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DOCUMENT de RECHERCHE

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DR n°2014-1

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Payments for Ecosystem Services: Can we kill two birds with one stone? Insights from a Natural Field Experiment in Madagascar.

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January, 2014

Abstract

The explicit assumption underlying Payments for Ecosystem Services (PES) is that offering payments that are at least equal to individual's opportunity cost will establish individuals' participation. At the same time, that payment should act as a substitution within landowners' global income, making environmental conservation compatible with economic development goals, and suitable for win-win policy. This partially acts under the more general hypothesis of money fungibility built-in neoclassical economic premise. Meanwhile, behavioural economics demonstrate that individuals track their financial activities using a set of cognitive labels depending to the context in which it was obtained, each of which being associated with a different marginal propensity to consume. Based on a 'Humans' vs. 'Econs' approach, we test the effect of income's origin ('Low effort' based money vs. 'High effort' based money) on spending decisions (Necessity vs. Superior goods) and pro social preferences (Contribution to a public good) within Madagascar rural areas that are potential beneficiaries of PES programs, using a natural field experiment. Our findings support that human's behavioural responses matter and could, under some circumstances, alter environmental conservation policies.

Keywords Payments for ecosystem services, mental accounting, self-licensing, natural field experiment

JEL Classification C93, D03, Q56, Q57

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1. Introduction

If humans behave as *Homo economicus*, 'Payments for Ecosystem Services' appear to be a well-designed concept. When people are generating negative externalities on a public good, a sound win-win solution to be proposed consists in offering those people money for renouncing to work on their land in order to increase public good value while presenting individuals a fair and stable source of income to develop alternative activities. This looks like a very attractive solution, and this is probably why Payments for Ecosystem Services (PES) have been proliferating within the last decade, especially in developing countries (Swallow et al. 2008, Wunder 2008).

Indeed, PES in a developing countries' context makes them worthwhile for several reasons. To start with, developing countries hold the highest pie of tropical forest, which has the potential to provide several ecosystem services through species conservation, climate regulation, watershed protection, carbon sequestration and also pure aesthetic benefits. Second, developing countries pose a special test for market based solutions to conservation like PES because government and market institutions are weak. To end with, because developing countries characteristics have also to face high rate of poverty, the eventuality of a win-win approach which would enable both poverty alleviation and environmental conservation, makes PES especially appealing for policy makers, program designers, and researchers. In line with this increasing popularity, PES are currently explored as a way to pass on the found from the United Nations program on Reducing Emissions from Deforestation and Forest Degradation (REDD)[1] (Pistorius et al, 2012, Figuières et al 2012), an international monetary transfer scheme often referred as a 'new channel of foreign aid' by streaming considerable founds from North to South. Some developing countries like Mexico, Costa Rica and Ecuador have already included PES in their national policy frame (Wunder 2008), and other like China are getting on board with large-scale projects estimated in billions of dollars (Liu et al., 2008).

When a tool is conferred so many attributes, negative spillovers are often neglected due to the fatal attraction of win-win solutions. As noted in Muradian et al (2013) and Kinzig (2011, 2012), over reliance on win-win solutions might lead to ineffective outcomes, similar to earlier experience with integrated conservation and development projects. In this research, we use behavioural economics to enlighten potential biases that might

[1] Tropical deforestation represents roughly 15 to 17% of anthropogenic emissions of CO2 by current estimates (IPCC, 2007) and mitigating climate change by curbing deforestation in Southern countries is estimated to be less costly than abating industrial emissions in Northern countries (IPCC, 2007; Naucler and Enkvist, 2009). Based on this statement, an initiative named Reductions of Emissions from Deforestation and Degradation (REDD), consisting in compensating southern country for their carbon emission reduction, was formally introduced in the Copenhagen Accord, at the 15th Conference of the Parties, which was held in Copenhagen in December 2009.

affect tools designed for ecosystem services conservation,. More than a 'pros and cons' approach, our motive is to admit complexity by studying unintended spillovers caused by behavioural response, in a 'Econs' vs. 'Humans' fashion (Thaler and Sunstein, 2008). Our work aims to study two biases. The first bias, named "mental accounting" examines the poverty alleviation dimension conferred to PES and answers to the question 'Does the service mentioned in the contract (i.e. the degree of implication requested from the landowner) might impact subsequent economic decisions?'. The second bias, named "self licensing" studies the pro social dimension and answers to the question 'Might people adopt consistent behaviour in favour of the environment?'.

1.1. Is one dollar for conservation equal to one dollar for economic development?

Payments for Ecosystem Services are commonly defined as "A voluntary transaction where a defined ecosystem service (ES) (or a land-use likely to secure that service) is being 'bought' by a ES buyer from a ES provider" (Wunder 2008). This definition covers a wide array of cases depending on the ecosystem services provided (watershed protection, carbon sequestration, biodiversity conservation, etc.) and the selected payment scheme (degree of implication requested[2], cash vs. in-kind, direct vs. indirect payment etc). In this work, we will more specifically focus on the later aspect, payment scheme and degree of implication requested. We want to explore the behavioural impact of the effort's level required to obtain the ES payment, since it may vary considerably from the degree of effort required by more traditional land use.

The degree of implication depends on the programs. Some contracts mention the adoption of a sustainable management plan or an engagement in reforestation, while others are based on conservation exclusively. For instance, watershed protection includes cases where upstream communities are paid to protect forests and renounce to their activity nearby the river bank (Pagiola et al, 2008), in given carbon sequestration programs, farmers are compensated to stop cutting trees (Börner et al, 2010) or also in some biodiversity conservation projects, payment are offered in exchange of renouncing to hunt wildlife and limit expansion of crops and livestock on given lands (Frost and Bond, 2008).

One of the main focuses in research has been geared towards method to estimate payments that are at least equal to landowners' opportunity cost (Wunder 2008, Pagiola et al. 2005), but little attention has been given to how those payments are integrated in farmers' budgets and whether it acts as a real economic development tool. It has been assumed that such payment would be substituted to traditional land use income, which acts under the more general hypothesis of money fungibility present in neoclassical economic theory.

[2] Land conservation, land reforestation, sustainable management plan, etc

However, the literature offers little evidence on how the payments are used and the relationship between PES and poverty alleviation remains mainly theoretical (Bulte et al 2008, Zilberman et al 2008, Wunder 2008). In the meantime, researches in anthropology, psychology and behavioural economics suggest that human's reaction to economic instruments may differ from those predicted by models of rational choice. In sum, as well exposed by Thaler and Sunstein (2008) 'Humans' do not behave as 'Econs'. More specifically, a whole body of researches reports evidences that money is not treated as fungible by human's beings. The refutation of fungible money principle led a group of researcher to establish a theory of mental accounting (Kahneman and Tversky 1984, Thaler 1990, Thaler 1999), which posits that people value money differently depending on how the money is obtained and class it into categories. Such accounts would be meaningless if they were perfectly fungible, but experimental evidence proves that the way you get a payment or an in-kind determines the way you use it subsequently.

For instance, a research on prostitutes in Oslo demonstrated that they spend differently the money they earned from their clients than the one they received from the governments. Clean money will be used to spend on rent or food whereas dirty money will be used to party (Sager, 2010). In Kenya, tribes make scrupulous differences between categories of money. Income from selling lands cannot be used to buy cattle or the entire cattle would die (Shipton, 1990). Money that has been tagged 'bitter' will be dedicated to specific circumstances and some kind of money has to be 'purified' before moving to the spending account. Christmas club accounts constitute another example. Those fixed term accounts appeared in the 1970s in the United States. Despite providing no interest and high penalty in case of early withdrawal, those accounts have become very popular, simply by allowing people to tag money as Christmas expenses and keep it away from other expenses (Surowiecki, 2006).

Mental accounting in developing countries remains widely underexplored. Even more, the absence of studies in natural context (i.e. outside the lab) casts doubt upon its external validity. Will money (or in kinds) received by farmers to stop working lands be used similarly to money obtained from working that lands? Is one dollar from a conserved land the same dollar from a cultivated land? This is one of the main questions we address in this work. We test how two different ways of obtaining an income influences spending behaviour, using a natural field experiment in a developing country context.

The experimental purpose is to compare individual's choice between necessitiy vs. superior (i.e. hedonic) goods, whether payments are obtained with little effort or by work. To the best of our knowledge, this is the first natural field experiment to test the impact of income's sources on spending behaviour. Mental accounting is an

understudied effect within developing countries context, while it could directly impacts policies efficiency. In this work, we propose to focus our attention on how this dimension of the contract could interfere with PES programs under the assumption of a mental accounting bias. This question has direct implications for the economic development dimension of PES programs. But above all, it is the whole conservation's goal that is threatened through unsure economic sustainability.

1.2. Will payments for environmental services promote sustainable behaviour?

How to incentivize people remains an ongoing question for research. It is now well admitted that financial incentives can crowd out pre-existing intrinsic motivation (Frey and Jegen, 2001; Bénabou and Tirole, 2006). On the other side, non-financial incentives have attracted increasing interest (Thaler and Sunstein, 2008), with still little evidence of behavioural responses. Gneezy et al. (2011) review the debate stating that the effects of incentives depend on how they are designed, the form in which they are given (especially monetary or nonmonetary), and how they interact with intrinsic motivations and social motivations. In sum, incentives do matter, but in various and occasionally unexpected ways.

