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A Contribution to the Empirics of Consumers' Anxiety Behavior on and in Credit Card Repayment. Credit Card Management and Financial Literacy Among College Student

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Financial Anxiety and Consumers' Behavior on and in Credit Card Repayment

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Abstract

This paper studies the determinants of financial anxiety and the role that anxiety plays in consumers' credit card repayment behavior. Exploratory estimates with anxiety levels as dependent variable, first, and repayment frequency on credit card second, provide robust support to the hypothesis that issues relating to consumer's perception of self, regarding consumption and borrowing behavior, such as poor mental accounting on expenditure, combined with impatience and present-bias behavior result in higher levels of anxiety. To this end, higher financial literacy does not cause less anxiety, yet it does improve repayment rates on credit cards. In addition, it appears that parental driven financial education while having the desirable effect to improve repayment behavior on credit card debt, also has a negative effect on the anxiety level. A robust result of our study indicates that higher financial anxiety increases the probability to accumulate a month-to-month balance on credit cards.

Keywords: Anxiety; Credit card repayment behavior; Financial literacy; Impatience and self-control; Trans-generational financial education effects.
JEL Codes: G00; G02; G29.

1 Introduction

Credit cards are a fundamental fact of life for a large segment of the US population. Credit cards serve many useful purposes such as being an almost indispensable mean to build a credit record, a necessary condition when renting a car for instance, or make an online purchase. Credit cards allow individuals to make immediate purchases to then be paid when the bill comes due at the end of the billing cycle. However, as easy as it is to use a credit card, it is extremely easy – if not easier – to misuse credit cards and generate a misalignment between income and consumption patterns. Mismanagement of credit cards could easily result in large accumulation of revolving month-to-month debt. Keys

and Wang (2015) note that as of May 2016 there is $712 billion outstanding credit card debt in the US; and it is projected to reach $1 billion by the end of 2016. Credit cards could also result in financial anxiety relating to debt repayment capabilities. In this paper we place a primarily role in anxiety derived from credit cards use, debt and issues relating to financial education regarding financial literacy, credit card repayment and consumption decision patterns. Particularly, our main interest is to address two questions: first, how is financial anxiety generated? And secondly, how does financial anxiety reflects itself on credit card repayment patterns?

Credit card regulation allows individuals to accumulate a month-to-month balance since paying in full every month is not mandatory. In fact, as long as individuals make at least a minimum payment (set by the credit card companies) every billing cycle they remain in «good» standing; and are therefore allowed to continue using the credit card. This behavior could lead to accumulating more debt and financing day-to-day purchases with credit instead of using cash. As Keys and Wang (2015) also note, minimum payments (or any payment frequency other than pay in full) create biased payment amounts that translate into a growing month-to-month balance. Of course, late fees and added interest on the balance also accumulate. In this context, however, financial anxiety related to credit card repayment capabilities of the individual has received only minimal attention.

Issues relating to credit card debt mismanagement could easily be related to several factors, such as easy access to credit cards, lack of financial education – consequently low levels of financial literacy – which could and indeed translate into large levels of credit card debt accumulation. The combined result of these factors is to create pervasive incentives for consumers to live beyond their means. Educational programs and early intervention regarding financial literacy are aimed at preventing individuals from engaging in this type of behavior, and compensate for the endogenous presence of naïve behavior, lack of self-control and overconfidence regarding repayment capabilities and overall financial knowledge.

The literature on behavioral biases, mainly that relating to consumption patterns, proposes the existence of several factors governing individuals' behavior. Particularly issues relating to hyperbolic discount functions in consumption – present bias – naïve behavior, lack of self-control and impatience (Akerlof, 1991; Laibson, 1997; O'Donoghue and Rabin, 1999; Kuchler, 2013; Thaler and Shefrin, 1981; among others) may lead to patterns of consumption, which fueled by easy access to credit cards may result into too much debt accumulation. This type of behavior leads to unintended consequences such as high levels of financial anxiety[1]. The extant literature does not provide a distinctive answer as to whether anxiety is – endogenous – the result of self-driven decision making processes or – exogenous – transmitted from parents to children. An issue that remains unresolved is whether endogenously determined anxiety leads to poor repayment, as anxiety is a by-product/manifestation of irrational consumption behavior; or exogenously driven anxiety that spins off from parental education and possibly low financial literacy.

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[1] The literature on rational behavior assumes, and dictates consequently, that individuals may obtain debt in line with their repayment capabilities and adhere to optimal debt repayment. In this framework, decision-making processes are optimal and therefore consumption smooths out across time, because individuals have perfect foresight, are rational and apply consistent discounting rules on consumption.

In this paper we aimed at addressing the issue of financial anxiety. Our paper contributes to the extant literature in at least three strands: *i*) issues relating to financial anxiety and its effect on credit card repayment; *ii*) consumption behavior as a catalyst for financial anxiety; and *iii*) effects of transgenerational financial knowledge spillover effects in credit card markets, especially relating to anxiety as a mechanism to educate children (college students).

