes, how much of your employment income do you share with this household?

Everything	1
Most	2
Some	3
Little	4
None	5

NOTE: Read out all the options. Circle one option only.

15. Do you receive a social welfare grant?

Yes	No
-----	----

16. If so, what is your total monthly social grant income?

Rand

--	--	--	--	--	--

17. What type of social grant do you receive?

Old age pension	1
Child support grant	2
Disability grant	3
Foster care grant	4
Other (please specify) _____	5

NOTE: Read out each option. Circle all applicable options.

18. Do you share some of this grant income with this household?

Yes	No
-----	----

19. If yes, how much of your social grant income do you share with this household?

Everything	1
Most	2
Some	3
Little	4
None	5

NOTE: Read out all the options. Circle one option only.

20. If you were to receive some money, how much of it would you share with this household?

Everything	1
Most	2
Some	3
Little	4
None	5

NOTE: Read out all the options. Circle one option only.

	H	H	H	S	S
--	---	---	---	---	---

21. Please describe your family in terms of the following:	Strongly disagree	Generally disagree	Undecided	Generally agree	Strongly agree
21.1 Family members are satisfied with how they communicate with each other.					
21.2 Family members are very good listeners.					
21.3 Family members express affection to each other.					
21.4 Family members are able to ask each other for what they want.					
21.5 Family members can calmly discuss problems with each other.					
21.6 Family members discuss their ideas and beliefs with each other.					
21.7 When family members ask questions of each other, they get honest answers.					
21.8 Family members try to understand each other's feelings					
21.9 When angry, family members seldom say negative things about each other.					
21.10 Family members express their true feelings to each other.					

22. How satisfied are you with the following?	Very Dissatisfied	Somewhat Dissatisfied	Generally Satisfied	Very Satisfied	Extremely Satisfied
22.1 The degree of closeness between family members.					
22.2 Your family's ability to cope with stress.					
22.3 Your family's ability to be flexible.					
22.4 Your family's ability to share positive experiences.					
22.5 The quality of communication between family members.					
22.6 Your family's ability to resolve conflicts.					
22.7 The amount of time you spend together as a family.					
22.8 The way problems are discussed.					
22.9 The fairness of criticism in your family.					
22.10 Family members concern for each other.					

	H	H	H	S	S
--	---	---	---	---	---

23. On a scale of 1 to 7 please circle your view: 1 = you completely agree that most people can be trusted. 7 = you completely agree that you cannot be too careful in dealing with people.

Most people can be trusted You can't be too careful

1	2	3	4	5	6	7
---	---	---	---	---	---	---

NOTE: Read out the options. Circle one option only.

24. How important is family to you?

Very important	1
Rather important	2
Not very important	3
Not at all important	4

NOTE: Read out the options. Circle one option only.

25. Do you trust people from your family?

NOTE: Read out the options. Circle one option only.

Completely	1
Somewhat	2
Not very much	3
Not at all	4

26. People organize their household finances differently. Which of the following comes closest to the way finances is organized in your household?

NOTE: Read out the options. Circle one option only.

We pool all the money	1
We pool some of the money and keep the rest separate	2
We each keep our own money separate	3

27. How would you say you played the games today:

NOTE: Read out the options. Circle one option only.

More generous than in real life	1
About the same as in real life	2
Less generous than in real life	3

28. Have you heard about these games before today?

Yes	No
-----	----

29. Assuming someone gives you R100, how much of this money would you give to a stranger you do not know?

Rand			
------	--	--	--

Thank you again for taking part in this study.

### 13. Annexure B

**Table B1: Subject and household characteristics, by order – Bloemfontein**

Subject characteristics		Order		t-value/ Chi2	Total
		Order 1	Order 2		
Age	Mean	39.17	39.77	0.18	39.46
	Median	35	34	0.03	35
Gender	Female	0.76	0.66	1.39	0.72
Education	None	5.13	8.33	1.57	6.67
	Grade 1-7	26.92	27.78		27.33
	Grade 8 - 11	46.15	45.83		46.00
	Grade 12	20.51	15.28		18.00
	Tertiary	1.28	2.78		2.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Marital status	Yes	0.10	0.15	0.92	0.12
Decision -making status	None	34.62	40.28	0.73	37.33
	None-main	32.05	26.39		29.33
	Main	33.33	33.33		33.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Children supported	Mean	1.98	2.11	0.35	2.04
	Median	1	2	0.05	2
Employment status	employed	20.51	28.17	1.75	24.16
	unemployed	33.33	35.21		34.23
	Not active	46.15	36.62		41.61
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Employment income	Mean	1721	4343	1.18	3178
	Median	1200	2000	2.94*	1800
Employment income sharing	Yes	1.00	1.00	-	1.00
Employment income sharing category	Everything	19.75	25.00	0.66	22.22
	Most	37.50	40.00		38.89
	Some	31.25	20.00		25.00
	Little	12.50	15.00		13.89
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant recipient	Yes	0.53	0.52	0.21	0.53
Grant income	Mean	1261	1194	0.33	1230
	Median	1260	1430	0.10	1400
Grant type	Old age	42.86	37.84	0.83	40.51
	Child support	47.62	45.95		46.84
	Other	9.51	16.22		12.66
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant share	Yes	0.95	1.00	1.35	0.97
Grant sharing category	Everything	31.58	33.33	3.69	32.43
	Most	28.95	38.89		33.78
	Some	31.58	13.89		22.97
	Little	7.89	13.89		10.81
	None	0.00	0.00		0.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B1: Subject and household characteristics, by order – Bloemfontein (continued)**