Conducting an artefactual field experiment embedded in a reforestation project in Bolivia, Adda (2011) studied the trade-off between individual and social benefits in natural resource use and demonstrated that both financial and non-financial rewards could potentially crowd out intrinsic motivation. In parallel, an emerging literature on self-licensing demonstrates that doing something morally valuable in a first stage increases the likelihood to do something less morally valuable at a later stage. According to this theory, pro social preferences are not exogenous but context dependent (Khan and Dhar, 2006; Sachdeva et al., 2009; Mazar and Zhong, 2010; Chiou et al., 2011) and vary according to a moral regulation process where good deeds purchase the right to act more selfishly afterwards.

Very little is known on this moral accounting process, better identified as a self licensing effect, while it raises questions on specific interactions between monetary and non monetary incentives for the effectiveness of ecosystems' conservation. Knowing more is thus essential when collective action institutions are involved and when the promoted task has an important pro-social component with moral consideration guiding people's actions such as it is in PES.

The reminding of this paper is organized as follows: the next section presents relevant contributions about mental accounting and self-licensing in the existing literature and introduces our main behavioural hypothesis.

Section 3 presents the background work that contributed to design our study as well as the experimental procedure while section 4 analyses the results. In section 5, we discuss relevant implications for policy design.

2. Literature background, behavioural hypotheses and conceptual framework

2.1. Mental accounting in PES

At least two ways of describing consumption behaviour are present in the literature. On one side, classic theory assumes that money is fungible. One dollar is one dollar, and it should be used independently of the way it has been created. This model assumes that when faced with a given income, individuals will use it according to their stated preferences. Within this viewpoint, human preferences are stable and exogenously determined. On the other side there is a distinct type literature, made of anthropologist, psychologist and behavioural economist, which inspiration are mainly drawn by an empirical paradox. This literature argues the opposite: the way money is obtained matters.

2.1.1. From classic theory…

One of the fundamental assumptions in traditional economics is that money is fungible. All money is created equal and should be treated equal. This goes with the assumption that people tend to maintain preferences stable overtime disregarding money's framing[3]

However, evidence shows some deviations from those predictions (Shapiro and Slemrod 2003, Epley et al. 2006, Milkman and Beshears 2009), which are difficult to explain under this theoretical framework (e.g. tax rebate failing to boost the economy, coupons leading to unusual consumption, etc.).

2.1.2. …to empirical paradoxes

Empirical evidence suggests that humans create mental accounting procedures. People will track their financial activities using a set of cognitive labels depending to the context in which it was obtained, each label being associated with a different marginal propensity to consume. This principle has been developed by mental accounting theory (Kahneman and Tversky 1984, Thaler 1990).

[3] Consistent consumption is predominant in the two economic theories of spending and saving, with the Life-cycle hypothesis (Modigliani, 1966) on one side, and Permanent income hypothesis (Friedman, 1957) on the other side. The Life-cycle hypothesis (LCH) argues that people maintain stable life style over time, while the Permanent Income hypothesis (PIH) defends that temporary change in income do not affect individual's spending behavior

Mental accounting refers to the tendency people have to classify their money into different accounts, similar to the way organizations create accounting procedures, to manage their financial decisions. Rather than making choices through a global optimization process over long-term horizon, individuals categorize their activities into 'mental accounts' and make their decisions independently. In the behavioural economics literature, Thaler (1999) mentions three components that characterize mental accounting. The first one captures how outcomes are perceived and experienced and how decisions are made and subsequently evaluated. The second component involves the assignment of activities to specific accounts. And the third one concerns the frequency with which accounts are evaluated.

In September 2001, the United States government gave back 38 billion dollars to the country in the form of tax rebates, with the objective of increasing consumer's expenses and stimulates the economy. American citizens received a check ranging from $300 to $600 according to their annual reported income. Later results based on macroeconomic data reported that government's expectations were not fulfilled, with low spending rates, partly softened by a 14% increase in saving (Shapiro and Slemrod, 2003). Additional data from Shapiro and Slemrod, analyzing 500 household survey reports that overall, only 21.8% of people answered that the tax rebate was used for spending. The tax rebate had a small impact on aggregate demand and therefore was not successful to provide the wanted short run stimulus. A follow up experiment was run in New York City's Grand Central Station a few months after the tax rebate occurred. Participants were first asked whether they remember receiving a check from the 2001 Tax Relief Act (they all did). The 76 participants were then assigned to two different conditions: one that presented the checks as an additional income resulting from a budget surplus returned as a bonus, or the other one presented it as a tax surplus that should be returned as withheld income (the framing in this condition was paraphrased from the real description of the rebate). Results indicate that participants in the bonus condition recalled spending more (M=76%) than those in the rebate condition (M=41%).

Although there are many reasons why people may choose to spend or save, Epley et al. (2006, 2007) suggests that the way people code these rebates may have a significant impact. Windfalls are more likely to be saved when coded as refund, and they are more likely to be spent were coded as bonus. To test this prediction, Epley et al. (2006, 2007) run an experiment involving 47 undergraduate students from Harvard University. For this experiment, participants received a $50 check as they arrived in the laboratory. While a first group was told that this money came from a 'fund's surplus', the other group received the same amount as a 'tuition rebate'. A week after the experiment, participants received an email where they had to indicate how they spent this money.

Results show that subjects in the bonus condition spent significantly more than people in the tuition rebate condition and corroborate the impact of incomes' framing (M=$22,04 vs M=$9,55, χ^2=6.34, p<0.05).

2.1.3. Playing with the 'house money'

A significant body of experimental economists have documented that when subjects play with standard laboratory endowment, they make less self-interested choice than when they use money they have earned through a laboratory task. It suggests that the impact of whether the monetary endowment gain is either a windfall gain ("house money") or a reward for a certain effort-related performance impacts subsequent behaviour, as documented below.

At risk games for instance, individuals are much more willing to take risk when the money is not really their, compared with when they had to earn it. Thaler and Johnson (1990) run a trading experiment involving 206 MBA students from Cornell University, demonstrating that traders who are given a higher windfall income at the start of a market session bid higher. In fact, 77% of subjects are risk takers when they experienced a gain in a first stage, versus 44% in single stage scenario including no prior gains. Ackert et al (2006) found similar results: when endowed with house money, people become more risk taking.

Cherry et al (2002) tested this 'house-money effect' (i.e. 'House money' versus 'Earned money') with about 300 undergraduates from University of Central Florida in a dictator game. It turned out that the percentage of selfish subjects (i.e. null offer) raises from 19% in the house money condition to 79% in the earned money condition, significant at the 1% level. Those results are supported by a charitable giving game from Reinstein and Riener (2011) where subjects are more willing to donate to a charity when the endowment is not linked to any previous effort.

2.1.4. And outside the lab?

Despite a lack of experimental evidence from the field, surveys based on quasi-experimental or empirical data offer worthy findings.

An interesting analysis of an online grocery store in North America reveals that customers increased their consumption of marginal products after they received a $10-off coupon. This research from Milkman et al (2009) studied the effect of windfalls on people spending decisions by comparing the online purchase of groceries. Motivation for offering those $10 coupons was to thank customers who encouraged others to order

from the online grocer. In total, between January 1st, 2005 and December 31st, 2005, 4435 customers benefited from this $10-off discount coupon. Milkman et al. found that grocery spending increases by $1.59 when a $10-off coupon is redeemed ($p<0.01$), meaning that extra spending associated with coupon redemption is focused on groceries that a customer does not typically buy.

In a developing countries context, a few works that studied savings behaviour endorse mental accounting principle. For example, researches that have been studying savings determinants found that in some developing countries (Guatemala and Malawi), remittances were not used in the same way than other income sources (Davies et al 2009, Adams and Cuecuecha 2010). Adams and Cuecuecha. (2010) found that money from remittances had greater propensity to be saved than money from other income sources, while Davis et al. (2009) report a positive impact of remittance specifically intended for education. Davies et al. (2009) results are based on a survey of 5644 rural households across Malawi. Their data include detailed income and consumption variables as well as a wide range of household characteristics. Qualitative questions reveal that households perceive remittances as distinct income from others and choose to use it differently. In support, a regression analysis supports that remittances from rural and urban Malawi exhibit a positive and significant impact on education expenses.

Dupas and Robinson (2012) document in their work a randomized control trial designed to test the impact of various saving's strategies on household capacity to cope with health's problem. Within this work, interesting references are made to mental accounting. For example, respondents said that once the money was set aside in a box, they were better able to avoid 'unplanned expenditures' (i.e. transfers to friends or relatives, luxury spending, etc). Indeed, people in the safe box group feel less constrained to share with relatives, reporting an average of 4.30 on a scale from 1 to 5 (1= High constraint; 5=Low constraint), versus 2.35 for the group with no safe box. A sizeable fraction (51%) reports that this is because the money in the box is for a specific goal. According to Dupas and Robinson (2012) money set aside was labeled as health savings and became non-fungible with other sources of cash, even though the money was still physically easily accessible.