To address the issues described above, we divide our empirical analysis into three steps. We first estimate an Ordered Probit model with anxiety levels as dependent variable (Ranked category from 1 = no, 2 = some, 3 = somewhat, 4 = very, and 5 = extreme anxiety) and several demographic, financial education and financial literacy, and behavioral variables as independent variables. Second, we estimate an Ordered Probit model for the monthly credit card repayment frequency (1 = pay in full, 2 = pay some in full, some carry a month-to-month balance, 3 = pay more than minimum and carry a month-to-month balance, 4 = make minimum payment and carry a balance, 5 = pay less than minimum). Here we use the same explanatory variables as in the first estimation, but add anxiety on capabilities to pay credit card as an independent variable. Third, we complete our empirical analysis by computing expected probabilities and corresponding marginal analysis for the Anxiety model estimation. A few challenges that we ran into have to do with the possible simultaneous effects that anxiety has on repayment frequency and then repayment frequency on anxiety. Given that our data is a cross section, we cannot disentangle this issue. Our empirical exploratory estimates find that anxiety levels increase because of suboptimal credit card repayment, and that frequency in credit card repayment is negatively affected by higher levels of financial anxiety. Thus, higher levels of financial anxiety do not result in better repayment behavior, but increase the probability of falling behind and accumulating more debt. We also find that a significant component of financial anxiety is endemic and transmitted from parents to children.

We organize the rest of the paper as follows. The next section reviews the most relevant literature on financial literacy and financial anxiety. The third section describes the research design, the estimation model and the data. Because we use ranked dependent variables for the model estimations, we then provide a thorough interpretation of the Ordered Probit model estimations, and conduct corresponding impact analysis. The last section presents some general conclusions and policy recommendations.

2 Literature Review

The literature on issues relating to financial literacy, financial knowledge and financial education has grown exponentially in recent years due to the importance that these topics play in individuals' consumption/savings decisions. In this section, we will review some of the most salient elements pertaining to three main topics relating to these dimensions, namely: i. credit card use and repayment behavior; ii. the role of parents in financial education and individual behavior; and iii. the effect that anxiety, particularly financial anxiety may play in shaping or countering individual behavior in relation to credit card use and repayment. To address this task, we will cover several areas of the literature that

expose the progress in the field of financial literacy and consumer behavior and also identify the gap where our paper makes it largest contribution.

First, to begin with, it is relevant to point out that whether we want or not we all experience anxiety in multiple dimensions in our lives. However, anxiety, as an inner condition of our lives, could serve either as a motivating stressor, or as a negative stressor. In this regard, several papers address the issue and occurrences of financial anxiety, such as Archuleta, Dale and Spann (2013); Drentea (2000); Chamberlain, Diala and Muntaner (2003); Gambetti and Giusberti (2014); Simming, Conwell, Fisher, Richardson and Wijngaarden (2012); Heckman, Lim and Montalto (2014); Andrews and Wilding (2004); Yaroslav (1999). On the negative side, previous studies have shown that anxiety may lead to depression. In turn, they find that depressive states may lead to overall poor choices as a result of inadequate awareness of elements or wrong assessment of outcomes (Diala and Muntaner, 2003; Black, Shaw, McCormick and Allen, 2013; Almeida, Draper, Pirkis, Snowdon, Lautenschlager, Byrne and Pfaff, 2012; Andrews and Windling, 2014). Particularly, some of those poor choices may result in negative financial decisions, such as, but not limited to, over borrowing, accumulation of month-to-month balance on credit cards, or inadequacy to complete payment transactions according to schedules. Even though the prevalent view and the majority of research on anxiety focuses on the negative aspects, there are some studies recognizing the possibility of positive effects deriving from anxiety (Hamann and Sobaje, 1983; Yaroslav, 1999) on individuals' behavior. Specifically, this second line of research argues that anxiety can help individuals perform better under certain circumstances; such in the case of an induced stressor may make people react proactively to negative or stressful situations. Truly, the body of literature studying the sources and effects of anxiety is scarce. Thus, understanding the possible sources of financial anxiety and how it manifests itself through and because of behavior is one of the main goals of this paper.

Second, while significant progress has been made in understanding the importance of financial education and financial literacy regarding improved financial decision making processes, little is known regarding the impact that financial anxiety may have on decision-making processes. Thus, given that financial anxiety is still a relatively new field of study further research needs to be developed. For instance, research in this field looks at direct links of anxiety to financial decisions. Falconier (2015) looks at the anxiety caused by financial stress in marriages. While, Mills, Grasmick, Morgan and Wenk (1992) finds that financial stress also affects other family dimensions that cause anxiety such as quality of life and self-worth. Additional studies like Drentea (2000), found that age and debt are positively correlated with anxiety, that is as people get older and hold more debt then a higher level of financial anxiety develops.