Subject characteristics		Order		t-value/ Chi2	Total
		Order 1	Order 2		
Money sharing	Everything	21.79	19.44	2.84	20.67
	Most	39.74	38.89		39.33
	Some	10.26	19.44		14.67
	Little	26.92	20.83		24.00
	None	1.28	1.39		1.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family communication (%)	Mean	76.00	78.81	0.79	77.35
	Median	86.00	86.00	0.08	86.00
Family communication category	Very low	2.56	1.39	2.95	2.00
	Low	2.56	2.78		2.67
	Moderate	19.23	11.11		15.33
	High	23.08	31.94		27.33
	Very high	52.56	52.78		52.67
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family satisfaction (%)	Mean	68.69	66.27	0.56	67.53
	Median	71.00	71.00	0.08	71.00
Family satisfaction category	Very low	5.13	6.94	0.46	6.00
	Low	8.97	8.33		8.67
	Moderate	21.79	22.22		22.00
	High	28.21	30.56		29.33
	Very high	35.90	31.94		34.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Trust	Mean	4.38	4.76	1.04	4.56
	Median	4.00	5.00	0.32	5.00
Family trust	Completely	0.96	0.93	0.84	0.94
Finance pooling	All	39.74	41.67	0.32	40.67
	Some	53.85	50.00		52.00
	None	6.41	8.33		7.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Generosity in game-play	generous	66.67	58.33	2.28	62.67
	the same	32.05	41.67		36.67
	less generous	1.28	0.00		0.67
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Dictator game	Mean	16.51	17.16	0.21	16.82
	Median	10	10	0.07	10
<b>Household characteristics</b>					
Members aged 16+	Mean	4.42	4.00	1.27	4.22
	Median	4.00	4.00	0.17	4.00
Members employed	Mean	0.80	0.79	0.05	0.8
	Median	0.00	1.00	0.94	1.00
Members receiving social grants	Mean	1.88	1.58	1.01	1.74
	Median	2.00	1.00	0.74	1.00
Household size	Mean	6.07	6.00	0.12	6.04
	Median	5.56	6.00	0.00	5.50

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B2: Subject and household characteristics, by order – Alice**

Subject characteristics		Order		t-value/ Chi2	Total
		Order 1	Order 2		
Age	Mean	48.38	47.94	0.11	48.16
	Median	49.00	46.00	0.42	47.00
Gender	female	0.72	0.69	0.35	0.70
Education	None	1.33	4.00	1.47	2.67
	Grade 1-7	30.67	28.00		29.33
	Grade 8 - 11	34.67	36.00		35.33
	Grade 12	24.00	25.33		24.67
	Tertiary	9.33	6.67		8.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Marital status	Yes	0.42	0.37	0.66	0.40
Decision -making status	None	24.32	21.33	0.24	22.82
	None-main	41.89	45.33		43.62
	Main	33.78	33.33		33.56
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Children supported	Mean	2.16	2.21	0.15	2.18
	Median	2.00	2.00	0.11	2.00
Employment status	employed	16.00	17.33	0.95	16.67
	unemployed	13.33	18.67		16.00
	Not active	70.67	64.00		67.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Employment income	Mean	3094	953	1.18	1981
	Median	740	600	0.03	600
Employment income sharing	Yes	0.91	0.76	0.98	0.84
Employment income sharing category	Everything	0.00	30.00	6.96*	14.29
	Most	45.45	10.00		28.57
	Some	36.36	20.00		28.57
	Little	18.18	40.00		28.57
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant recipient	Yes	0.56	0.56	0.09	0.56
Grant income	Mean	1195	1324	0.90	1260
	Median	1500	1500	0.86	1500
Grant type	Old age	65.00	65.00	1.03	65.00
	Child support	32.50	35.00		33.75
	Other	2.50	0.00		1.25
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant share	Yes	0.85	0.85	0.04	0.85
Grant sharing category	Everything	38.24	31.43	1.91	34.78
	Most	26.47	34.29		30.43
	Some	29.41	28.57		28.99
	Little	2.94	5.71		4.35
	None	2.94	0.00		1.45
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B2: Subject and household characteristics, by order – Alice (continued)**

