Gender and personal finance management

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Abstract

The chapter reviews gender related differences on saving and investment behavior and on debt management, including major factors that have been identified in previous research as influencing the quality of financial decisions making, such as risk attitudes, financial literacy, confidence in financial knowledge and cognitive style. In addition, we analyze preliminary data from our laboratory on men and women's management of multiple debt accounts, and based on these data, suggest possible mechanisms behind gender similarities and differences in the observed behavior.

Keywords: debt repayment, financial decision making, financial literacy, gender differences, investment and saving behavior, risk attitudes

1. Introduction

The ability of both men and women to effectively manage their personal and household finances has important consequences on individuals’ lives in modern society. For instance, the implications of making sound savings and investment decisions and efficiently managing open debt accounts are considerable, both at the personal level of financial well-being and psychological wellbeing (Lusardi & Mitchell, 2008, 2011) and at the public level of welfare policy and economic growth. Therefore, it is not surprising that researchers as well as financial institutions are interested in understanding how individuals make monetary decisions. The challenge is to better understand the psychological forces that lead people to irrational financial decisions, and then redirect these forces to design public policy interventions to improve the financial capabilities of individuals (e.g., encourage people to employ financial planning and save more for tomorrow, Thaler & Benartzi, 2004).

The need to improve financial behavior gains additional impetus, when we take into account gender differences and inequality. A relatively broad range of empirical literature has documented that the economic wellbeing of men and women differ significantly. Women tend to have lower working-life incomes (Bajtelsmit, Bernasek & Jianakoplos, 1999), save less for retirement (Kelly & Gong, 2010), own fewer investment products (Atkinson & Messy, 2012) and have lower levels of wealth as compared to men (Hui, Vincent & Woolley, 2011; Schmidt & Sevak, 2006; Siermiska, Frick & Grabka, 2010). According to an OECD report (2013), women tend to live longer than men, but have a weaker labor market position, shorter working lives and lower average income. Thus women are at higher risk than men of facing financial hardship. Consequently, women's ability to effectively participate in

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economic activities, manage their financial accounts and control their decision-making processes is crucial.

An essential aspect of attempts to improve the financial wellbeing of individuals is understanding the factors that influence the quality of their financial decisions, and uncovering which factors have a differential effect on men and women's financial behavior. In section 2 we elaborate on several such factors that have been identified in previous research including risk attitudes, financial literacy, confidence in financial knowledge and cognitive style. This section also reviews explanations and possible determinants of these observed gender differences.

The remainder of the chapter is organized as follows: Section 3 examines the impact of gender related differences on the quality of investment decisions. Section 4 reviews the current literature on the effect of gender on debt management behavior, and then analyses data from our laboratory on men and women's management of multiple debt accounts. Based on these preliminary data, we suggest possible mechanisms behind gender similarities and differences in the observed behavior.

It should be noted, however, that the existing body of research on gender differences in financial decision making has focused mostly on investments and gambling. Although we acknowledge that the ability to make appropriate saving and investments decisions has a profound impact on individuals' overall wealth and their future financial well-being, we also stress in this chapter that additional financial activities such as open debt management (i.e., Novailitis, Merwin, Osberg, Roehling, Young & Kamas, 2006), might also play a major role in determining financial wealth and well-being. Our data analysis on gender differences in debt management is thus a first step in exploring this untraveled route.

2. Factors that differentially impact men and women's financial decisions


2.1 Attitudes toward Risks

Different risk preferences by men and women have been documented in many studies across a wide range of domains. A substantial body of research suggests that in most areas females tend to be more averse to risk than males (see a meta-analysis by Byrnes, Miller & Schafer, 1999). A similar pattern of higher propensity for risk taking in men as compared to women was also found by most of the studies in the domain of investing and gambling. (Berggren & Gonzalez, 2010; Croson & Gneezy, 2009; Eckel & Grossman, 2002, 2008; Graham, Stendardi, Myers, Graham, 2002; Hallahan, Faff, & McKenzie, 2004; but see also Kunnanatt & Emiline, 2012). This association has been detected both in experimental laboratory studies and in field
surveys. For instance, field studies that have looked at the structure of individuals' actual investments found consistent support for gender-related differences in risk preferences. Women report lower levels of risk tolerance, tend to have less risky asset portfolios, exhibit greater relative risk aversion in their allocation of wealth into defined contribution pension assets and exhibit lower willingness to accept financial risk as compared with men (Agnew, Balduzzi & Sunden, 2003; Arano, Parker & Terry, 2010; Bajtelsmit et al., 1999; Halko, Kaustia & Alanko, 2012; Hinz, McCarthy & Turner, 1997; Jianakoplos & Bernasek, 1998; Siva, 2012; Watson & McNaughton, 2007).