On the behalf of this literature, we hypothesize that mental accounting matters, and could bias the efficiency of payments for ecosystem services' programs. We formulate the following hypothesis:

Hypothesis 1: *Mental accounting affects economic decision. Individuals who received money tagged as 'low effort money' are more inclined to make hedonic choices subsequently than individuals who received higher effort based money.*

Both experimental and field experiments stress that the origin of income impacts on preferences and behaviour: 'Effort based money' vs. 'Low effort based money' lead people to behave differently and remittances are not treated as other income sources, or that money put in a safe box becomes non-fungible. While those outcomes partly dispel doubts on mental accounting's external validity, there is still no experimental evidence from the field that establishes the consequences of how income is obtained. In the meantime, policies for environmental conservation are still embedded in conceptual issues regarding PES programs' design with no clear incomes frame defined, leaving the issue open for a wide range of configurations. We therefore believe that testing the impact of incomes' sources in field settings is highly valuable for researchers and policy makers involved in PES program design.

In this work, we propose to investigate the effect of income's sources ('Low effort' based money vs. 'High effort' based money) on spending decisions (Hedonic vs. Utilitarian) within Madagascar rural areas that are potential beneficiaries of PES programs, using a natural field experiment. This is the first time that the hypothesis for consistent vs. inconsistent consuming behavior out of different income's framing is tested in real life settings.

2.2. Moral accounting in PES

Along the previous paragraphs, we introduced our central research question: do mental accounting influence consuming behaviour in a natural field context? This is a crucial question for policy makers that wish to confer PES programs economic development virtues.

The forthcoming paragraph introduces a more unconventional question, while still inspired from mental accounting model. If the earlier focuses on financial transfers (between immediate consumption and savings, or classifying income among different groups, etc), little attention has been given to moral transfers, while having a determinant role in common pool resources management and environmental conservation. Recent work, mainly coming from psychology, suggests that doing something morally valuable in a first stage might increase the likelihood to do something less morally valuable in a later stage or even morally dubious (Khan and Dhar, 2006; Sachdeva et al., 2009; Mazar and Zhong, 2010; Chiou et al., 2011).

Named 'Self licensing', the concept describes a situation where being 'good' leads to more self-indulgent option afterwards and vice et versa (the reverse situation would be better referred as moral cleansing). In other words, this describes a process of moral accounting where good deeds are assimilated as moral credit and bad deed as

moral debit. Experimental evidence shows that people who bought green product are then more likely to cheat (Mazar and Zhong, 2010), people who took vitamins are then increasing cigarette consumption (Chiou et al. 2011), or people who established non-racist preferences are then more likely to adopt racist attitudes (Merritt and Effron, 2010). In the environmental domain, Panzone et al (2012) report that consumers are less sustainable in the food market once they have shown their environmental sensitivity in another domain. Another research shows that residents who received weekly feedback on their water consumption lowered their water use (6.0% on average), but at the same time increased their electricity consumption by 5.6% compared with control subjects (Tiefenbeck et al, 2013).

Meritt et al (2010) propose a moral credit model where credits are earned through good deeds and use a bank account metaphor: good deeds purchase 'moral credits' that diminish the responsibility of engaging in bad deeds in the future, permitting deviations from common 'self expectancies'. A similar metaphor can be found in Hollander (1958) earlier work, where good deeds establish moral credits that can be 'withdrawn' to 'purchase' the right to do bad deeds with impunity from inside the individual. According to moral credit theory, when people feel licensed, they feel as if their past behaviors has earned them credit to stray some from the shining path while still retaining a positive balance in their moral bank account.

This raises questions on potential spillovers generated by programs relying on pro social motivations. If nudges or pro social preferences are increasingly referred as a convenient way to promote individuals' cooperation, potential externalities need to be considered;

Hypothesis 2: *Moral accounting (i.e. self licensing) affects economic decision. Individuals who earned moral credits are more inclined to make less cooperative choices subsequently than individuals who did not earned moral credit.*

In the same domain, some researches established that hedonic consumption was associated with guilt and sentiment of responsibility (Dahl et al 2003, Khan and Dhar 2006). The preference for luxuries is believed to produce subsequent negative self-attribution because such goods are harder to justify than necessary goods, and, as a matter of fact, are self-indulgent. Strahilevitz and Myers (1998) demonstrate that donations commitments to charity were more likely to lead to consumption of hedonic products than more necessary products. The other way round, the guilt linked to the preference for superior good might lead to the need for counter balancing those self indulgent choices subsequently and explain greater contribution to a public good, so as a guilt-reduction

mechanisms. This effect is the opposite of the moral licensing effect and is more commonly referred in the literature as 'moral cleansing' (Sachdeva et al 2009, Brañas-Garza et al 2012)

Hypothesis 2 bis: *Moral cleansing affects economic decision. Individuals who lost moral credits through previous choices for hedonic products are more likely to make more cooperative choices subsequently than individuals who did not lose moral credits.*

2.3.Conceptual framework

The Life cycle theory assumes that an individual's consumption should depend only on the present value of his wealth (Friedman 1957, Modigliani 1966). A hypothesis that has been refuted by a later theory called Behavioral life cycle theory (Shefrin and Thaler, 1988), based on three main assumptions: first, individuals face the temptation for immediate consumption rather than saving for the future. Second, savers overcome this temptation by investing in different assets with various temptation levels. Third, the Marginal Propensity to Consume (MPC) is higher for assets labeled as current income than those labeled wealth or future income. In the following part, we propose a small extension of this model by considering different current incomes, with different MPC, labeled according to their respective effort level.

Shefrin and Thaler (1988) introduce three broad accounts: a current income account *C*, an asset account *A*, and a future income account *F*.

$$C = C(Y, A, F) \qquad (1)$$

While in the Life Cycle Hypothesis theory, the MPC (Marginal Propensity to Consume) for each of those three categories is equal, Shefrin and Thaler posit that they are different, refuting for the first time the key assumption of money fungibility:

$$\frac{\partial C}{\partial Y} \neq \frac{\partial C}{\partial A} \neq \frac{\partial C}{\partial F} \qquad (2)$$

In Shefrin and Thaler (1988), all current incomes are combined. In our work, we propose a model with different current incomes, which varies according to their associated effort level. Consumption of good *G* is thus a function of assets *A*, future income *F*, and the different current income $Y\{1,\ldots,j)$, and we suggest that the MPC out of those different current income differs.:

$$C = C(Y_1, Y_2, ..., A, F) \qquad (3)$$

$$\frac{\partial C}{\partial Y_1} \neq \frac{\partial C}{\partial Y_2} \neq ... \neq \frac{\partial C}{\partial Y_j} \qquad (4)$$

In the natural field experiment we will present in section 3, we consider a situation with two different incomes, Y_L, an income based on low effort, and Y_H, an income based on high effort, and three goods, G_1 a good with strong hedonic properties (i.e. superior good[4]), G_2 a good with strong utilitarian properties (i.e. necessity good), and G_P, a public good, with the three cooresponding consumption functions:

$$C_{G_1}(Y_L, Y_H) \qquad (5)$$

$$C_{G_2}(Y_L, Y_H) \qquad (6)$$

$$C_{G_P}(C_{G_1}, C_{G_2}) \qquad (7)$$

Under the hypothesis of a house money effect (hypothesis 1), the MPC out of the two different incomes will be:

$$\frac{\partial C_{G_1}}{\partial Y_L} > \frac{\partial C_{G_1}}{\partial Y_H} \qquad (8)$$

$$\frac{\partial C_{G_2}}{\partial Y_L} < \frac{\partial C_{G_2}}{\partial Y_H} \qquad (9)$$

(8) and (9) corresponds to the following assumptions: The MPC out of different equally liquid income source are not equal. The MPC for hedonic good is higher when income is based on low effort, while the MPC for utilitarian good is higher when income is based on high effort[5].

(10) and (11) develop the MPC for the public good and (12) capturesthe self-licensing hypothesis according to which the two different incomes Y_L and Y_H could impact individual's contribution to the public good G_P, with G_P being a decreasing function of Y_H (i.e. high effort in favour ofthe community self licenses a decrease in the contribution's level to the public good).

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[4] A superior or luxury good is defined as having an income elasticity of demand greater than one ($\varepsilon_d > 1$), while a necessity good has an income elasticity of demand comprised between zero and one ($0 < \varepsilon_d < 1$).

[5] Which also means that $\varepsilon_{dL} > \varepsilon_{dH}$ in the case of the superior good and $\varepsilon_{dH} > \varepsilon_{dL}$ in the case of the necessity good.

$$\frac{\partial C_{G_P}}{\partial Y_L} = \frac{\partial C_{G_P}}{\partial C_{G_1}} \frac{\partial C_{G_1}}{\partial Y_L} + \frac{\partial C_{G_P}}{\partial C_{G_2}} \frac{\partial C_{G_2}}{\partial Y_L} \quad (10)$$

$$\frac{\partial C_{G_P}}{\partial Y_H} = \frac{\partial C_{G_P}}{\partial C_{G_1}} \frac{\partial C_{G_1}}{\partial Y_H} + \frac{\partial C_{G_P}}{\partial C_{G_2}} \frac{\partial C_{G_2}}{\partial Y_H} \quad (11)$$

$$\frac{\partial C_{G_P}}{\partial Y_L} > \frac{\partial C_{G_P}}{\partial Y_H} \quad (12)$$

$$\frac{\partial C_{G_P}}{\partial C_{G_1}} > \left[\left(\frac{\partial C_{G_1}}{\partial Y_L} - \frac{\partial C_{G_1}}{\partial Y_H} \right) \Big/ \left(\frac{\partial C_{G_2}}{\partial Y_H} - \frac{\partial C_{G_2}}{\partial Y_L} \right) \right] \frac{\partial C_{G_P}}{\partial C_{G_2}} \quad (13)$$

$$If \left(\frac{\partial C_{G_1}}{\partial Y_L} - \frac{\partial C_{G_1}}{\partial Y_H} \right) \Big/ \left(\frac{\partial C_{G_2}}{\partial Y_H} - \frac{\partial C_{G_2}}{\partial Y_L} \right) \leq 1, then \frac{\partial C_{G_P}}{\partial C_{G_1}} > \frac{\partial C_{G_P}}{\partial C_{G_2}} \quad (14)$$

(14) shows that under certain circumstances, public good contribution might also be influenced by previous consumption, as established in the correlated hypothesis[6] of moral cleansing (i.e. guilt-reduction mechanisms).