Subject characteristics		Order		t-value/ Chi2	Total
		Order 1	Order 2		
Money sharing	Everything	17.33	9.33	2.90	13.33
	Most	25.33	30.67		28.00
	Some	46.67	50.67		48.67
	Little	8.00	5.33		6.67
	None	2.67	4.00		3.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family communication (%)	Mean	81.05	83.33	0.66	82.19
	Median	88	88	0.00	88
Family communication category	Very low	5.33	1.33	3.02	3.33
	Low	2.67	1.33		2.00
	Moderate	5.33	9.33		7.33
	High	22.67	21.33		22.00
	Very high	64.00	66.67		65.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family satisfaction (%)	Mean	76.74	77.14	0.09	76.94
	Median	87	84	0.81	87
Family satisfaction category	Very low	6.76	5.33	2.43	6.04
	Low	5.41	8.00		6.71
	Moderate	8.11	4.00		6.04
	High	25.68	33.33		29.53
	Very high	54.05	49.33		51.68
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Trust	Mean	4.65	4.76	0.27	4.70
	Median	6	6	0.11	6
Family trust	Completely	0.82	0.74	1.19	0.78
Finance pooling	All	16.00	21.33	2.30	18.67
	Some	37.33	44.00		40.67
	None	46.67	34.67		40.67
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Generosity in game - play	generous	58.67	62.67	0.94	60.67
	the same	33.33	26.67		30.00
	less generous	8.00	10.67		9.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Dictator game	Mean	12.42	14.72	0.84	13.57
	Median	10.00	10.00	1.01	10.00
<b>Household characteristics</b>					
Members aged 16 <sup>+</sup>	Mean	4.20	4.64	1.12	4.42
	Median	4.00	4.00	0.34	4.00
Members employed	Mean	0.44	0.60	0.83	0.52
	Median	0.00	0.00	0.32	0.00
Members receiving social grants	Mean	1.88	1.96	0.34	1.92
	Median	2.00	2.00	0.13	2.00
Household size	Mean	5.76	6.92	1.86*	6.34
	Median	6.00	7.00	3.00*	6.00

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B3: Subject and household characteristics, by order – total**

Subject characteristics		Order		t-value/ Chi2	Total
		Order 1	Order 2		
Age	Mean	43.69	43.94	0.09	43.81
	Median	41.00	43.00	0.33	42.50
Gender	female	0.74	0.68	1.24	0.71
Education	None	3.27	6.12	1.47	4.67
	Grade 1-7	28.76	27.89		28.33
	Grade 8 - 11	40.52	40.82		40.67
	Grade 12	22.22	20.41		21.33
	Tertiary	5.23	4.76		5.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Marital status	Yes	0.26	0.26	0.07	0.26
Decision-making	None	29.61	30.61	0.03	30.10
	None-main	36.84	36.05		36.45
	Main	33.55	33.33		33.44
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Children supported	Mean	2.07	2.16	0.36	2.11
	Median	2.00	2.00	0.18	2.00
Employment status	employed	18.30	22.60	1.74	20.40
	unemployed	23.53	26.71		25.08
	Not active	58.17	50.68		54.52
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Employment income	Mean	2310	3007	0.46	2687
	Median	1200	1200	0.51	1200
Employment income sharing	Yes	0.96	0.90	0.85	0.93
Employment income sharing category	Everything	11.11	26.67	3.74	19.30
	Most	40.74	30.00		35.09
	Some	33.33	20.00		26.32
	Little	14.81	23.33		19.30
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant recipient	Yes	0.54	0.54	0.07	0.54
Grant income	Mean	1229	1262	0.26	1245
	Median	1500	1500	0.64	1500
Grant type	Old age	53.66	51.95	0.18	52.83
	Child support	40.24	40.26		40.25
	Other	6.10	7.79		6.92
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant share	Yes	0.90	0.92	0.48	0.91
Grant sharing category	Everything	34.72	32.29	4.00	33.57
	Most	27.78	36.62		32.17
	Some	30.56	21.13		25.87
	Little	5.56	9.86		7.69
	None	1.39	0.00		0.70
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B3: Subject and household characteristics, by order – total (continued)**

Subject characteristics		Order		t-value/ Chi2	Total
		Order 1	Order 2		
Money sharing	Everything	19.61	14.29	3.86	17.00
	Most	32.68	34.69		33.67
	Some	28.10	35.37		31.67
	Little	17.65	12.93		15.33
	None	1.96	2.72		2.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family communication (%)	Mean	78.47	81.12	1.07	79.77
	Median	88.00	88.00	0.00	88.00
Family communication category	Very low	3.92	1.36	2.71	2.67
	Low	2.61	2.04		2.33
	Moderate	12.42	10.20		11.33
	High	22.88	26.53		24.67
	Very high	58.17	59.86		59.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family satisfaction (%)	Mean	72.61	71.82	0.25	72.22
	Median	79.00	79.00	0.00	79.00
Family satisfaction category	Very low	5.92	6.12	1.25	6.02
	Low	7.24	8.16		7.69
	Moderate	15.33	12.93		14.05
	High	26.97	31.97		29.43
	Very high	44.74	40.82		42.81
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Trust	Mean	4.51	4.76	0.92	4.63
	Median	5.00	5.00	0.61	5.00
Family trust	Completely	0.89	0.83	1.49	0.86
Finance pooling	All	28.10	31.29	0.87	29.67
	Some	45.75	46.94		46.33
	None	26.14	21.77		24.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Generosity in game-play	generous	62.75	60.54	0.21	61.67
	the same	32.68	34.01		33.33
	less generous	4.58	5.44		5.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Dictator game	Mean	14.50	15.91	0.69	15.20
	Median	10.00	10.00	0.77	10.00
<b>Household characteristics</b>					
Members aged 16 <sup>+</sup>	Mean	4.31	4.32	0.04	4.32
	Median	4.00	4.00	0.49	4.00
Members employed	Mean	0.62	0.69	0.38	0.66
	Median	0.00	1.00	0.98	0.00
Members receiving social grants	Mean	1.88	1.77	0.57	1.83
	Median	2.00	2.00	0.14	2.00
Household size	Mean	5.92	6.46	1.22	6.19
	Median	6.00	7.00	1.92	6.00