Laboratory studies that have presented participants with settings designed to mimic investment behavior have generally reverberated the same pattern of gender related differences. For example, Charness and Gneezy (2012) found strong evidence for gender differences in risk preferences. They collected data from fifteen sets of experiments with a similar design that involved a single simple investment game. These experiments were conducted by different researchers in different countries, with different instructions, durations, payments, subject pools, etc. The analysis of the actual investment behavior of the participants yielded a consistent result. Women made smaller investments in risky assets as compared to men. Thus, the researchers concluded that women are financially more risk-averse. Eckel and Grossmann (2002) found significant gender differences in risk preferences. In their study, participants chose between alternative gambles with different expected returns and variances. They found that women indicated a preference for the less risky prospect. Women also reported a lower risk propensity than men when asked about their attitudes towards financial risks.

It should be noted that although gender related disparities in risk perception are widely acknowledged, there is less agreement about their causes and their underlying mechanisms. In addition, some studies have found contradictory evidence under specific settings. For example, Schubert, Brown, Gysler & Brachinger (1999) found gender differences in risk preferences when the task involved abstract gambling decisions; however, the differences disappeared when an investment decision context was presented. Schubert et al. (1999) found that under specific situations men might be more risk-averse than women. Eckel & Grossman (2008) reviewed several studies that examined differences in risk-related behavior of men and women. They made a distinction between laboratory studies that presented abstract gambles, laboratory studies that presented contextual environments of investments or insurance decisions, and field studies that measured men and women's actual gambling behavior and real-life investment allocation decisions. While the majority of the laboratory experiments in their review showed that women are less risk-tolerant than men, some studies that involved investment and insurance frames presented counterevidence. In addition, some cross-cultural studies have found gender differences among whites, but not among other ethnic groups (Feng & Seasholes, 2008), although women tended to be more risk averse than men in most countries (OECD, 2013; Zinkhan & Karande, 1991).

2.1.1 Why do men and women differ in their attitudes toward risk?

Although gender-related disparities in risk preferences have been demonstrated across a wide variety of domains and specifically in financial arenas, the mechanisms underlying these differences have been less well explored. Researchers have suggested several possible explanations for the gender gap in risk preferences.
One explanation was put forward by Eckel & Grossman (2008) who contended that the contradictory results in the literature might stem from a failure to control for intervening factors such as, wealth, marital status and other demographic factors that might bias the measures of males and female differences in risky choices. In line with these concerns, some authors have proposed socio-cultural explanations, including that women's tendency for risk aversion is a result of factors such as marital status, self-perception as knowledgeable, and age (Gerrans & Clark-Murphy, 2004). For example, the gender effect in Gerrans and Clark-Murphy's study was not uniform and some notable reversals of the gender effect where found. In their study single females in the younger age category emerged as more likely to select lower risk investment choices, but married females in the younger age category had a greater likelihood of choosing the riskier option relative to married males in the older age category.

A second explanation has to do with disparities in the levels of financial knowledge and financial experiences of women and men (Beckmann & Menkhoff, 2008; Brokešová, 2013; Dwyer, Gilkeson, & List, 2002; Eckel & Grossman, 2008; Menkhoff, Schmidt & Brozynski, 2006). Several researchers have presented empirical evidence that demonstrates a direct link between financial knowledge and risk tolerance. For example, in a sample of undergraduate students, women were inclined to choose safer options in financial decisions, but these differences were statistically significant only when experience and knowledge were very high (Brokešová, 2013). Similarly, the impact of gender on risk taking was significantly weakened when investor knowledge of financial markets and investments was controlled for (Dwyer, Gilkeson, & List, 2002). In addition, men were more risk-seeking among low knowledge individuals, while women were more risk-seeking among high knowledge individuals (Gysler & Kruse, 2002).