Third, since we bring forth the argument that the fundamental piece of this study is to understand the determinants of financial anxiety and, in turn, how anxiety affects credit card repayment patterns, consumer financial behavior and more importantly the time decision management of funds, we also take a look at the research in relation to credit cards. To this end, a very well-known fact is that credit cards have become a key factor in the personal financial lives of most American households, and recently of young individuals such as college students. Particularly, when credit cards are not handled properly the catalyst of financial anxiety could occur. In fact, no matter what stage of life a person is the use of credit cards for a large proportion of the US population has become one

of the major tools for financing purchasing despite the possible lack of income to cover their costs. Research conducted by Agarwal, Chomsisengphet, Mahoney and Stroebel (2015), note that the aggressiveness of credit card companies trying to target younger and younger audience could potentially have a negative effect if financial literacy is not address at an early age. Other supporting research demonstrates that a high level of anxiety for college students is due to the complexity of financial decisions many face for the first time in their young adult lives (Archuleta, Dale and Spann, 2013; Stein *et al.*, 2013). To this end, Heckman, Lim and Montalto (2014) showed that over 70% of the college students surveyed reported feeling stressed from their personal finances. They also note more students are relying on college loans which will need to be repaid after graduation as a major source of financial anxiety. In another finding, 1/3 of respondents said that financial stress had a negative effect on academic performance (Trombitas, 2012), which can be another indicator that college students face financial anxiety during college.

Fourth, because of its relevance, and the forefront place that regulators have given to the youth-credit card relationship, we pay precise attention to credit card behavior among college students. Thus, when looking directly at college students and credit card use, research specifically indicates credit card debt to be on the rise. Studies also suggest that students holding relatively high credit card balances come from lower income households (Silva and Draut, 2004; Lusardi, Mitchell and Curto, 2010). For these individuals, the struggle of repayment of credit card debt is becoming increasingly evident as month-to-month balance continues to increase, anchoring takes place, and overspending behavior continues to dominate. In this context, Barboza (forthcoming) shows that «repayment is a major problem affecting a large segment of the population» (p. 27) and some of it is the result of present biased behavior and procrastination traits. This line of research helps demonstrate that debt and consumption behavior can cause stress and anxiety among college students. In addition, other factors found in these studies, such as but not limited to personality factors, minority background, age, females, financial status, low financial education, etc, show a positive relationship with higher levels debt accumulated (see among others Norvilitis, Merwin, Osberg, Roehling, Young and Kamas, 2006; Hayhoe, Leach, Allen and Edwards, 2005; Norvilitis and Mendes-Da-Silva, 2013; Gutter, Garrison and Copur, 2010; Gutter and Copur, 2011). For instance, Barboza, Smith, and Pesek (2016) found that students that maintain a healthy consumption behavior – paying in full the balance credit card every month – are more likely to hold lower debt amounts not only in credit cards, but also in student loans.

Fifth, the assumption can be made that with healthy personal financial management/knowledge an individual is less likely to have the negative effects of anxiety. In fact, several papers such as Barboza, Smith and Pesek (2016), Lusardi and Tufano (2009), Archuleta, Dale and Spann (2013), Mottola (2012), Chen and Volpe (2002), Brougham, Zail, Mendoza and Miller (2009), Hayhoe, Leach and Turner (1999), Guo, Wang, Johnson and Diaz (2011) propose that financial literacy is the most adequate tool to prevent individuals from engaging in unhealthy consumption-debt patterns[2]. To this end, there are at least

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[2] Alternatively, the argumentation in this regard, indicates that those possessing lower levels of financial literacy tend to be at a significant disadvantage in terms of lack of knowledge regarding the cost of buying on credit, making less

two main sources of financial education that individuals, and particularly the youth can have access to and consequently benefit from. On the one hand, formal financial education as reflected by higher levels of financial literacy; and secondly through financial knowledge deriving from transgenerational spillover effects from parents to children.

Under the latter, trans-generational knowledge spillover effects can be an important factor affecting and shaping financial knowledge and incidentally consumption behavior. Elsewhere (Smith and Barboza, 2014) offer a comprehensive review of trans-generational effects on financial knowledge and financial literacy. In their research, they determine that trans-generational knowledge has a positive effect on the amount of debt (less) a student carries. That is, the better students handle their credit history the less likely they are to have higher debt. In this context, individuals that continuously and systematically discuss financial issues with their parents tend to perform better than those that do not. Other studies also support the stated correlation as well such as Allen, Edwards, Hayhoe and Leach (2007). Similarly, Barboza, Smith and Pesek (2016), found that students with a higher GPA have had more opportunities to be academically prepared, and more access to financial incentives such as scholarship and grants to finance their college education. Despite the advances in this topic, there is still relatively little research addressing trans-generational financial knowledge and its definite effects impacting student's financial performance, particularly on issues relating to behavior and anxiety. Thus, based on the review of the literature we believe that more research needs to be done in this field to determine how much influence parents have on their children's lives.

The second component of the financial education process comes in the form of level of actual financial literacy. In this regard, different studies have developed and used alternative measures to assess level of financial literacy. The typical assessment tools ask individuals knowledge regarding subjects such as inflation, compound interest and value of money across time[3]. The research continues to shows that financial literacy will give people better judgment when dealing with their finances (Peng *et al.*, 2007; Jappelli and Padula, 2011; Lusardi, Mitchell and Curto, 2009; Allen *et al.*, 2007; Bernheim and Garrett, 2003; Bowen and Jones, 2006; Carlin and Robinson, 2012; Chen, 2005; Chen and Volpe, 1998 and 2002; Mojtaba and Taihyeup, 2011).