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B4: Sender-recipient relationship, by order – Bloemfontein**

	Order (%)			
	Order 1	Order 2	Chi2	Total
Parent-child	19.23	20.83	2.94	20.00
Child-parent	19.23	20.83		20.00
Grandparent-grandchild	16.67	15.97		16.33
Grandchild-grandparent	16.67	15.97		16.33
Other family	28.21	26.39		27.33
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B5: Sender-recipient relationship, by order – Alice**

	Order (%)			
	Order 1	Order 2	Chi2	Total
Parent-child	20.67	22.00	4.50	21.33
Child-parent	20.67	22.00		21.33
Grandparent-grandchild	21.33	19.33		20.33
Grandchild-grandparent	21.33	19.33		20.33
Other family	16.00	17.33		16.67
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B6: Sender-recipient relationship, by order – total**

	Order (%)			
	Order 1	Order 2	Chi2	Total
Parent-child	19.93	21.43	5.40	20.67
Child-parent	19.93	21.43		20.67
Grandparent-grandchild	18.95	17.69		18.33
Grandchild-grandparent	18.95	17.69		18.33
Other family	22.22	21.77		22.00
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B7: Sender-recipient gender differential, by order – Bloemfontein**

	Order (%)			
	Order 1	Order 2	Chi2	Total
Male-male	5.13	9.72	73.57***	7.33
Male-female	17.95	23.61		20.67
Female-male	17.95	23.61		20.67
Female-female	58.97	43.06		51.33
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B8: Sender-recipient gender differential, by order – Alice**

	Order (%)			
	Order 1	Order 2	Chi2	Total
Male-male	4.00	5.33	5.89	4.67
Male-female	24.00	25.33		24.67
Female-male	24.00	25.33		24.67
Female-female	48.00	44.00		46.00
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B9: Sender-recipient gender differential, by order – total**

	Order (%)			
	Order 1	Order 2	Chi2	Total
Male-male	4.58	7.48	62.28***	6.00
Male-female	20.92	24.49		22.67
Female-male	20.92	24.29		22.67
Female-female	53.59	43.54		48.67
<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B10: Subject and household characteristics, by communication – Bloemfontein**

Subject characteristics		Communication		t-value/ Chi2	Total
		Yes	No		
Age	Mean	41.33	37.60	1.17	39.46
	Median	39.00	33.00	0.96	35.00
Gender	female	0.74	0.69	0.72	0.72
Education	None	12.00	1.33	7.35	6.67
	Grade 1-7	25.33	29.33		27.33
	Grade 8 - 11	42.67	49.33		46.00
	Grade 12	17.33	18.67		18.00
	Tertiary	2.67	1.33		2.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Marital status	Yes	0.12	0.13	0.24	0.12
Decision -making status	None	37.33	37.33	0.00	37.33
	None-main	29.33	29.33		29.33
	Main	33.33	33.33		33.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Children supported	Mean	2.10	1.98	0.33	2.04
	Median	2.00	2.00	0.00	2.00
Employment status	employed	24.00	24.32	0.01	24.16
	unemployed	34.67	33.78		34.23
	Not active	41.33	41.89		41.61
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Employment income	Mean	4292	2063	1.00	3178
	Median	1900	1500	0.11	1800
Employment income sharing	Yes	1.00	1.00	-	1.00
Employment income sharing category	Everything	16.67	27.78	4.44	22.22
	Most	27.78	50.00		38.89
	Some	33.33	16.67		25.00
	Little	22.22	5.56		13.89
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant recipient	Yes	0.53	0.52	0.07	0.53
Grant income	Mean	1313	1145	0.82	1230
	Median	1500	1050	1.02	1400
Grant type	Old age	50.00	30.77	3.06	40.51
	Child support	40.00	53.85		46.84
	Other	10.00	15.38		12.66
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant share	Yes	1.00	0.94	1.51	0.97
Grant sharing category	Everything	27.50	38.24	2.99	32.43
	Most	42.50	23.53		33.78
	Some	20.00	26.47		22.97
	Little	10.00	11.76		10.81
	None	0.00	0.00		0.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B10: By Communication, subject and household characteristics – Bloemfontein (continued)**