One plausible way to examine whether women's risk aversion stems from a lack of relevant knowledge is looking at the behavior of knowledgeable women in risky financial settings. However, the results from several sources suggest that women's tendency toward risk aversion is also present in professional financial analysts. For example, gender was still a strong predictor of risk taking when the study included participants who had extensive personal and professional experience with financial matters, such as wealthy private banking investors, investment advisors and managers and finance students (Halko, Kaušia & Alanko, 2012). In addition, female professional investors placed more emphasis on the safety of an investment than male professional investors (Olsen & Cox, 2001). Furthermore, female fund managers were found to be more risk-averse and more likely to shy away from competition than male fund managers (Beckmann& Menkhoff, 2008).

Other explanations cite biological factors such as gender differences in testosterone levels (Sapienza, Zingales & Maestripieri, 2009), or cognitive or emotion-based factors, such as women’s relative insensitivity to probabilities combined with their tendency for pessimism (Fehr-Duda, De Gennaro & Schubert, 2006), a tendency for optimists of a specific subgroup of males (Felton, Gibson & Sanbonmatsu, 2003), and gender differences in self-reported emotions (Johnson & Weber, 2009).

Finally, an evolutionary explanation was put forward by Eckel and Grossman (2002). They claimed that gender differences in risk-behavior patterns stem from evolved strategies that reflect differences in the costs and benefits of sex-linked alternative investments in reproductive success. Interestingly, evolutionary accounts are also used to explain gender related differences in the importance placed in financial security in the domain of sexual attraction. Financial security was found to be one of the three qualities women most often sought in men. Woman were more
than twice as likely as men to seek financial security, and women placed much more emphasis on financial security as compared to physical attractiveness while men were more likely than women to seek attractiveness (Harrison & Saeed, 1977). This explanation seems quite compelling and relevant, since, historically, women across many different countries have been dependent on men for financial security (Schmidt & Sevak, 2006).

2.2 Financial literacy

Recently, financial literacy has been widely acknowledged as a basic skill that is essential for individuals who need to make financial decisions in today's modern multifaceted financial environment. An extensive amount of empirical studies provides evidence that men have higher levels of financial literacy (Chen & Volpe, 2002; Fonseca et al., 2012; Lusardi & Mitchell, 2008, 2011; Zissimopoulos, Karney & Rauer, 2008). For example, Zissimopoulos et al., (2008) found that less than 20% of middle-aged college-educated women could answer a basic compound interest question compared to about 35% of college-educated males of the same age. Chen & Volpe (2002) found that women have lower financial knowledge in personal finance than men. Women scored lower than men in 22 out of 36 questions and had a higher score on only one question. These patterns were obtained across different countries (OECD, 2013), and a wide range of age groups (Agnew & Harrison, 2015; Chen and Volpe 2002).

Although the evidence on gender related disparities in financial literacy are quite robust, less is known about the mechanisms that may produce this gap (Fonseca, Mullen, Zamarro, & Zissimopoulos, 2012). The studies on the mechanisms that underlie the observed gender gap offer some insights on possible determining factors, including differences in tendencies, attitudes, and experiences (OECD, 2013). Chen & Volpe (2002) argued that gender differences in financial literacy are related to education and experience. Their study shows that factors such as major field and years of education had a significant effect on knowledge. Business majors knew more than non-business majors, and knowledge increased with years of education. They also argued that men and women have different attitudes to financial matters, and that women have less interest in finance, as more men than women in their study rated personal finance as an important topic. Where as men chose to study mathematics and other number- oriented subjects, women had a preference for English and word-related subjects. Other researchers who have specifically examined how financial decisions are made within households, have reported that men more often than women make the financial decisions and consequently acquire more financial knowledge (Fonseca et al., 2012).

2.3 Confidence and overconfidence in financial knowledge and skills

The evidence indicate that men have more confidence in their financial skills than females (Chen & Volpe, 2002; Fonseca et al., 2012; Lusardi & Mitchell, 2008, 2011; Zissimopoulos, Karney & Rauer, 2008). Research focusing on gender related differences in investment patterns suggests that female investors tend to have less confidence in their investment decisions than male investors in similar settings (Agnew et al., 2003; Barber & Odean, 2001; Webster & Ellis, 1996), even when there was no apparent difference in actual knowledge (Goldsmith & Goldsmith, 1997) or
when both genders had a similar level of prior experience and education (Powell & Ansic, 1997). Females less than males tend to feel that they are better off in comparison with others (Hira & Mugenda, 2000), and are more likely to attribute their performance to good luck (Powell & Ansic, 1997) and to indicate that they do not know the answer to a question on a financial knowledge test rather than attempt to answer it (Bengtsson, Persson & Willenhag 2005; OECD, 2013). However some studies have not found a difference in men and women's level of confidence in financial decision making (Berggren & Gonzalez, 2010).