In sum, our work proposes to test two hypotheses. One addresses the mental accounting linkage with PES poverty alleviation dimension. The second one explores moral accounting and potential spillovers on future cooperation.

The next part presents the preliminary work that helped us to design our natural field experiment as well as the experimental design.

3. Groundwork & experimental design

A central question in this work is whether money received from a working activity would be more likely to be placed in a current income and treated with high responsibility (i.e. utilitarian consumption) compared to money received with little or no effort, which would be more likely to be spent impulsively (i.e. hedonic consumption).

6 Hypothesis 2 bis

3.1. Initial test of mental accounting

Prior to implementing the natural field experiment designed to test this hypothesis, we run a survey among students from the University of Antananarivo, as a first check. This trial consisted in a 2 (No effort money vs. Effort money) x 2 (Yourself vs. Others) between subjects experiment.

The four treatments are presented in table 1. The main objective of that design is to see whether on a hypothetical basis, people would state different economic decisions depending on how they got money (No effort money vs. Effort money). The other treatment (Yourself vs. Others) is a strategy that aims at minimizing declarative biases, under the assumption that individuals have excessively positive views of themselves but more accurate perception of their peers. This way, we could attempt to get more correct outcomes, controlling for answers that could be perceived as undesirable when referring to oneself, but not when referring to someone else (i.e. control for the social desirability bias). Indeed, preceding works have shown that more accurate answers can be collected by asking what people think about others' preferences (Epley and Dunning, 2000; Grolleau et al, 2012).

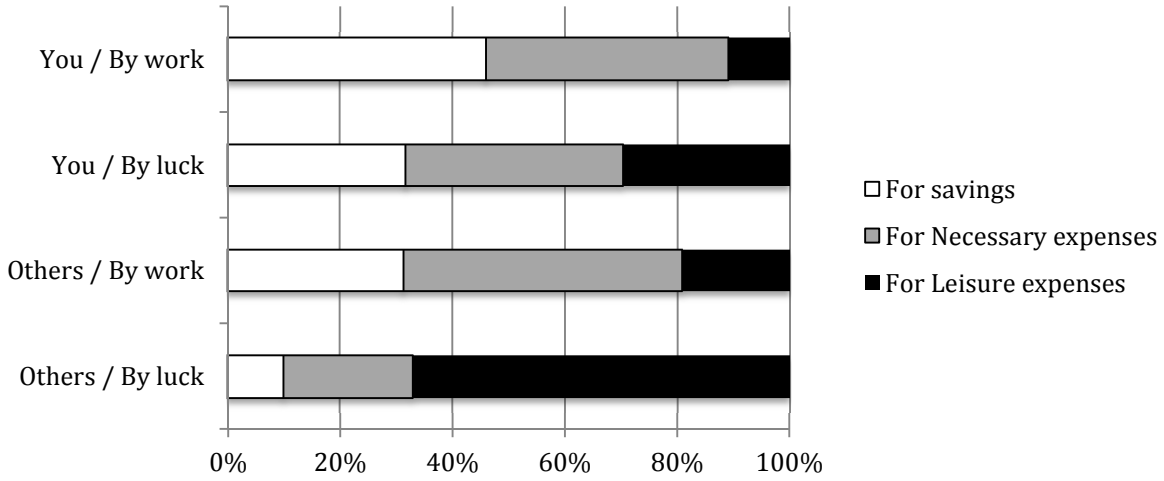
Table 1 – Experimental design – Questions and possible answers within the 4 treatments

Treatments		Questions		Answers
1	***You***	Supposing that **you** get 10 000 MGA **by working in a restaurant**,	In your opinion, how would **you** use this money?	1) Savings 2) Necessary expenses 3) Leisure expenses
2		Supposing that **you** get 10 000 MGA **by chance in the street**,		
3	***Others***	Supposing that **someone** gets 10 000 MGA **by working in a restaurant**,	In your opinion, how would **this person** use this money?	
4		Supposing that **someone** gets 10 000 MGA **by chance in the street**,		

A total of 746 undergraduates from Antananarivo's University enrolled in this experiment, in May 2012. Results indicate the following: subjects were significantly more inclined to select the leisure option in the lucky (i.e. no effort) condition than in the working (i.e. effort) condition, when referring both to themselves and to others, which confirms our hypotheses. When referring to themselves, 30% chose the leisure option when getting the money by chance, which is 19 points higher than in the working condition, with difference significant at the 1% level (p=0.0000) using a Student t-test. The difference is even greater when referring to others. They were 67% to state that others would choose the leisure option in the windfall condition, which is 48 points more than in the

working condition, also significant at 1% level (p=0.0000). Figure 1 illustrates our findings. Those results strongly confirm our hypothesis that income's framing has an impact on stated preferences.

Figure 1 – Money use among the 4 treatments



3.2. Preliminary work in the field

Taking a step further, we describe in the following part how we built our natural field experiment. The purpose of using natural field experiment is to capture as much of the context as possible and thus increase external validity. List and Hofler (2004) demonstrated that pro social behaviour observed in a laboratory settings were not happening anymore in natural setting, questioning about the robustness delivered by laboratory experiments. Also, laboratory experiments are often observing student's behaviour, which undermine a possible extension of the results to the rest of the population.

A natural field experiment consists in using non-standard subject pool (as in artefactual field experiment) and in a field context (as in framed field experiment). The main specificity of this type of experiment resides in the fact that participants do not know that they are part of an experiment. It makes this kind of experiment very close to natural settings, limiting suspicion bias (knowing you are participating in an experiment may eliminate spontaneous behaviour). This increased external validity is however offset by a set of logistical challenges, due to the constraint of ensuring high level of control during the experiment. In the next point, we describe how we overcame those constraints.

3.2.1. The field context

This study takes place in Arivonimamo province, located in the central highlands of Madagascar[7]. Madagascar owns a wide set of ecosystem services while being among the poorest country in the world, which makes it especially attractive for 'win-win' policy designers. In the meantime, PES programs are still at their preliminary stage, including several design issues, resulting in a high need for research.

Population in Arivonimamo province turns around 19,000 people, relying mainly on agricultural activities. The area is famous for its Tapia's forest. Tapia trees grow in stony soils and serve as the primary protector against erosion, but are increasingly degraded due to bush fire and deforestation for subsistence or grazing purposes. Tapia forest also hosts the wild Malagasy silkworm, associated with silk production, which offers an attractive alternative to promote conservation within the area.

Recent decentralization programs led by the national government and international organizations have been effective in granting increasing autonomy to local institutions in the province. Those local associations of villagers called 'VOI' (Vondron' Olona Ifototra) have been given the responsibility of their communal land with the objective to promote sustainable land management.

The study took place in June 2012. June is exempt of both harvest work and traditional celebrations so we could increase our chance to get a high participation rate. We selected 4 villages within the area to be part of our work. Among a set of criteria, those villages were selected because of their accessibility, density, size and access to market. It was important to make sure they had these features in common since it might impact their economic behavior. The full leadership during discussions as well as the management of the surveys and experiments has been left to Malagasy people to avoid an 'experimenter effect'. The experimenter effect has been first demonstrated by Hoffman et al (1996), proving that subjects' degree of social distance from the experimenter affect subject's behaviour.

At a preliminary stage, we organized a focus group gathering the four VOI's representatives from each village we planned to visit as well as the VOI's president for the province. This focus group aimed at determining an activity that could be organized under the initiative of the VOI and linked to sustainable land use. This activity would build up our natural setting for the experiment. We wanted the activity to be the same among the four villages to reduce potential biases linked to the tasks' attributes.

[7] http://en.wikipedia.org/wiki/Arivonimamo

Considering local characteristics, it turned out to be an activity based on Tapia's forest maintenance, including a set of duties such as path clearance and tree pruning. We also ensured we could schedule all the field experiment within the same week and we agreed on visiting the 4 villages named Ambohimanjaka, Tsarahonenana, Merinavaratra and Ambohijatovo, respectively from Monday to Thursday. The experiment had to be conducted before Friday's weekly market, where most of the villagers meet, in order to prevent contamination biases. Except on Fridays, villagers are unlikely to meet because of long walking distance within the four villages. Also, another very important feature was to start the activity early in the morning to enable people in the 'Low effort' condition to go back to work after the experiment (otherwise, an opportunity cost effect could undermine the results). We agreed with all VOI's representatives that the compensation for this half day activity will be an equivalent of 2500 MGA in in-kind (the equivalent of a day wage for a low skilled worker). VOI's representatives stressed out that when calling for community participation, cooperation motivation overcome financial concerns, which ensured participation to be high. One could argue that people participating to this VOI's activity for Tapia's forest maintenance are therefore people concerned by environment and community projects, which is not a major concern since it is also those people who are more likely to join a PES program.