Subject characteristics		Communication		t-value / Chi2	Total
		Yes	No		
Money sharing	Everything	21.33	20.00	3.18	20.67
	Most	33.33	45.33		39.33
	Some	14.67	14.67		14.67
	Little	29.33	18.67		24.00
	None	1.33	1.33		1.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family communication (%)	Mean	76.61	78.09	0.41	77.35
	Median	86.00	86.00	0.24	86.00
Family communication category	Very low	0.00	4.00	4.22	2.00
	Low	2.67	2.67		2.67
	Moderate	18.67	12.00		15.33
	High	28.00	26.67		27.33
	Very high	50.67	54.67		52.67
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family satisfaction (%)	Mean	68.77	66.29	0.57	67.53
	Median	71.00	71.00	0.24	71.00
Family satisfaction category	Very low	4.00	8.00	1.61	6.00
	Low	8.00	9.33		8.67
	Moderate	24.00	20.00		22.00
	High	28.00	30.67		29.33
	Very high	36.00	32.00		34.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Trust	Mean	4.73	4.40	0.91	4.56
	Median	5.00	5.00	0.02	5.00
Family trust	Completely	0.97	0.92	1.45	0.94
Finance pooling	All	45.33	36.00	2.90	40.67
	Some	45.33	58.67		52.00
	None	9.33	5.33		7.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Generosity in game-play	generous	62.67	62.67	1.01	62.67
	the same	36.00	37.33		36.67
	less generous	1.33	0.00		0.67
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Dictator game	Mean	17.52	16.13	0.45	16.82
	Median	10.00	10.00	0.24	10.00
<b>Household characteristics</b>					
Members aged 16 <sup>+</sup>	Mean	4.24	4.20	0.11	4.22
	Median	4.00	4.00	0.00	4.00
Members employed	Mean	0.84	0.76	0.28	0.8
	Median	1.00	1.00	1.13	1.00
Members receiving social grants	Mean	1.80	1.68	0.40	1.74
	Median	2.00	1.00	1.28	1.00
Household size	Mean	6.24	5.84	0.63	6.04
	Median	7.00	5.00	0.08	5.50

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B11: Subject and household characteristics, by communication – Alice**

Subject characteristics		Communication		t-value/ Chi2	Total
		Yes	No		
Age	Mean	48.65	47.68	0.24	48.16
	Median	48.00	46.00	0.10	47.00
Gender	female	0.77	0.64	1.80*	0.70
Education	None	4.00	1.33	1.47	2.67
	Grade 1-7	28.00	30.67		29.33
	Grade 8 - 11	36.00	34.67		35.33
	Grade 12	25.33	24.00		24.67
	Tertiary	6.67	9.33		8.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Marital status	Yes	0.44	0.36	0.99	0.4
Decision -making status	None	17.33	28.38	3.12	22.82
	None-main	49.33	37.84		43.62
	Main	33.33	33.78		33.56
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Children supported	Mean	2.16	2.21	0.15	2.18
	Median	2.00	2.00	1.77	2.00
Employment status	employed	18.67	14.67	1.03	16.67
	unemployed	13.33	18.67		16.00
	Not active	68.00	66.67		67.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Employment income	Mean	2561	1242	0.71	1981
	Median	940	600	1.06	600
Employment income sharing	Yes	0.78	0.90	0.81	0.84
Employment income sharing category	Everything	9.09	20.00	2.29	14.29
	Most	36.36	20.00		28.57
	Some	36.36	20.00		28.57
	Little	18.18	40.00		28.57
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant recipient	Yes	0.53	0.59	0.76	0.56
Grant income	Mean	1338	1188	1.05	1260
	Median	1500	1500	0.20	1500
Grant type	Old age	65.79	64.29	1.21	65.00
	Child support	31.58	35.71		33.75
	Other	2.63	0.00		1.25
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant share	Yes	0.87	0.83	0.48	0.85
Grant sharing category	Everything	29.41	40.00	2.41	34.78
	Most	35.29	25.71		30.43
	Some	29.41	28.57		28.99
	Little	2.94	5.71		4.35
	None	2.94	0.00		1.45
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B11: Subject and household characteristics, by communication – Alice (continued)**