2.4 Thinking style

Another factor that was highlighted as affecting investment behavior is the prevalence of analytic versus intuitive thinking styles (for recent review see Ayal, Rusou, Zakay & Hochann, 2015). The dominance of the two thinking styles is measured by the Rational-Experiential Inventory (REI) developed by Epstein, Pacini, Denes-Raj & Heier (1996) which consists of two subscales, the rational thinking style (which measures individual differences in relying on a conscious, analytical, and relatively affect-free information processing system) and experiential thinking style (faith in intuition). Studies have reported small but significant gender differences in thinking styles. Males are more likely than females to identify themselves as rationally able, and females were more likely than males to identify themselves as experiential (having higher faith in intuition) (Epstein, 2003; Pacini & Epstein, 1999; Sladek, Bond & Phillips, 2010).

Glaser & Walther (2013) argued that high faith in intuition might diminish the positive effect of financial literacy on reasonable investment decisions, since individuals might rely on their hunches rather than on thorough explorations. On the other hand, Wong, Kwong, & Ng (2008) examined the relationship between the rational thinking style and decision quality in an escalation situation, and reported a positive relationship between a tendency for rational thinking and escalation bias. They concluded that rational thinking increases confidence in previous decisions, and accordingly increases escalation.

3. Gender differences in saving and investment behavior

Given the relative robustness of the evidence on gender differences in risk attitudes, financial literacy, confidence in financial matters and thinking style, there appear to be implications for men and women's investment patterns and financial outcomes. For instance, some researchers have claimed that the lower levels of knowledge, lower confidence and reduced willingness to accept risks can be costly to women investors, and lead them to less profitable investments, due to their higher reliance on safer low return saving products and less reliance on high return investments (Brokešová, 2013; Graham et al., 2002).

These claims are reinforced by a substantial body of literature on the relationship between gender and investment behavior, which has shown that women invest their financial resources more conservatively compared to men. For example, Halko, Kaustia & Alanko (2012) studied the relationship between gender and stock holdings...
in Finland, and found that men have riskier portfolios than women, even after controlling for financial knowledge and financial resources. They also found that the strongest predictor of this gender gap is women’s higher risk aversion. Watson and McNaughton (2007) examined the impact of gender on the retirement fund preferences of staff in an Australian university. Their data revealed that women chose more conservative investment strategies than men. This result remained significant after controlling for age (which was negatively related to risk taking) and income (which was positively related to risk taking). Similar patterns have emerged in studies that analyzed allocations of wealth into defined contribution pension assets (Bajtelsmit, et al., 1999), and data of the 1990 survey of participants in the federal government’s Thrift Savings Plan in the USA (Hinz et al.,1997). In both studies, women invested their pension assets more conservatively than men. Hinz et al. (1997) also found that a large percentage of women invested in the minimum-risk portfolio available to them. A portion of the pattern could be explained by women’s lower incomes, but the result persisted after controlling for economic and demographic variables.

However in specific situations, women's lower confidence can be beneficial (Barber & Odean, 2001; Willows & West, 2015). For example, research by Barber and Odean (2001) provides evidence that men trade more excessively than women. They analyzed the trading records of approximately 35,000 households and found that men traded 45 percent more than women, and that this excessive trading led to significantly lower returns for men as compared to women. These differences were the most prominent between single men and single women. The authors suggested that because of their tendency toward less overconfidence, women tend to be more careful, rely on information that is more comprehensive and are likely to ask more questions than men do.

To summarize, the picture that emerges from the ample research on the relationship between gender and investing behavior highlights several factors that differentially affect men and women's behavior patterns of personal finance management, and specifically suggest that there are advantages and disadvantages associated with the fact that women invest their financial resources more conservatively. Nevertheless, there are also studies that do not find these expected gender differences (Bliss & Potter, 2002; Powell & Ansic, 1997; Willows & West, 2014). The implications of these differences on overall portfolio performance are inconclusive and have yet to be explored.