The review of the extant literature provides an excellent background on some of the most relevant issues relating to financial literacy and its importance on credit card issues. However, the current literature still has to provide more analysis regarding the causes and effects of anxiety regarding financial issues, and particularly its role in credit card repayment. We propose the following model to address some of the existent gaps in the literature. As noted earlier in the introduction, this paper aims to contribute in the following three topics: financial anxiety and its effect on credit card repayment, consumption behavior as a catalyst for financial anxiety, and effects of transgenerational financial knowledge spillover effects in credit card markets.

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than full repayment every month on the credit cards, paying fees and penalties, and overall misusing access to credit to finance consumption.

[3] For instance, later on we provide in Table 1 a series of questions that were administered to a sample of college students to assess her/his level of financial literacy. Other studies such as Lusardi and Mitchell (2007) use the big three questions, to assess financial literacy level on the subjects mentioned above.

3 The Data and Model Description

Data for this research comes from a survey administered to three samples of college students. The first, 402 undergraduate students attending a Midwest Higher Education University, the second to a different cohort of students (466) from the same Midwest University and the last to 281 undergraduate and graduate students attending a Mid Atlantic University, both in the United States[4]. We define the dependent variable, as the level of anxiety on credit card repayment capabilities (*Anx*); where 1 = not anxious at all, and 5 = extremely anxious. However, since anxiety is measured as individuals' capabilities to repay credit card balance, we then also have a secondary (highly interrelated) dependent variable for a second set of estimations, where credit card repayment behavior becomes the dependent variable. Thus, our main interest is to conduct empirical analysis using the two sets of equations, using anxiety and repayment frequency as dependent variables in each set. Furthermore, we also incorporate repayment frequency as an independent variable in the first set of estimations.

We divide the list of independent variables in the following groups: demographics, behavioral, financial education and literacy. Our list of independent variables aims at assessing the participants' knowledge of credit card debt management while trying to understand his or her current buying and repaying behavior, after controlling for standard demographic characteristics.

The *demographic* variables serve as controls and provide the benchmark for our analysis. These variables allow us to account for possible differences in academic status, age, gender, and race. Several of these variables have been identified in the literature review as having potentially important effects in the levels and differences on financial literacy and credit card debt management by college students. We place particular emphasis on gender, academic status, and race differences. Our intuitive expectation and tentative hypothesis are that the estimated coefficients will demonstrate the existence of a negative relationship with anxiety and credit card repayment behavior against minorities and female, as documented in the literature review section. Regarding *Gender*, the literature indicates that females are more likely to hold larger amounts of debt, particularly as it relates to credit card; therefore, we expect to have a positive estimated coefficient for the gender variable, since we define female = 1 and male = 0. For the academic status variable, we expect a positive coefficient, indicating that levels of anxiety and poor repayment patterns in credit card balance increase as students advance in their college career.

The *behavioral* category group includes several variables designed to capture actual behavior along with sources of financial education for students. These variables serve as proxies to assess individuals' time preferences (present bias issues), and potential issues relating to procrastination and lack of commitment, which may in turn be reflected in behavioral delays on credit card repayment and increase anxiety levels as well. In the case of credit card use – as a proxy for actual decision-making – we use a categorical scale regarding repayment behavior on credit card balance (Pay if full every month = 1, Pay some in full and other only minimum = 2, Pay more than minimum but not in

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[4] A copy of the survey is available from the authors upon written request.

full = 3, Pay Minimum = 4, Pay less than Minimum = 5), and thus define Repayment Frequency = *Rfreq*.

In this regard, we expect that as the frequency of repayment increases, the level of debt will decline and it should be represented by a negative coefficient, and consequently translate into less anxiety. Our tentative hypothesis is that students that pay in full would tend to suffer less of a present-bias issue and therefore are more likely to balance their purchases to their disposable income, and consequently less likely to hold debt. This in turn should translate into less anxiety. In this line of thought, we also define the variable *MissPay* as the number of payments (monthly within the last year) that students have missed. We hypothesis that the more payments are missed the higher the level of anxiety and also the higher the fees credit card holder pays. In the event that the credit card is paid by the parents, we define a dummy variable *PrtPay* to take the value of 1. Should parents pay the credit card, it should lead to lower levels of anxiety as financial decisions in this context are assumed by the parent; a negative sign is expected for the anxiety level. To further understand individuals' decision making process, subjects were asked if they were surprised at the end of the billing cycle with the balances their credit cards have reached, and secondly if they have made purchases knowing that they did not have money to pay in full when the balance was due. We define these two variables as *Surp* and *Overspd* respectively. In both cases, our tentative hypothesis is that we expect a positive coefficient indicating higher levels of self-surprise and higher amounts of overspending lead to higher anxiety. These two variables capture elements regarding present-bias, impatience and self-control regarding consumption/savings decisions. If the evidence were to reject the null hypothesis in favor of the alternative, then we would argue that increased *Surp* and *Overspd* imply that individuals use the credit card, but make sure to have high level of repayment at the end of the billing cycle, and consequently maintain lower levels of anxiety. In this case, an individual would be characterized as having perfect foresight and little to no present bias preferences. Furthermore, she should be able to hold adequate mental accounting allowing for a smooth consumption/spending transition between income and billing cycles. We hypothesize that this type of individuals should report no or lower levels anxiety on her capabilities for credit card repayment. The underlining assumption is that individuals with demonstrated present biased preferences are more likely to hold a month-to-month balance in their credit card as they tend to value present consumption significantly more than future consumption.