Subject characteristics		Communication		t-value/ Chi2	Total
		Yes	No		
Money sharing	Everything	12.00	14.67	3.19	13.33
	Most	24.00	32.00		28.00
	Some	52.00	45.33		48.67
	Little	9.33	4.00		6.67
	None	2.67	4.00		3.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family communication (%)	Mean	84.53	79.85	1.37	82.19
	Median	90.00	88.00	0.42	88.00
Family communication category	Very low	4.00	2.67	3.73	3.33
	Low	1.33	2.67		2.00
	Moderate	4.00	10.67		7.33
	High	20.00	24.00		22.00
	Very high	70.67	60.00		65.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family satisfaction (%)	Mean	76.62	77.27	0.15	76.94
	Median	87.00	87.00	0.01	87.00
Family satisfaction category	Very low	6.67	5.41	1.51	6.04
	Low	5.33	8.11		6.71
	Moderate	8.00	4.05		6.04
	High	29.33	29.73		29.53
	Very high	50.67	52.70		51.68
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Trust	Mean	4.96	4.45	1.31	4.70
	Median	6.00	5.00	1.01	6.00
Family trust	Completely	0.81	0.76	0.79	0.78
Finance pooling	All	18.67	18.67	0.29	18.67
	Some	38.67	42.67		40.67
	None	42.67	38.67		40.67
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Generosity in game-play	generous	57.33	64.00	0.83	60.67
	the same	33.33	26.67		30.00
	less generous	9.33	9.33		9.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Dictator game	Mean	16.09	11.05	1.88*	13.57
	Median	10.00	2.00	1.79	10.00
<b>Household characteristics</b>					
Members aged 16 <sup>+</sup>	Mean	4.48	4.36	0.30	4.42
	Median	4.00	4.00	0.34	4.00
Members employed	Mean	0.52	0.52	0.00	0.52
	Median	0.00	0.00	0.32	0.00
Members receiving social grants	Mean	1.88	1.96	0.34	1.92
	Median	2.00	2.00	0.13	2.00
Household size	Mean	6.6	6.08	0.81	6.34
	Median	6.00	6.00	1.33	6.00

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B12: Subject and household characteristics, by communication – total**

Subject characteristics		Communication		t-value/ Chi2	Total
		Yes	No		
Age	Mean	44.99	42.64	0.91	43.81
	Median	45.5	39.00	0.85	42.50
Gender	female	0.76	0.66	1.79*	0.71
Education	None	8.00	1.33	7.63	4.67
	Grade 1-7	26.67	30.00		28.33
	Grade 8 - 11	39.33	42.00		40.67
	Grade 12	21.33	21.33		21.33
	Tertiary	4.67	5.33		5.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Marital status	Yes	0.28	0.24	0.65	0.26
Decision -making status	None	27.33	32.89	1.45	30.10
	None-main	39.33	33.56		36.45
	Main	33.33	33.56		33.44
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Children supported	Mean	2.13	2.10	0.12	2.11
	Median	2.00	2.00	0.90	2.00
Employment status	employed	21.33	19.46	0.27	20.40
	unemployed	24.00	26.17		25.08
	Not active	54.67	54.36		54.52
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Employment income	Mean	3535	1752	1.19	2687
	Median	1300	1200	0.89	1200
Employment income sharing	Yes	0.90	0.96	0.92	0.93
Employment income sharing category	Everything	13.79	25.00	2.75	19.30
	Most	31.03	39.29		35.09
	Some	34.48	17.86		26.32
	Little	20.69	17.86		19.30
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant recipient	Yes	0.53	0.56	0.47	0.54
Grant income	Mean	1325	1167	1.28	1245
	Median	1500	1500	1.41	1500
Grant type	Old age	57.69	48.15	1.46	52.83
	Child support	35.90	44.44		40.25
	Other	6.41	7.41		6.92
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Grant share	Yes	0.93	0.88	1.14	0.91
Grant sharing category	Everything	28.38	39.13	4.82	33.57
	Most	39.19	24.64		32.17
	Some	24.32	27.54		25.87
	Little	6.76	8.70		7.69
	None	1.35	0.00		0.70
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table B12: Subject and household characteristics, by communication – total (continued)**

Subject characteristics		Communication		t-value/ Chi2	Total
		Yes	No		
Money sharing	Everything	16.67	17.33	5.78	17.00
	Most	28.67	38.67		33.67
	Some	33.33	30.00		31.67
	Little	19.33	11.33		15.33
	None	2.00	2.67		2.33
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family communication (%)	Mean	80.57	78.97	0.64	79.77
	Median	88.00	88.00	0.01	88.00
Family communication category	Very low	2.00	3.33	0.83	2.67
	Low	2.00	2.67		2.33
	Moderate	11.33	11.33		11.33
	High	24.00	25.33		24.67
	Very high	60.67	57.33		59.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Scale of family satisfaction (%)	Mean	72.70	71.74	0.31	72.22
	Median	79.00	84.00	0.56	79.00
Family satisfaction category	Very low	5.33	6.71	1.54	6.02
	Low	6.67	8.72		7.69
	Moderate	16.00	12.08		14.05
	High	28.67	30.20		29.43
	Very high	43.33	42.28		42.81
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Trust	Mean	4.84	4.42	1.58	4.63
	Median	5.00	5.00	0.48	5.00
Family trust	Completely	0.89	0.84	1.35	0.86
Finance pooling	All	32.00	27.33	2.26	29.67
	Some	42.00	50.67		46.33
	None	26.00	22.00		24.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Generosity in game-play	generous	60.00	63.33	0.36	61.67
	the same	34.67	32.00		33.33
	less generous	5.33	4.67		5.00
	<i>Total</i>	<i>100.00</i>	<i>100.00</i>		<i>100.00</i>
Dictator game	Mean	16.80	13.59	1.58	15.2
	Median	10.00	10.00	1.65	10.00
<b>Household characteristics</b>					
Members aged 16 <sup>+</sup>	Mean	4.36	4.28	0.30	4.32
	Median	4.00	4.00	0.17	4.00
Members employed	Mean	0.68	0.64	0.23	0.66
	Median	0.00	0.50	0.16	0.00
Members receiving social grants	Mean	1.84	1.82	0.10	1.83
	Median	2.00	2.00	0.23	2.00
Household size	Mean	6.42	5.96	1.03	6.19
	Median	6.50	6.00	1.46	6.00