4. Gender differences in the management of open debts

The ability to manage open debts efficiently (or inefficiently) directly affects the risk of accumulating high levels of debts and the total amount of wealth possessed by an individual. In addition, the amount of individual debt has psychological and social implications. The empirical evidence shows that high levels of debt are associated with increased levels of psychological distress (Bridges & Disney, 2010; Brown, Taylor & Price, 2005; Norvilitis, Szablicki,& Wilson, 2003), and mental disorders (Jenkins, Bhugra, Bebbington, Brugha, Farrell, Coid, Fryers, Weich, Singleton & Meltzer, 2008). High levels of debt are also associated with individuals' lower self-perceptions of their ability to control their financial situation (Lange & Byrd, 1998), and with higher probabilities of dropping out of college (Dwyer, Hodson & McCloud,
Thus, in order to develop effective approaches to improve financial well-being, it is essential to understand how people handle their multiple debts, and whether women differ from men in this regard.

To date, however, there has been very little exploration of gender differences in debt management and the few studies that have addressed this issue report inconclusive results. Some studies show that women own more credit cards (Goldsmith & Goldsmith, 2006), report spending more than they should, buy things they do not need and make unplanned purchases (Hira & Mugenda, 2000; Hira & Loibl, 2008) and carry more debt than men (Davies & Lea, 1995; Goldsmith & Goldsmith, 2006). On the other hand, other studies did not find gender differences in credit-card debt (Novailitis, Merwin, Osberg, Roehling, Young & Kamas, 2006) or in individuals' satisfaction with their debt levels (Hira & Mugenda, 2000) and some studies demonstrated that more women than men are likely to have a budget (Henry, Weber & Yarbrough, 2001), and that the majority of both men and women did not engage in excessive or problem buying behavior (Hira & Mugenda, 2000). Thus, the role of gender in debt management is unclear and calls for further research (c.f., Novailitis et al., 2006).

4.1 Data from our laboratory

One important component of debt management is the repayment of open debts. Since many individuals have several debt accounts (Experian 2009), a key element in the attempt to reduce open debt is by developing strategies of debt repayment (i.e., developing schemes to determine which of their open debt accounts to repay first). From a normative perspective, it is quite clear that in order to minimize the total amount of debt across loans, the best approach is to pay the minimum payment for each debt first (to avoid surcharges and penalties) and then use all available cash to pay down the loan with the highest interest rate. After this loan has been paid off, people should move to the loan with the next highest interest rate, and so on.

However, previous research suggests that people stray from normative principles when managing debts. Rather than adhering to the financially optimal strategy of repaying first the debts with the highest interest rates, many individuals prefer to repay the smallest debts first. That is, they prioritize reducing the number of debt accounts over reducing the total amount of debt across accounts, and thus exhibit "debt account aversion" (Amar, Ariely, Ayal, Cryder & Rick, 2011).

To tackle the issue of which gender related differences in behavior are likely to emerge in an environment of multiple debt accounts, we reanalyzed a database from an experiment that simulated a real-life situation of recurring repayment decisions in an environment of multiple open debts. To this end, we employed the "Debt Management Game" (Experiment 1, Amar et al., 2011 – see box below). One hundred ninety two undergraduate students (55% female; mean age: 21.5) participated in the experiment.

We extended this basic paradigm and used two experimental conditions, each designed to shed light on a different aspect of debt repayment behavior. The first condition ("No-saving"), in which participants were required to allocate all of their available cash to debt repayment, examined gender differences in debt account aversion. The second condition, ("Saving Allowed") in which participants could
determine the amount of the money to repay debts and store the rest in a “checking” account (with lowest interest rate than all open debt), examined how the opportunity to irrationally keep some of the available cash differentially affected men and women's repayment strategies.
**Box 1: Overview of the "Debt Management Game"

In the Debt Management Game, participants were saddled with multiple debt accounts that varied in amount and annual interest rate (see Table below), and were asked to make recurring decisions on how to repay these debts over 25 rounds, which represented 25 years. In each round, participants received a $5,000 cash allotment that they could use to pay down one or more of the open debt accounts. In addition, participants occasionally received cash bonuses that could also be used to pay off their debts ($20,000 in round 6, $15,000 in round 12, and $40,000 in round 19). Participants repaid debts by typing in the amount they wanted to allocate to each debt account and then approving it (see Appendix A). After participants approved their decision, the program presented the updated balance of each debt and a graph displaying the past and current standing of each debt (to illustrate, appendix A presents a screen example of the debt management game). At the end of the game, the total debt of each participant was calculated. In the "No Saving" condition, total debt was calculated by summing debt amounts in the participant's open debt accounts. In the "Saving Allowed" condition, total debt was calculated by reducing the amount of cash remaining in the checking account (if any) from the sum of debts in the open debt accounts.