Under the *financial education and literacy* group of variables we asked questions that allow us to assess students' perceptions on these topics[5]. First, we measure financial literacy using the five questions listed in Table 1 above. Also we ask students whether parents are the main source of financial education. Based on the number of correct answers from Table 1 we construct an index of financial literacy that we labelled *FLitRate*. In this context, the null hypothesis is that people with higher levels of financial literacy (more correct answers) should also be able to make more informed and accurate financial decisions, thus we assume this would reduce anxiety. Hence, we hold the tentative

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[5] The use of financial literacy questions like those in Table 1 are used in the literature to create testable hypothesis of the effects of financial knowledge on financial decision making adequacy. See for instance, Lusardi *et al*. (2009), Lusardi and Mitchell (2007), Barboza, Smith and Pesek (2016).

Table 1: Financial literacy questions

Question 1: Suppose you had US $ 100 in a savings account and the interest rate was 2% per year. After two years, how much do you think you would have in the account if you left the money to grow?   1. More than $102   2. Exactly $102   3. Less than $102   4. Don't know
Question 2: Imagine that the interest rate on your savings account is 2% per year and inflation is 5% per year. After one year, how much would you be able to buy with the money in this account?   1. More than today   2. Exactly the same   3. Less than today   4. Don't know
Question 3: Assume a friend inherits US $ 10,000 today and his sibling inherits US $ 10,000 three years from now. Who is richer because of the inheritance?   1. My friend   2. His sibling   3. They are equally rich   4. It depends   5. Don't know
Question 4: Suppose that in 2012, your income has doubled and the prices of all of the goods and services that you consume have also doubled. In 2012, how much were you able to buy with your income (assuming that you did not change your spending habit)?   1. More than you did in 2011   2. Exactly the same   3. Less than you did in 2011   4. Don't know
Question 5: What do you think of the following statement «Buying a single company stock usually provides a safer return than a stock mutual fund»?   True   False   Don't know

hypothesis that higher levels of financial literacy result in a negative coefficient related to anxiety. Consequently, if this is an accurate representation of how financial literacy results in lower anxiety then we argue that in our second set of estimations we expect a negative coefficient as our null hypothesis; that is higher financial literacy lowers the amount of month-to-month credit card debt through improved repayment frequency. In other words, the more correct answers a student achieves the higher her/his financial literacy level and therefore the lower the expected amount of debt (s)he would hold, that is month-to-month balance should be zero or close to zero, and lower anxiety should follow. However, it is also plausible that «ignorance becomes a blessing in disguise», and thus knowing more about financial elements actually increase the level of anxiety, despite actual repayment behavior leading to lower or no month-to-month balance on credit card(s). If students on the other hand, are overconfident and overestimate their financial knowledge, that is they are naïve, then the estimated coefficient would be positive; the more they report knowing, the higher the probability of holding large amounts of debt and the less likely they would be able to repay in full, increasing anxiety.

To assess the level of knowledge gap, or desire to learn more about financial issues, we asked students if they would like to know more about financial issues and second in which subject matter would they. We report here the two most relevant answers in relation to our study. First the overall willing to learn about financial issues as Desire to Learn (*D2L*) and more specifically *D2L* on Credit Card Debt Management (*D2LCCD*). In both cases, the hypothesis is that the higher the desire to learn the higher the current

level of anxiety the individual has. This is the result of self-reporting a gap in her capacity to make accurate decisions in terms of financial matters and more specifically on credit card repayment capabilities.

Because of the importance given in the extant literature, we also explore the role that parents may play in financial education. In this sense, our survey asks several questions. First, we define a dummy variable *FePar* when students report that parents are their main source of financial education. In line with the transgenerational effect we found elsewhere (Smith and Barboza 2014), we argue that if parents are the main source of financial education, then parents should serve as a mechanism to avoid painful self-experiences, and thus provide positive spillover knowledge effects that result in lower levels of anxiety. To account for parents' own education level, we ask the highest level of education attained by the mother, and create an interaction effect (*FinEdImp*) between *FePar* and Mother Education level. Our tentative hypothesis is that higher levels of mother's education result in higher transmission of useful information to make adequate financial decisions. This in turn should lead to lower levels of anxiety as education serves as a mean to lower uncertainty in the decision-making process. Of course, it could very well be that the opposite happens, that is, even though children are better equipped to make more adequate decisions, this also comes at the price of higher levels of anxiety. In this regard, we will let the data speak. In line with the literature, we also expect that *FinEdImp* has a negative sign relating to credit card repayment, thus higher education leads to better repayment patterns.