Moreover, this setting is adequate to create the moral credit condition to test for our second hypothesis ('Moral accounting affects economic decision') while the kind of selected in-kinds (superior vs. necessity goods; see next paragraph for more details) would enable to test the moral cleansing related hypothesis.

A month before the experiments, we run another set of studies in Arivonimamo's province to define the in-kinds that would be given to participants, which should symbolize either the hedonic consumption or the utilitarian consumption. Surveyors interviewed a total of 30 people[8] asking for the more necessary goods they were buying on a weekly basis versus the set of goods they do not buy commonly, but more likely for holidays or celebrations' purpose. Results shows that coffee and oil were the most cited items for necessary goods, both part of the weekly purchase. For both products, more than 80% of the respondents considered them as necessary. In the case of the superior good, surveyors asked for items that are not bought weekly, but more likely during holidays and celebration. Interviewed people mainly agreed on clothes and sodas (i.e. more specifically Fanta)[9], in more than 50% of the cases. We then kept the two goods that best suited our experimental constraints,

[8] Other than those who participated to the field experiment.
[9] Clothes were more often cited (about 65% of participants) but less easy to accommodate with the experimental design compared to soda (about 50% of participants).

therefore oil and soda[10], since both could be delivered in bottle format, which minimize a potential packaging bias and help control for decision's anonymity.

3.2.2. Experimental strategy

We selected our participants from individuals, sharing a common pool resource and physically able to take part in the maintenance task. We worked in collaboration with the local organization in charge of land's conservation (VOIs). This organization supported our work by implementing a half-day activity linked to environmental management settling the basis of our experimentation. This activity was paid with in-kinds (superior vs. necessary goods) and participants were randomly assigned to two conditions. A first group was constituted of participants that were exempted to work by a lottery game (also referred as the 'Low effort' money condition), while others had to comply with the task before getting their due (the 'High effort' money condition).

A week in advance, villager's were informed by their VOI's representative that a half day activity would take place to maintain Tapia's forest, with a meeting time set up at 6:45am. In exchange they would receive the equivalent of a day wage. Each VOI's representative had in charge to inform at least 40 individuals. The day of the activity, the experimental team met the VOI's representative first and then waited for participants. At 7am[11], the VOI's representative briefly introduced the team (our presence was explained as a punctual support to finance maintenance activities). The instructor then started reading the instructions aloud; thanking villagers for being there and confirming they would receive a 2500 MGA compensation in in-kind (the equivalent of a day wage) after the activity.

After this brief introduction, we proceed to the randomization, which consisted in allocating people randomly between the two conditions ('Low effort' money vs. 'High effort' money). In order to do so, the audience was informed that due to a high number of participants, the group should be divided into two subgroups, and were distributed an individual number. The team then proceeded to the lottery. The subgroups constituted of non selected numbers was told that they could start the activity and go to the Tapia's forest, while the other group was told to stay.

Once the group of workers left (they were accompanied by the VOI's representative and one member of the team), the instructor explained that not all participants were needed to work in the forest because they were too

[10] 2500 Ariary corresponds to 1,5 liter of soda and 1 liter of oil.
[11] Participants were very punctual and most of them arrived before 7am. For those arriving later, they were told that unfortunately they could not participate anymore in the activity. For a few that insisted, they were included in the activity and received compensation but the corresponding observation was not included in our database.

many, so they could luckily be exempted to work while still receiving their due wage. Those lucky participants were then in a condition where they got a day wage without any previous effort. The instructor explained that they could choose between two goods, which are oil and Fanta. The experimenter showed the litter of oil that was in a 1,5 litter bottle by taking it out of a black plastic bag and did the same for the Fanta (also in a 1,5 litter bottle). The instructor informed participants that they would receive their in-kind in a black plastic bag too. This setting aimed at avoiding emotional biases due to packaging[12], as well as social image biases. After they receive explanations of the two goods, they were given a paper with drawings of the two goods, and where they should mark the product they wanted. They had about one minute to mark their choice. After the minute elapsed, pencils were collected and they could go to collect their in-kind, individually, and the first experiment ended.

As a second activity, we proposed participants to take part to a socio economic survey. This was a way for us to collect extensive socio economic data. We told participants this survey will be paid 1000 MGA and will last about 20 minutes. All participants agreed to take part in the survey. Questions were linked to their agricultural activities (culture type and size), their consumption habits in oil and soda, as well as more general data about their household and expenses.

Once they completed the survey, we gave them an envelope containing the 1000 MGA (in 100 notes), mentioning they could give any part of this amount to their VOI by dropping the envelop in a box that was nearby. They were many options around to hide (houses, trees, etc.) so anyone could get a sense of privacy (what they all did) to split the 10 notes between themselves and the envelop they would then leave in the box.

This additional activity also aimed at testing the impact of the initial experiment on further economic decisions as presented in our second hypotheses. Making the payment separate between the two activities aimed at controlling for a potential remaining house money effect induced from the first activity.

About 4 hours later, while the other sub group came back from the Tapia's forest activity, the experimental team followed exactly the same procedure as the one just described above (cf. Instructions in Appendix for more details).

[12] A wide range of research in marketing has been studying the impact of packaging on consumer choice (Schifferstein et al, 2013).

4. Results

In this result's section, we first present a summary of our data and statistical tests. In a second stage, we proceed to a set of regressions to investigate the determinants of the observed behaviour. As we shall see, the level of hedonic preferences is significantly higher when money is obtained in the 'low effort' condition.

4.1. Data summary and statistical tests

4.1.1. Sample's characteristics

We collected in total 142 observations across the 4 villages. Participation rate in village 4 was lower than expected due to an unforeseen last minute circumcision's ceremony that happened the same day in a nearby village. Table 2 presents the summary data.

Gender There were generally more women than men among participants. Men represent 33,10% of the entire sample. Even if people in charge of inviting participants insisted on the importance to get men for this forest maintenance activity that requires strong physical abilities, men were still more reluctant to cancel their daily activity than women.

Age Participants were on average 39.8 years old.

Monthly resources & weekly food expenses per unit Those two items aimed at estimating participant's welfare category. Monthly resources were an estimate of how much a household gets per month, classified in four ranges, from low income (below 50 000 Ariary) to high income (more than 200 000 Ariary). For increased accuracy, we also asked for weekly food expenses, that we then divided by the number of members belonging to the household. Both indicators converge to illustrate that participants from Ambohijatovo were wealthier than participants from other villages.

Land size It reports the average cultivated land size per farmer. Cultivated land per participant is twice bigger in village 4 than in other villages.

Education This is the percentage of participants that reached the secondary school level.

Outsiders Many inhabitants in Arivonimamo come from Antananarivo[13] province as a result of increasing land pressure in the surrounding area of the capital. Outsiders characterize people from Antananarivo province that settled in Arivonimamo since less than one generation.

Oil's regular buyer An 'Oil's regular buyer' is someone that buys oil for regular purpose. This concerns 100% of our sample.

Fanta's_buyer A 'Fanta's buyer' is someone that bought Fanta at least once in the past. Buyers of Fanta represents 56,34% of the sample

Fanta's hedonic buyer A 'Fanta's hedonic buyer is someone who lastly bought Fanta for festive purpose (Mother's day, national holiday, birthdays etc.). Among Fanta's buyers, 65% consume Fanta for special occasions, which represents 36.62% of the entire sample.

Table 2 – Sample characteristics for the four villages.

Participants	Village 1 (Ambohimanjaka) N=38	Village 2 (Tsarahonenana) N=41	Village 3 (Merinavaratra) N=41	Village 4 (Ambohijatovo) N=22	**TOTAL** N=142
Demographic characteristics					
Gender ratio (% of male)	23,68%	36,59%	41,46%	27,27%	**33,10%**
Age	42.57895	35.82927	43.73171	35.36364	**39.84507**
Monthly resources [1]					
<50 000	81.58%	75.61%	78.05%	54,55%	**75,35%**
50 000 – 100 000	18.42%	24.39%	17.07%	40,91%	**1,41%**
100 000 – 200 000	-	-	2.44%	4,55%	**22,54%**
>200 000	-	-	2.44%	-	**0,70%**
Weekly food expenses / household unit	1898.058	2061.876	2043.302	2546.555	**2087.765**
Land size	1.7486	1.617	2.1	4.2	**2.18**
Education level (% of secondary level)	13,15%	24,39%	21,95%	45,45%	**23,94%**
Outsiders	50%	47.36%	48.78%	53.65%	**50%**
Consumption's habits					
Oil's regular buyer	100.00%	100.00%	100.00%	100.00%	**100.00%**
Fanta's buyer	52.63%	58.53%	48.78%	72.72%	**56.34%**
Fanta's hedonic buyer	39.47%	26.82%	29.26%	63.63%	**36.62%**

[1] Monthly resource is in Ariary. 1 Euro = 2.864,43 Ariary.