Notes: \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

## CHAPTER 5: GENERAL CONCLUSION

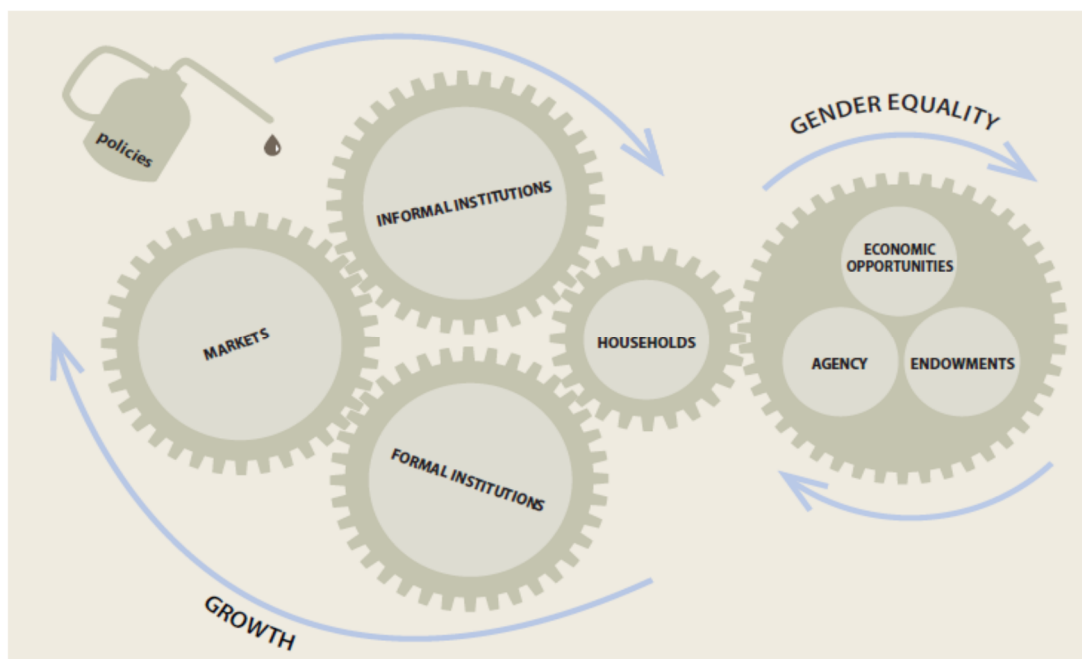
### 5.1 Introduction

The focus in this conclusion falls on four main policy conclusions emanating from the research. The chapter presents a conceptual framework to guide the policy discussion and then discusses each of the four policy messages before drawing the conclusion to the study.

### 5.2 Conceptual framework

Figure 1 suggests an interlocking relationship between gender-related outcomes, households, and markets and institutions. The current study fits squarely within the ‘households’ and the ‘gender equality’ gears. There is a bi-directional influence in this framework. On the one hand, markets and institutions can influence gender equality. On the other hand, gender equality can impact on economic growth and development represented by well-functioning markets and institutions. The household is an important connecting gear in this process. The framework below is employed to elaborate on the policy suggestions emanating from the study’s findings.

**Figure 1: Gender outcomes, households, markets, and institutions**



Source: World Development Report (2012:9)

In the framework, ‘economic opportunities’ include gainful employment, while ‘endowments’ encompass the assets, income, and education that an individual possesses. Both gender-based outcomes constitute economic bargaining power in the study. Agency, a critical component that represents the ability to make choices to achieve desired outcomes, is the prerequisite to being a financial or economic decision-maker within the household. These gender-related outcomes influence and are influenced by intra-household decision-making arrangements. As Razavi (2016:32) states, “households and families are an essential part of the political and economic life of all societies”. In this study, the ‘gender equality’ gear drives the ‘households’ gear and in turn influences household investment in family public goods and the developmental outcomes of such investments. The relationship between households and the gender-related outcomes is oiled by intra-household cooperation and communication. Limited gender equality and/or lack of satisfactory family cooperation and communication act as a potential wedge in the engine of development.