Finally, we assess the role of cosigning, particularly when parents are the cosigners, and also when parents are in charge of paying the credit card. We define thus two interaction effect variables, *COSPAR* when the parent in the cosigner, and *COSPAY* when the cosigner pays. As expected these two variables are highly correlated and thus we could only use one at a time in the estimation section.

Table 2 presents some basic descriptive statistics on the variables used in the empirical estimation section. A full description of each variable and its corresponding coding could also be found there. With these considerations in mind, we then proceed to outline the model specification and the corresponding model estimations expectations and restrictions.

3.1 The model

Since, we code students' responses on credit card repayment capability anxiety levels using a discrete categorical variable; therefore, the most appropriate model to use in our estimations is an ordered dependent variable model. Here we follow closely the model specification presented in Smith and Barboza (2014). This model allows us to compute the expected probabilities on anxiety related to repayment capabilities and corresponding behavior. The same general model specification is used when studying repayment frequency. In addition, the use of an ordered dependent model will allow us to determine the effects of a series of independent variables on the discrete ordered repayment model. The basic model description has the following general specification:

(1) $$y_i^* = x_i'\beta + \varepsilon_i$$

Table 2: Descriptive statistics of variables by category, description and coding

Category	Description	Code	Median	Mean	Std Dev	Max	Min	Obs
Demographics	Academic Status (F = 1, S = 2, J = 3, Sr = 4, Grad = 5)	AS	3	2.705	1.338	5	1	941
	Gender (Female = 1)	G	0	0.486	0.533	1	0	941
	Age	AGE	20	21.375	5.317	62	17	736
	Race (Minority = 0)	RACE	1	0.850	0.358	1	0	945
Financial Education and Literacy	Parents are main source of Financial Education	FEPAR	1	0.583	0.494	1	0	393
	Desire to Learn on Financial Issues	D2L	1	0.592	0.492	1	0	397
	D2L on credit card debt	D2LCCD	0	0.137	0.344	1	0	503
	Cosigner (Yes = 1)	Cosign	0	0.309	0.463	1	0	366
	Interaction when Cosigner Pays (if pay = 1)	CosPay	0	0.071	0.258	1	0	364
	Interaction when Cosigner is Parent (Yes = 1)	CosPar	0	0.236	0.425	1	0	364
	Mother level of education and FEPAR	FinEdImp	0	0.836	1.462	4	0	397
	1. Compound Interest (Correct = 1)	Cint	1	0.704	0.457	1	0	670
	2. Inflation question (Correct = 1)	Inf	1	0.668	0.471	1	0	671
	3. Inheritance question (Correct = 1)	Inh	0	0.335	0.472	1	0	671
	4. Purchasing Power (Correct = 1)	PP	1	0.772	0.420	1	0	671
	5. Risk Management (Correct = 1)	Risk	1	0.510	0.500	1	0	671
	Index of Financial Literacy Sum(1-5)/5 = (%)	FlitRate	0.60	0.598	0.267	1	0	671
Behavioral	Level of Anxiety on Repayment capacity	Anx	2	2.048	1.112	5	1	315
	Frequency of Payment on Credit Card	Rfreq	1	1.531	0.943	5	1	367
	Miss PaymentMiss	Pay	1	0.986	0.935	3	0	368
	Parent Pay (1 = if parent pays)	PrtPay	0	0.087	0.283	1	0	367
	Surprised on CC balance level	Surp	1	0.986	0.935	3	0	368
	Frequency of Overspending	Overspd	0	0.550	0.859	3	0	369
	Number of Credit Card	NCC	1	1.522	1.522	6	0	513