In table 3, we test the presence of statistically significant differences between samples after randomization, controlling with the variables mentioned earlier, using the Kruskal-Wallis H test. This is the non-parametric equivalent of the one-way analysis of variance (ANOVA). Since all p-values are non significant (column 4), we assume that this sample is equally distributed among control and treatment, which should enable adequate conditions to detect treatment effects. We also looked at correlation between control variables (table 4 in

[13] The capital and largest city in Madagascar.

appendix). The table shows the presence of weak correlations between gender and resource as well as between age, resource and education.

Table 3 – Randomization table: Kruskal-Wallis H test of between group differences across participants from the four villages assigned to control and treatment groups.

(N=142)	(1) Control group	(2) Treatment group	(3) H-statistics	(4) P-value
Socio demographic characteristics				
Gender ratio (% of male)	36.98	28.98	0.676	0.4108
Age	40.38356	39.27536	0.136	0.7118
Monthly resources < 50 000 Ar	80.82	71.01	0.858	0.3542
Weekly food expenses per household unit	2098.233	2076.691	0.224	0.6359
Land size	2.9001	1.3801	1.357	0.2441
Education level (% of secondary level)	21.91	26.08	0.184	0.6682
Outsiders	52.05	47.82	0.189	0.6638
Consumption's habits				
Oil's regular buyer	100	100	0.000	1
Fanta's buyer	56.16	56.52	0.001	0.9705
Fanta's hedonic buyer	32.87	40.57	0.627	0.4285

4.1.2. Treatment's effect

Our first main result indicates that participants in the 'Low effort' condition were more inclined to choose a soda bottle than participants in the working (i.e. 'High effort') condition, which supports our main hypothesis. The data reports 13.7% of participants who selected the hedonic option in the 'Low effort' money condition against 2.9% in the 'High effort' money condition as illustrated in Figure 1. The difference is significant at the 5% level, using both Student's t-test (t=2.3407, p|t|=0.0207) and Ranksum test (z=2.304 p|z|=0.0212). Table 4 compares average choice for hedonic option across treatments, using a parametric and a non-parametric test.

Those first results apply to all participants, without considering their consumption's habits (whether they do consume oil and soda, and under which circumstances). As presented earlier, we gathered additional data (i.e. when people lastly bought oil and when they lastly bought Fanta), which facilitates classifying people among different category of consumption's habits.

For instance, looking participants that buy Fanta for 'Hedonic' purpose, the treatments difference is greater, with 29.17% of them choosing soda in the 'Low effort' money condition, versus 7.14% in the 'High effort' money condition, equal to 23 points more, significant at 5% using both tests (t=2.1444, p|t|=0,0369; z=2.073,

p|z|=0.0382). Figure 1 illustrates those results. Also, in the 'Low effort' condition, 'Fanta's hedonic buyers' were significantly more likely to select the soda than 'Fanta's regular buyers' (t=-2.5804, p|t|=0.0137; z=-2.415, p|z|=0.0157), but not in the 'High effort' condition. It means that the income's framing had an impact on hedonic choice mainly on people who have a hedonic consumption of this good (i.e. Fanta's hedonic buyers). Taken as a whole, this strengthens the idea that 'Low effort' based money increases hedonic consumption.

Figure 2 – Hedonic choice across treatments and samples.

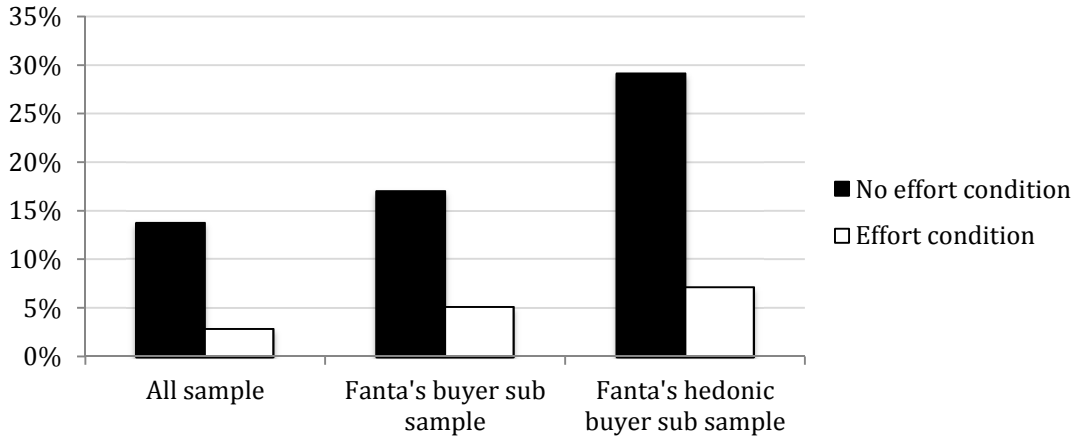


Table 4 – Differences in hedonic preferences across treatments and consumption category, for entire sample and sub samples.

(Student parametric test and Mann-Whitney non-parametric test.)

Comparisons	Average of hedonic choice	Student test (t)	p-value	Mann-Whitney test (z)	p-value
Low effort condition vs. High effort condition					
All sample	0.1369863/ 0.0289855	2.3407	0.0207**	2.304	0.0212**
Buyers sub sample	0.1707317/ 0.0512821	1.6994	0.0932*	1.679	0.0931*
Festive buyers sub sample	0.2916667/ 0.0714286	2.1444	0.0369**	2.073	0.0382**
Fanta's festive buyer vs. regular buyer					
Low effort condition	0.2916667/ 0.0612244	-2.7951	0.0067***	-2.672	0.0076**
High effort condition	0.0714286/ 0	-1.7500	0.0847*	-1.724	0.0847*

***, **, * Indicates statistical significance at the 1, 5 and 10 percent significance levels, respectively.

Looking at the public good contribution, happening at the second stage of this experiment, interesting results are rising.

First, positive contribution rate is 100%. Usual contribution rate (i.e. percentage of people who gives something) in standard dictator game are 60% (Engel, 2011). All participants donated a positive amount, ranging from 100

MGA (48,59% of participants) to more than 500 MGA (4,92% of participants). The average donation is 180.99 MGA, with a standard error of 9.84. Overall, participants shared 18.01% of the pie. Standard results in dictator game show that participants share about 30% of the pie (Engel, 2011). Similar games have been played in developing countries, revealing equivalent results (individuals sharing 31% of the pie, Henrich et al., 2005). Second, effort condition (i.e. 'High effort' condition) and consumption preferences seem both to affect the amount donated to the public good. Participant from the 'Low effort' condition gave on average 50 Ar more than participants from the 'High effort' condition, significant at the 5% level, while participants who chose the superior good gave close to 100 Ar more than people who chose the necessity good, significant at the 1% level. According to the statistical test presented in table 5, both effect appear to act individually: among the participants who selected the necessity good, those in the 'Low effort' condition gave significantly more than those in the 'High effort' condition (188.89 vs. 158.21, p<0,10%), and among the participants belonging to the 'Low effort' condition, those who selected the superior good donated significantly more than those who selected the necessity good (290 vs. 188.89, p<0.05%).. If that previous consumption effect seems stronger than the 'High effort' condition, this would have to be confirmed in the regression analysis.

Table 5 : Differences in pro social preferences across treatments and consumption choice, for entire sample and sub sample

Student parametric test and Mann-Whitney non-parametric test.

Comparisons	Average of hedonic choice	Student test (t)	p-value	Mann-Whitney test (z)	p-value
Low effort condition vs. High effort condition					
All sample	202.7397/157.971	2.3086	0.0224**	2.686	0.0072***
Necessity good	188.8889/ 158.209	1.7181	0.0882*	2.026	0.0427**
Superior good	290/150	0.8483	0.4161	1.390	0.1646
Superior good vs Necessity good					
All sample	266.6667/173.0769	-2.7040	0.0077***	-2.483	0.0130**
Low effort condition	290/188.8889	-2.3127	0.0236**	-2.130	0.0332**
High effort condition	150/158.209	0.1201	0.9048	-0.144	0.8857

***, **, * Indicates statistical significance at the 1, 5 and 10 percent significance levels, respectively.

4.2. Regression analysis

We perform a Probit[14] regression for the determinants of hedonic preferences, taking into account variables that could be expected to affect such behavior. The two regressions for the determinants of hedonic preferences are shown in Table 6[15]. Table 7 reports the marginal effects.

$$\Pr(Y=1 \mid X_1, X_2, \ldots, X_n) = F(\theta_0 + \theta_1 X_1 + \theta_2 X_2, \ldots, + \theta_n X_n)$$

The probit results support our findings. Being in the 'High effort' group decreases significantly by a coefficient of 0.127 the probability to choose the hedonic good (p=0.000), while being a « Non regular buyer » increases significantly by a coefficient of 0.124 the probability to choose the hedonic good (p=0.014). We find no other effect relative to gender, age, education, revenue, or origin within the total sample data set. We also control for village effect. But the Kruskall-Wallis H test reports no difference in the distribution of the hedonic choice among the 4 villages. (χ^2=0.425, p=0.9350). In sum, the Probit model validates our first hypothesis, according to which mental accounting plays a role in economic decision.