### **5.3 Findings**

The *first* key finding in this study calls for gender-based economic empowerment policies. Building on the previous United Nations conventions on women, the 1995 Beijing Declaration and Platform for Action (BPfA) set out “to assert women’s rights as human rights, and insist that global governance take seriously obligations to gender equality and to ending discrimination against women” (Cornwall & Edwards, 2015:1). The current study, however, finds that gender inequality in economic bargaining power within couples (heterogamy) and the broader adult population, persists. Whereas women dominate the role of financial and economic decision-making, which is a laudable improvement, they do so mainly as secondary decision-makers, which is another sign of gender inequality. However, the economic empowerment of women means that their decision-making power increases, and concomitantly the expenditure on family public goods. In fact, expenditure on family public goods increases even when females are not economically empowered but empowered with decision-making power.

Farré (2013) argues for an expansion of women’s opportunities with regard to issues such as health, education and earnings, in order to reduce gender inequality and promote development. The South African government recognises the persistence of gender inequality with regard to economic factors and suggests an array of measures that can advance women’s

equality and these include a specific focus on the employment of youth and women in public employment; the active participation of women in the transformation of the economy; and allowing females taking leadership roles in sectors of society (National Development Plan, 2014). A policy focusing on educating societies about social accountability may further reinforce these gender-based policy measures articulated in the National Development Plan (NDP).

Policies such as these that promote gender equality, facilitate homogamy. Homogamy in couples, for instance, is an important factor in fairer intra-household decision-making. Even if decision-making agency does not matter for family public goods expenditure, as a goal, decision-making agency is bound to provide broader indirect or intrinsic value such as self-esteem. In this respect, decision-making agency's impact on other related attitudes or norms has spill-over effects onto other decision spheres. For instance, women with financial or economic decision-making power may gain power in other decision-making spheres such as fertility and sexual practices. The finding from an examination of the causal direction of influence as flowing from gender-based outcomes to markets and institutions supports the argument that gender equality is necessary for development, both in terms of decision-making power and economic bargaining power.

The *second* finding appeals more broadly to economic development policies and posits that economically empowered men spend more on family public goods and delegate economic decision-making responsibility to their spouses who in turn spend more on family public goods. These direct and indirect conduits to family public goods expenditure point to both the practice of "smart economics - which as above rationalises investing in women and girls for more effective development outcomes" (Chant & Sweetman, 2012:518) and a quest for improvements in economic status regardless of gender. Economic development policy measures can be viewed as oiling the 'markets' and 'institutions' gears in the framework.

Policies that promote economic growth create economic opportunities for both men and women, thereby, under certain conditions, facilitating favourable intra-household decision-making processes and raising gender equality within the household and in the economy at large. Farré (2013) emphasises the importance of men in the design and implementation of gender-oriented policies, given the well-documented influence of men on almost every aspect of women's lives at all levels in the society. Any such initiative, however, does not preclude the need for 'gender equality in access to opportunities, rights, and voice, a necessary

condition for more efficient economic functioning and better institutions with dynamic benefits for investments and growth' (World Bank, 2007:145).

In the *third* instance, the endowment size effect observed in one of the two communities in this study may play an important role for policy given that the benefit of an economic opportunity for one family member of earning a wage or receiving a social grant, cascades to other family members. The dynamic context within which the household operates suggests that greater access to economic bargaining power (assets or income) by one member may result in an increase in family public goods investments and an uplifting of the well-being of all household members that may, for example, propel higher returns on education for the household. Therefore, household developmental outcomes and economic development at large, may be enhanced through the creation of more economic opportunities facilitated by oiled 'markets' and 'institutions' gears, and a greater level of within household cooperation.

The *final* finding from the field experiment, as established in one of the two communities, is that communication impacts positively on cooperation within extended inter-generational families. Related to this is that joint decision-making, which is associated with greater expenditure on food in the survey evidence, requires communication to facilitate cooperation. Further research that confirms positive impact of communication on cooperation and joint decision-making on family public goods would call for preventative and developmental social work programmes that focus on promoting communication within households. There is further empirical evidence from meta-analyses supporting such intervention, in particular in support of training in marriage and parenting skills, as well as in marriage and relationship education (MRE). Kaminski et al. (2008), for example, found that emotional communication skills are important for the achievement of household developmental outcomes and family stability.

Blanchard et al. (2009) also outline evidence that shows the positive effects of MRE on both well-functioning and more distressed couples, while Hawkins et al. (2008) found that MRE impacts positively on communication skills. Schrodtt, Witt and Messersmith's (2008:248) meta-analysis found that "family communication patterns (i.e. conversation and conformity orientations) have a meaningful association with a variety of cognitive activities and relational behaviours, as well as individual well-being." This literature confirms that a lack of satisfactory family communication is a potential wedge, not only within the household, but in

the engine of development. Developmental social policies, therefore, are instrumental in achieving household developmental outcomes.

#### **5.4 Conclusion**

It is clear, on the basis of the study's findings that, specific gender-based economic empowerment as well as broad economic development policies are proffered, together with social developmental programmes.

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