Notes: Demographic variables are defined as follows. Gender *G* is a dummy variable taking value of 1 if female and 0 otherwise. Academic Status-*AS* is the 1 = Freshman; 2 = Sophomore; 3 = Junior; 4 = Senior and 5 = Grad Student. *Race* is 1 if white and 0 if minority. *Age* is expressed in years at the time of the survey. Financial Literacy, Education and related variables include the following. Compound Interest-*Cint*, measures knowledge on compound interest on a fixed investment. Variable takes value of 1 if answer is correct and 0 otherwise. Inflation-*Inf* measure knowledge of the effect on inflation on nominal interest rates. Variable takes value of 1 if answer is correct and 0 otherwise. Inheritance-*Inh* measures the value of an inheritance across time when given on a three year difference. Variable takes value of 1 if answer is correct and 0 otherwise. Purchasing Power-*PP* measures knowledge of value of money across time and purchasing power when income and prices increase by the same percentage rate. Variable takes a value of 1 if answer is correct, 0 otherwise. Risk Management-*Risk* measures knowledge by comparing level of returns' safety between a single stock and a mutual fund. Variable takes a value of 1 if answer is correct, 0 otherwise. Thus the Financial Literacy Rate-*FLitRate* measures the percentage of correct answers out of the five literacy knowledge questions. Anxiety-*Anx* is the level of anxiety reported on a scale from 1 = no anxiety to 5 = extremely anxious in relation to his/her capacity to repay your credit card monthly bill. *FEPar* takes a value of 1 if parents are the main source of financial education, 0 otherwise. *D2L* takes the value of 1 if individual desires more information on various financial management topics, 0 otherwise. *D2LCCD* takes the value of 1 if individual reveals a D2L on Credit Card Debt reduction strategies, 0 otherwise. Behavioral and Repayment on Credit Cards variables include the following. *MissPay* defines the number of times the individual missed payments in the last 12 months. *RFreq* defines the repayment behavior on credit cards. The variable takes the values of 1 = Pay in Full; 2 = Pay more than minimum, but carry month-to-month balance; 3 = Pay off some credit cards, but pays minimum on the rest; 4 = Pay minimum in all; 5 = Pay less than minimum in all. 6 = 1 = Parents pay in full will be the assumption. *PrtPay* takes the value of 1 if parents pay credit card on behalf of the student, 0 otherwise. *Surprised* defines the level of surprise the individual reports on how high of a balance is on the monthly statement. The variable takes the values of 0 = never; 1 = Rarely; 2 = Sometimes; 3 = Frequently. *OverSpd* defines the behavior of the individual regarding that she/he did not have money to pay when the bill came due. The variable takes the values of 0 = never; 1 = Rarely; 2 = Sometimes; 3 = Frequently. Number of Credit Cards-*NCC*, this is the number of credit cards the student currently holds. *Cosign* takes a value of 1 if individual has a cosigner in the account, 0 otherwise. *CosPay* takes a value of 1 if cosigner is the parent that pays the credit card, 0 otherwise. *CosPar* takes a value of 1 if the cosigner is also the parent as the main source of financial education when the parents are the main source of financial education. Finally, *FinEdImp* is a variable designed to measure the impact of the mother's level of education when the parents are the main source of financial education.

where ε_i are the error terms, x_y' is the matrix of explanatory variables, β is the vector of coefficients to be estimated and y_i^* is unobserved. According to Greene (2003) what one does observe is

(2)
$$\begin{aligned} y &= 0 \text{ if } y^* \le 0 \\ &= 1 \text{ if } 0 < y^* \le \mu_1 \\ &= 2 \text{ if } \mu_1 < y^* \le \mu_2 \\ &= J \text{ if } \mu_{J-1} < y^* \end{aligned}$$

where μ_i are unknown parameters to be estimated with β. It follows that the probabilities associated with achieving each event are given by

(3a)
$$Prob(y = 1|x) = \Phi(x'\beta)$$

(3b)
$$Prob(y = 2|x) = \Phi(\mu_1 - x'\beta) - \Phi(x'\beta)$$

(3c)
$$Prob(y = J|x) = 1 - \Phi(\mu_{J-1} - x'\beta)$$

Under the condition that $0 < \mu_1 < ... < \mu_{J-1}$, then all probabilities will be positive. Φ represent the normal distribution density function. In the case of an ordered probabilities model, it is relevant to keep in mind that in order to provide a meaningful interpretation of the results, we first need to transform the estimated coefficients from equation (1) into marginal effects. Conventional use of Ordinary Least Square estimates is not appropriate when using discrete (ordered) data; that is the estimated coefficient are not regular coefficients in the sense of ordinary estimations with a continuous dependent variable. Incidentally, in the Ordered Probit Model the marginal effects of x on the probabilities of occurrence of each of the events are not equal to the coefficient estimates β as in the conventional LS estimations. To obtain the marginal effects we need to take the partial derivative of the probability function with respect to the vector of parameters x. Thus, the marginal analyses of changes in the independent variable(s) on the probabilities in the case of three categories are given by:

(4a)
$$\frac{\partial Prob(y = 0|x)}{\partial x} = -\phi(x'\beta)\beta$$

(4b)
$$(\partial Prob(y = 1|x))/\partial x = [\phi(-x^{t'}\beta) - \phi(\mu_\downarrow 1 - x^{t'}\beta)]\beta$$

(4c)
$$\frac{\partial Prob(y = 2|x)}{\partial x} = -\phi(\mu_1 - x'\beta)\beta$$

In this regard, to obtain the marginal effects of changes in the explanatory variables we require the standard normal cumulative distribution function (ϕ) evaluated at $-x'\beta$ and $(\mu_1 - x'\beta)$ respectively. According to the marginal effects function, the probability

Table 3: Expected signs of coefficients by model (1 & 2) and corresponding expected effect on prob $(y = 1|x)$