Table 6: Probit regression - Superior Good (0/1)

	(1) Model 1		(2) Model 2	
Superior good				
Effort condition	-1.035**	(-2.30)	-1.417***	(-6.57)
Gender	0.206	(0.51)		
Age	0.000167	(0.01)		
Monthly resources [less than 50 000 Ar]	-0.689	(-1.06)		
Weekly food expenses per household unit	-0.000181	(-0.94)		
Land size	-0.0687	(-0.81)		
Education level [greater than secondary level]	0.355	(1.07)		
Outsiders	-0.163	(-0.40)		
Festive Buyer	1.116***	(2.78)	1.032***	(2.89)
Constant	-0.692	(-0.53)		
Observations	132		142	
BIC	107.0		77.45	
chi2	22.30		55.66	
p	0.00798		8.18e-13	

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[14] Because our dependant variable is binary, a Probit model is preferred.

[15] Regression in the second model keeps only variables that were significant in model 1.

Table 7: Probit regression - Superior Good (0/1) - Marginal effects

	(1) Model 1		(2) Model 2	
Superior good				
Effort condition	-0.0791**	(-1.98)	-0.127***	(-3.75)
Gender	0.0157	(0.48)		
Age	0.0000128	(0.01)		
Monthly resources [less than 50 000 Ar] (d)	-0.0405	(-1.26)		
Weekly food expenses per household unit	-0.0000138	(-0.95)		
Land size	-0.00525	(-0.83)		
Education level [greater than secondary level]	0.0271	(1.02)		
Outsiders (d)	-0.0124	(-0.41)		
Festive Buyer (d)	0.119**	(2.10)	0.124**	(2.46)
Observations	132		142	
BIC	107.0		77.45	
chi2	22.30		55.66	
p	0.00798		8.18e-13	

Marginal effects; t statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

To understand further the determinant of donation, we performed a censored Tobit regression[16]. Table 8 reports the result. Various experimental works that studied cooperation provide cues for control variables. To start with, Eckel and Grossman (1996) show that women behave more cooperatively than men, suggesting we might expect a gender effect in donations. Second, we might expect different cooperation's level according to participant's origin. While the majority of our subjects' come from Arivonimamo's province, still some migrated from Antananarivo's province. We might therefore have a lower level of cooperation among people that are recently settled in the area. Age might also have a role to play. List and Karlan. (2007) suggest that older people cooperate more than younger ones. In addition, Hofmeyr et al (2007) have shown that people with higher income cooperate more.

First of all, the regression supports our second hypothesis. People who did an effort for their VOI's in a first stage (i.e. 'High effort' condition), contributed less than those who did not have to do a real effort (i.e. 'Low effort' condition). With a coefficient of 35.55, people in the 'High effort' condition decreased significantly their donations (p=0.059) compared to people that were in the 'Low effort' condition, while individuals who selected the superior good increase their donation by 91.28 (p=0.008).

[16] A censored regression model enables to take into account that the dependant variable can take any value from 0 up to 1000.

Age is significant in model 1, but the parameter became non significant in the second model, that kept only significant variable from Model 1. We also find an income effect, indirectly measured through weekly food expenses, which appears to be robust across the two models.

Above all, this censored Tobit regression provides support for both hypotheses 2 and 2b of moral licensing and cleansing and shows that the moral cleansing effect plays a bigger role in determining public good contribution.

Table 8: Censored Tobit regression - donation amount [0;1000]

	(1) Model 1		(2) Model 2	
Effort condition	-36.33*	(-1.77)	-35.55*	(-1.90)
Gender	4.941	(0.23)		
Age	-1.057*	(-1.76)	-0.841	(-1.54)
Monthly resources [less than 50 000 Ar]	18.04	(0.73)		
Weekly food expenses per household unit	0.0123*	(1.92)	0.0134**	(2.39)
Land size	0.583	(0.20)		
Education level [greater than secondary level]	-8.453	(-0.49)		
Outsiders	-6.857	(-0.34)		
Superior good	96.94***	(2.68)	91.28***	(2.69)
Festive Buyer	-3.678	(-0.18)		
Constant	244.0***	(3.67)	231.6***	(5.71)
sigma				
Constant	109.2***	(16.25)	109.1***	(16.85)
Observations	132		142	
BIC	1672.3		1765.4	
chi2	21.21		19.38	
p	0.0197		0.000663	

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusion

Environmental economics has traditionally pointed out market failure as the main reason for economic inefficiency, recommending the use of market based instruments to restore the equilibrium. Those instruments are designed under the assumption that people would react as given in the rational choice theory, with an utility function based on profit maximization, associated to stable and exogenous preferences. Our work provides evidence that decision-making might, under some circumstances, follow different rules. For instance, while traditional economics would consider the economic properties of the transaction proposed in a PES contract as the only determinants for success, we showed that the circumstances under which someone receives the money and the motives behind involvement, also matter.

From a general theoretical standpoint, we found that both mental and moral accounting effects are robust to a natural field context. In particular, this work provides evidence that mental accounting impacts consumption behaviour and could, under some circumstances, mitigate the economic development dimension of environmental conservation policies. Enlarging the main focus of our investigations, this work leads us to a wider discussion on moral accounting, with results that raise evidence for both self licensing and moral cleansing effect, in relation with the pro social motives and collective action dimension of conservation policies. But more than giving a clear and definite conclusion on how PES should be implemented, this work mainly demonstrates that contextual environment and behavioural factors could challenge policies achievements at some point.

Those results feed a complementary discussion on whether payments for ecosystem services should include multiple goals, and whether those goals could be reached integrating the behavioural biases at stakes. In line with Muradian et al (2013), we believe that a simple policy tool such as PES should not systematically be used to solve complex policy problems, since it might distract the attention of policy makers and practitioners from core issues. This idea also remind us the so called 'Tinbergen rule' formulated by Jan Tinbergen (1952) stating that for each and every policy target there must be at least one policy tool.

Given the unintended behavioural responses to policy tools as suggested in this natural field experiment, we would encourage instruments that are less ambitious in terms of goals but that rely on stronger contextual evidence. We support that multiple objectives require multiple mechanisms and we believe in context specific framed tools better than one size fits all policies.

Acknowledgement

We thank the research program SERENA funded by the French National Research Agency (ANR) as well as the French research program GESSOL sponsored by the Ministère de l'Ecologie, du Développement durable, des Transports et du Logement, the Agency for the Environment and Energy Management (ADEME) for financial support.

References

Ackert, L. F., Charupat, N., Church, B. K., & Deaves, R. (2006). An experimental examination of the house money effect in a multi-period setting. *Experimental Economics*, *9*(1), 5–16. doi:10.1007/s10683-006-1467-1

Adams, R.H., & Cuecuecha, A. (2010). Remittances, Household Expenditure and Investment in Guatemala. *World Development*, 38(11). 1626–1641. doi:10.1016/j.worlddev.2010.03.003.

Adda, G. (2011). Motivation crowding in environmental protection: Evidence from an artefactual field experiment. *Ecological Economics*, 70(11), 2083-2097.

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

Börner, J., Wunder, S., Wertz-Kanounnikoff, S., Tito, M.R., Pereira, L., & Nascimento, N. (2010). Direct conservation payments in the Brazilian Amazon: Scope and equity implications. *Ecological Economics*, 69(6), 1272-1282.

Brañas-Garza, P. Bucheli, M., García-Muñoz, T., Espinosa A., Paz M. (2012). Moral cleansing and moral licenses: experimental evidence. *Economics and Philosophy*, 29(2), 199-212.

Bulte, E. H., Lipper, L., Stringer, R., & Zilberman, D. (2008). Payments for ecosystem services and poverty reduction: concepts, issues, and empirical perspectives. *Environment and Development Economics*, *13*(03), 245-254. doi:10.1017/S1355770X08004348

Cherry, T. L., Frykblom, P., & Shogren, J. F. (2002). Hardnose the dictator. *The American Economic Review*, *92*(4), 1218-1221.

Chiou, W.-B., Wan, C.-S., Wu, W.-H., & Lee, K.-T. (2011). A randomized experiment to examine unintended consequences of dietary supplement use among daily smokers: taking supplements reduces self-regulation of smoking. *Addiction*, 106(12), 2221–2228. doi:10.1111/j.1360-0443.2011.03545.x

Dahl, D. W., Honea, H., & Manchanda, R. V. (2003). The nature of self-reported guilt in consumption contexts. *Marketing Letters*, 14, 159–171.

Davies, S., Easaw, J., & Ghoshray, A. (2009). Mental accounting and remittances: A study of rural Malawian households. *Journal of Economic Psychology*, *30*(3), 321–334. doi:10.1016/j.joep.2009.03.003

Dupas, P., & Robinson, J. (2012). Why Don’ t the Poor Save More□? Evidence from Health Savings Experiments. *NBER Working Paper*, (17255), 1–44.

Eckel, C. C., & Grossman, P. J. (1996). The relative price of fairness□: gender differences in a punishment game. *Journal of Economic Behavior & Organisation*, 30(2), 143–158.

Engel, C. (2011). Dictator games: a meta study. *Experimental Economics*, 14(4), 583–610. doi:10.1007/s10683-011-9283-7

Epley, N., & Dunning, D. (2000). Feeling "holier than thou": Are self-serving assessments produced by errors in self- or social prediction? *Journal of Personality and Social Psychology*, 79(6), 861–875. doi:10.1037//0022-3514.79.6.861

Epley, N., & Gneezy, A. (2007). The framing of financial windfalls and implications for public policy. *The Journal of Socio-Economics*, 36(1), 36–47. doi:10.1016/j.socec.2005.12.012

Epley, N., Mak, D., & Idson, L. C. (2006). Erratum: Bonus of rebate?: The impact of income framing on spending and saving. *Journal of Behavioral Decision Making*, 19(4), 407–407. doi:10.1002/bdm.546

Friedman, M. (1957). A Theory of the Consumption Function. *Princeton University Press*, Princeton.