<table>
<thead>
<tr>
<th></th>
<th>Annual Interest Rate (%)</th>
<th>Initial Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt 1</td>
<td>2.50</td>
<td>3,000</td>
</tr>
<tr>
<td>Debt 2</td>
<td>2.00</td>
<td>8,000</td>
</tr>
<tr>
<td>Debt 3</td>
<td>3.50</td>
<td>11,000</td>
</tr>
<tr>
<td>Debt 4</td>
<td>3.25</td>
<td>13,000</td>
</tr>
<tr>
<td>Debt 5</td>
<td>3.75</td>
<td>52,000</td>
</tr>
<tr>
<td>Debt 6</td>
<td>4.00</td>
<td>60,000</td>
</tr>
<tr>
<td>Checking account*</td>
<td>2.00</td>
<td>0</td>
</tr>
</tbody>
</table>

*The checking account was used in the "Saving Allowed" condition, in order to store cash that was not used for debt repayment.

A financially optimal player who (in each round) allocates all available cash to the open debt with the highest interest rate would first pay off Debt 6, then Debt 5, and then Debt 3 and then begin to repay Debt 4 (the game would end before Debt 4 could be completely repaid). The financially optimal player would never allocate any cash toward Debts 1 and 2 and would conclude the game with three open debts that sum to $29,428 in total (appendix 2 shows the final screen of Debt Management Game for a financially optimal player). Importantly, because the interest rate on savings in the "Saving-Allowed" condition was less than or equal to the interest rates of all the debts (all debt interest rates were 2% or greater), a participant who adopted the normative approach in the "saving allowed" condition would not allocate any money to saving. Thus, the total debt of a financially optimal player at the end of the game should be $29,428 in both conditions (see Appendix B).

The game was incentive compatible. Participants received a bonus based on their performance: specifically, they received $4.00 if their total debt at the end of the game was $30,000 or less, $3.00 if their total debt was between $30,001 and $35,000, $2.00 if their total debt was between $35,001 and $40,000, and $1 if their total debt was greater than $40,000.
4.1.1 Working Hypotheses on Gender differences

The findings presented in this chapter suggest two main predictions with regard to gender differences in debt management. First, a relatively extensive literature on the gender gap in financial literacy yields the general finding that women have less financial knowledge than men (Fornero & Monticone, 2011; Lusardi & Mitchell, 2008, 2011; Sekita, 2011). Thus, we anticipated that women would show a higher bias toward reducing the number of debt accounts over reducing the total amount of debt across accounts. Based on this rationale we formulated our first hypothesis:

Hypothesis A - women will allocate less money to the highest interest debt, compared with men.

Second, women's tendency to exhibit intolerance to risk has been attributed by researchers to an evolved mechanism that reflects differences in the costs and benefits of sex-linked alternative investments in reproductive success (Eckel & Grossman, 2002). Hence, we expected that when being able to determine how much cash to keep versus allocating for debt repayment, women more than men might want to keep money for "a rainy day" and consequently would allocate less money to the closing of open debts. Based on this rationale we formulated our second hypothesis:

Hypothesis B - Women will keep more cash money (irrationally saving) compared to men, and as a result, women will end the game with higher total debt amounts.

4.1.2 Results and Discussion

First, we examined whether participants adopted a normative strategy for debt repayment (i.e., whether they used the money to repay the open debts with the highest interest rates). Mean total debt in both conditions was significantly greater than the total debt of a (hypothetical) financially optimal player (both $p < 0.001$). Across both conditions, the average participant lost $12,903 because of non-optimal debt repayment decisions. As reported in Amar et al. (2011), the total debt in the saving-allowed condition was significantly larger than total debt in the no-saving condition ($39,513 vs. $33,939; t(79) = 44.12, p<0.001$). However it remained unclear what prompted this increase in irrationality when saving was allowed and whether this effect was similar in both men and women.

In order to examine the first hypothesis that women would show a higher bias toward reducing the number of debt accounts over reducing the total amount of debt across accounts, we examined gender differences in the average amount of money which were used to pay off the debt with the highest interest (i.e., rational money). When saving was not allowed and all the money was allocated directly to open debts, no significant difference was found between women and men in their amount of money that was allocated to the debt with the highest interest rate (Mwomen = 86,665 vs. Mmen= 86,060; t(78) = .323, $p > .05$) or their aggregate debt at the end of the game (Mwomen =34,473 vs. Mmen= 33,216; t(78) = -1.134, $p > .05$). Thus, the first hypothesis was not supported since we did not find evidence for higher irrationality or debt account aversion (DAA) among women in this condition. These findings corroborate the mixed results that have been obtained in previous research and might suggest that gender has a null effect on rationality in debt management decisions.
However, the findings may also stem from the fact that debt management does not require extensive financial knowledge (i.e., interest rate comparisons are sufficient) compared to investment decisions.

Most interestingly, our analyses also revealed a potential gender difference when saving was allowed. In line with the second hypothesis, the data demonstrated that when able to determine how much money to keep versus how much money should be allocated for debt repayment, women chose to keep more cash than men, and consequently allocated less money to close open debts (Mwomen = 12,196 vs. Mmen = 15,560; t(110) = -2.09, p = .039). As a result, their aggregate debt at the end of the game was higher than that of men (Mwomen = 39,124 vs. Mmen = 35,128; t(110) = -2.42, p = .017). In addition, a comparison between the "Saving-Allowed" and "No Saving" conditions revealed that the option to keep cash had a negative impact on women's debt repayment performance. Specifically, the women’s aggregate debt at the end of the game in the saving-allowed condition was significantly higher than in the no-saving condition (M = 39,124 vs. 34,473; t(110) = -2.42, p = .001). In contrast, no negative impact was observed on men's debt repayment performance as no significant difference was observed between men's aggregate debt at the end of the game in the saving-allowed condition and the no-saving condition (Msaving allowed = 33,216 vs. Mnop saving = 35,128; t(110) = -1.02, p > .05).

These results lend initial credence to the supposition that women save more money for ‘a rainy day’ and consequently they end up with a higher total debt than men. While more direct research and field data are required to put this assertion to a direct test, it supports theoretical approaches that explain gender differences in financial decisions by evolutionary related differences, rather than cognitive skills such as rationality and financial literacy.

5. Concluding remarks

The evidence and the experiments reviewed in this section highlight the existence of substantial gender disparities in factors that have differential implications for men and women's management of personal finance. Although much is known about gender differences in factors related to general saving behavior such as risk attitudes, financial literacy, confidence in financial knowledge and thinking styles, less is known about how these factors differentially affect personal finance management of men and women. In particular, the evidence on the relationship between gender and monetary decisions in the loss domain such as debt management is still scarce and limited. Initial data from our lab did not support the claim that gender differences in financial performance stem from individual differences in thinking styles, knowledge or financial literacy but rather from women's greater need for financial security, which is reflected in a tendency to save more for a rainy day (even when this saving is irrational). These results emphasize the great importance of further studies to shed more light on this topic, and design effective interventions to promote more optimal financial decisions while considering gender differences and inequalities in economic wellbeing.
Acknowledgments

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References:


Appendix A

An Example Screen of Debt Management Game

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**Free Yearly Income:**
- Yearly income (in $U.S.) after living expenses
  - Fixed Income: 5000
  - Bonus: 0

**Current Position:**
- Rounds Played: 25
- Total Rounds: 25
- Cash Available: 0
- Total Debt: 47900.00

**Allocate Cash**
- Choose Debt:
  - Type Amount:
    - 0
  - Your Payment Choices:
    - Clear All
    - Approve All

**Final Screen of Debt Management Game for a Financially Optimal Player**

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**Final Screen of Debt Management Game for a Financially Optimal Player**

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**Allocate Cash**
- Choose Debt:
  - Type Amount:
    - 0
  - Your Payment Choices:
    - Clear All
    - Approve All

**Final Screen of Debt Management Game for a Financially Optimal Player**

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