Figuières, C., Leplay, S., Midler, E., & Thoyer, S. (2012). The REDD scheme to curb deforestation: A well-designed system of incentives? *Strategic Behavior and the Environment*, 2(3), 239-257. doi: 10.1561/102.00000017

Frey, B.S., Jegen, R. (2001). Motivation Crowding Theory. *Journal of Economic Survey*, 15(5), 589-611.

Frost, P.G.H., Bond, I. (2008). The CAMPFIRE programme in Zimbabwe: payments for wildlife services. *Ecological Economics*, 65(4), 776–787.

Gneezy, U., Meier, S., & Rey-Biel, P. 2011. When and Why Incentives (Don't) Work to Modify Behavior. *Journal of Economic Perspectives*, 25(4), 191-210.

Grolleau, G., Mzoughi, N., & Saïd, S. (2012). Do you believe that others are more positional than you? Results from an empirical survey on positional concerns in France. *The Journal of Socio-Economics*, 41(1), 48–54. doi:10.1016/j.socec.2011.10.001

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Mcelreath, R., Alvard, M. (2005). "Economic Man " in Cross-cultural Perspective□: Behavioral Experiments in 15 Small-scale Societies. *Behavioral and Brain Sciences*, 28(6), 815–855.

Hoffman, E., McCabe, K., Smith, V.L. (1996). Social distance and Other-Regarding Behavior in Dictator Game. American Economic Review, 86(3), 653-660.

Hofmeyr, A., Burns, J., & Visser, M. (2007). Income Inequality, Reciprocity and Public Good Provision: An Experimental Analysis. *South Africa Journal of Economics*, 75(3), 508–520.

Hollander, E. P. (1958). Conformity, status, and idiosyncrasy credit. *Psychological Review*, 65, 117–127

Kahneman, D., Tversky, A. (1984). Choices, values and frames. *American Psychologist*, 39 (4), 341–350. doi:10.1037/0003-066X.39.4.341.

Khan, U., & Dhar, R. (2006). Licensing Effect in Consumer Choice. *Journal of Marketing Research*, 43 (2), 357-365.

Kinzig, A.P., Perrings, C., Chapin, F.S., Polasky, S., Smith, V.K., Tilman, D., & Turner, B.L. (2011). Paying for Ecosystem Services - Promise and Peril. *Science*, 334(6056), 603-604.

Kinzig, A.P., Perrings, C., Chapin, F.S., Polasky, S., Smith, V.K., Tilman, D., & Turner, B.L. (2012). Ecosystem services: Free lunch no more. *Science*, 335(6069), 656-657.

List, J. A., & Hofler, R. A. (2004). Valuation on the Frontier: Calibrating Actual and Hypothetical Statements of Value. *American Journal of Agricultural Economics*, 86(1), 213–221.

List, J. A., & Karlan, D. (2007). Does Price Matter in Charitable Giving? Evidence from a Large-Scale Natural Field Experiment. *American Economic Review*, 97(5), 1774-1793.

Liu, J., Li, S., Ouyang, Z., Tam, C., Chen, X. (2008). Ecological and socioeconomic effects of China's policies for ecosystem services. *Proceedings of the National Acadamy of Sciences of the United States of America*, 105(28), 9477-9482.

Mazar, N., & Zhong, C.-B. (2010). Do Green Products Make Us Better People? *Psychological Science*, 21(4), 494-498.

Merritt, A. C., & Effron, D. A. (2010). Moral Self-Licensing□: When Being Good Frees Us to Be Bad. *Social and Personality Psychology Compass*, *5*(4), 344–357.

Milkman, K. L., & Beshears, J. (2009). Mental accounting and small windfalls: Evidence from an online grocer. *Journal of Economic Behavior & Organization*, *71*(2), 384–394. doi:10.1016/j.jebo.2009.04.007

Modigliani, F. (1966). The Life Cycle Hypothesis of Savings, the Demand for Wealth and the Supply of Capital. *Social Research*, *33*(2), 55-84.

Muradian, R., Arsel, M., Pellegrini, L., Adaman, F., Aguilar, B. Agarwal, B., Corbera, E., Ezzine de Blas, D., Farley, J., Froger, G., Garcia-Frapolli, E. Gómez-Baggethun, E., Gowdy, J., Kosoy, N., Le Coq, J.F., Leroy, P.,

May, P., Méral, P., Mibielli, P., Norgaard, R., Ozkaynak, B., Pascual, U., Pengue, W., Perez, M., Pesche, D., Pirard, R., Ramos-Martin, J., Rival, L., Saenz, F., Van Hecken, G., Vatn, A., Vira, B., & Urama, K. (2013). Payments for ecosystem services and the fatal attraction of win-win solutions. Conservation Letters, *0*, 1-6.

Pagiola, S., Arcenas, A., & Platais, G. (2005). Can Payments for Environmental Services Help Reduce Poverty? An Exploration of the Issues and the Evidence to Date from Latin America. *World Development*, 33(2), 237–253. doi:10.1016/j.worlddev.2004.07.011

Pagiola, S., Rios, A., Arcenas, A. (2008). Can the poor participate in payments for environmental services? Lessons from the Silvopastoral Project in Nicaragua. *Environment and Development Economics*, Cambridge University Press, 13(03), 299-325.

Pistorius, T., Schaich, H., Winkel, G., Plieninger, T., Bieling, C., Konold, W., & Volz, K.-R. (2012). Lessons for REDDplus: A comparative analysis of the German discourse on forest functions and the global ecosystem services debate. *Forest Policy and Economics*, 18, 4–12. doi:10.1016/j.forpol.2011.09.001

Reinstein, D., & Riener, G. (2011). Decomposing desert and tangibility effects in a charitable giving experiment. *Experimental Economics*, 15(1), 229–240. doi:10.1007/s10683-011-9298-0

Sachdeva, S., Iliev, R., & Medin, D. L. (2009). Sinning saints and saintly sinners: The paradox of moral self-regulation. *Psychological Science*, 20(4), 523–528.

Sager, R. (2010). How the Feds Try to Trick You Into Spending, http://www.smartmoney.com/

Shapiro, M., & Slemrod, J. (2003). Consumer response to tax rebates. *American Economic Review*, 93, 381–396.

Shipton, P. (1990). Bitter Money: Cultural Economy and Some African Meanings of Forbidden Commodities. *Journal of Anthropological Research*, 46(2), 205-207.

Strahilevitz, M., Myers, J. G. (1998). Donations to Charity as Purchase Incentives: How Well They Work May Depend on What You Are Trying to Sell. *Journal of Consumer Research*, 24 (4), 434–446.

Surowiecki, J. (2006). Bitter Money And Christmas Clubs. www.forbes.com

Swallow, B., Kallesoe, M., Iftikhar, U., Noordwijk, M. Van, Bracer, C., Mallee, H., & Rumley, R. (2008). Compensation and Rewards for Environmental Services in the Developing World : Framing pan-tropical analysis and comparison. *Ecology and Society*, 14(2): 26.

Thaler, R. H. (1990). Anomalies. Saving, Fungibility and Mental Accounts. *Journal of Economic Perspectives*, *4*(1), 193–205.

Thaler, R. H. (1999). Mental Accounting Matters. *Journal of Behavioral Decision Making*, *12*, 183–206.

Thaler, R. H., & Johnson, E. J. (1990). Gambling with the House Money and Trying to Break Even: The Effects of Prior Outcomes on Risky Choice. *Management Science*, 36(6), 643-660.

Thaler, R.H., & Sunstein, C.R. (2008). Nudge: Improving Decisions About Health, Wealth, and Happiness. *Environmental and Resource Economics*, 47(1), 149-150.

Tiefenbeck, V., Staake, T., Roth, K., Sachs, O. (2013). For better or for worse? Empirical evidence of moral licensing in a behavioral energy conservation campaign. *Energy Policy*, 57, 160-171

Tinbergen, J. (1952). On the theory of economic policy. Amsterdam: North Holland.

Wunder, S. (2008). Environment and Development Economics□: Payments for environmental services and the poor□: concepts and preliminary evidence. *Environment and Development Economics*, 13(3), 279–297. doi:10.1017/S1355770X08004282

Zilberman, D., Lipper, L., & Mccarthy, N. (2008). When could payments for environmental services benefit the poor? *Environment and Development Economics*, 13(3), 255–278. doi:10.1017/S1355770X08004294

Appendix A

Table 4 – Correlation table (Pearson correlation coefficient)

	Group	**Gender**	**Age**	**Resource**	**Education**	**Outsiders**
Group	1.0000					
Gender	0.0850	1.0000				
Age	-0.0329	-0.0553	1.0000			
Resource	0.1149	0.1842**	-0.1897**	1.0000		
Education	0.0488	-0.0612	-0.2024**	0.0719	1.0000	
Outsiders	-0.0423	-0.1048	0.0551	-0.0660	-0.0330	1.0000

***, **, * Indicates statistical significance at the 1, 5 and 10 percent significance levels, respectively

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