	Model 1	Model 2
	Anxiety	Repayment Frequency
Gender (Fem = 1)	(+) Prob (y = 1|x) ↓	(+) Prob (y = 1|x) ↓
Race (White = 1)	(+) Prob (y = 1|x) ↓	(−) Prob (y = 1|x) ↑
Academic Status	(+) Prob (y = 1|x) ↓	(+) Prob (y = 1|x) ↓
Age	(+) Prob (y = 1|x) ↓	(+) Prob (y = 1|x) ↓
FLitRate	(−) Prob (y = 1|x) ↑	(−) Prob (y = 1|x) ↑
Anxiety		(−) Prob (y = 1|x) ↑
Misspay	(+) Prob (y = 1|x) ↓	
Number of Credit Cards		(+) Prob (y = 1|x) ↓
DCC		(−) Prob (y = 1|x) ↑
Rfreq	(+) Prob (y = 1|x) ↓	
PrtPay	(−) Prob (y = 1|x) ↑	
Surp	(+) Prob (y = 1|x) ↓	(+) Prob (y = 1|x) ↓
Overspd	(+) Prob (y = 1|x) ↓	(+) Prob (y = 1|x) ↓
FePar	(−) Prob (y = 1|x) ↑	(−) Prob (y = 1|x) ↑
FinEdImp	(−) Prob (y = 1|x) ↑	(−) Prob (y = 1|x) ↑
D2LCCD	(−) Prob (y = 1|x) ↑	
D2L	(−) Prob (y = 1|x) ↑	
COSPAR		(−) Prob (y = 1|x) ↑
Cosign	(−) Prob (y = 1|x) ↑	(−) Prob (y = 1|x) ↑

Notes: Variable description is available on Table 1 above. In addition the table indicates the relative change in Prob (y = 1|x) direction, which then implies the opposite directional change in Prob (y = 5|x).

of occurrence of one particular categorical response increases, assuming that the corresponding β is positive, as the value of the explanatory variable increases. In other words, as x increases then the probability of achieving higher values of y increases as well. In the reverse case, when $\beta < 0$ then as x increases the probability of achieving lower values of y increases. Furthermore, in our case an increase in the probability value reflects an increase in the overall level of anxiety from none to high levels every month; or an increase in the probability to accumulate a month-to-month balance when credit card repayment is the dependent variable. Consequently, positive β coefficients indicate that higher survey values increase overall anxiety levels; and worsen credit card repayment away from paying in full (*Prob y = 1|ξ*). Marginal effects for continuous variables are computed assuming that all other variables are held at their mean value and only the variable of interest changes by one unit. In the case of dummy variables such as *Gender* or *FePar*, marginal effects are computed using the differences in probabilities that result when the variables take the two different values and the rest of the variables are held constant at their mean value (Table 3).

4 Results and Discussion

Results for the alternative model estimations; first using Anxiety and secondly Repayment Behavior on credit card balance are presented in Tables 5 and 6 respectively. Let us begin the analysis by looking at the estimation of Anxiety on capabilities of credit card repayment.

4.1 Anxiety

First, the basic model (I) indicates that no demographic related differences in levels of anxiety are reported, with the exception of *Race* related differences. Here, individuals classified as «White» have a lower chance of suffering from higher levels of anxiety than otherwise. In other words, all individuals report having the same chances of experiencing anxiety by age, gender and academic status classification.

Our second set of estimations (Models II and III in Table 4) incorporates our measure of financial literacy as an explanatory variable of anxiety levels. In this case, the estimated coefficient provides a negative sign, indicating that higher levels of financial literacy results in higher probability of having lower levels of anxiety. While being in line with the extant literature, the expected sign on the financial literacy variable is not robust to alternative model specification.

Thus, because of the lack of significance of the financial literacy variable in terms of explaining levels of anxiety, we drop the variable from further models (IV and on), and place more attention to behavioral elements. This is to say that while higher financial knowledge is desirable, it does not translate in less anxiety regarding credit card repayment capabilities, when other behavioral variables are included. This brings us to some revealing and interesting ideas that we proceed to explore. In addition, this is relevant because of the novelty/newness of such results in the literature. Particularly, the common/standard argumentation is that higher levels of financial literacy are a necessary condition for better financial performance. While we do not dispute this claim, in fact elsewhere we find supporting evidence to this hypothesis (Smith and Barboza, 2014), we do bring forth the ideas that financial anxiety may be exogenous to the level of financial literacy, but not necessarily of financial education. We will explain in more detail later.

Based on the findings from the literature review section and following recent developments from behavioral economics, we find statistical support of the role of behavior as a fundamental piece to understand financial anxiety. To this end, let us begin analyzing the effect of missing payments (*MissPay*) on anxiety related to credit card repayment. Missing payments is a main and robust source of anxiety in all model specifications at the 1% level of confidence. Now the question that remains unanswered is, why do individuals miss payments on their credit card? Notice that in terms of behavior there are multiple differences between carrying a balance because of payment is less than full, and the case when a person misses a payment all together. While in both cases fees are changed, in the latter the person also incurs in additional fees such as late fee and possibly an increase in the interest rate charged. It is more than clear that as individuals miss payments the effect is an increase in the level of anxiety, that is individuals are not indifferent yet still misses the payment.

From a practical point of view, it is also relevant to recall that missing payments only can happen after the bill was due. In other words, having failed at least one payment is the reflection of prior financial mismanagement that creates negative spillover effects in the current billing cycle; this time manifesting through revealed anxiety. Incidentally carrying a month-to-month balance due to missing payments is a sign of financial distress[6].

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[6] A hand full of individuals added a hand written note to the survey where they indicated that missing the payment was the result of not knowing that (s)he had a balance in the account. This is to say, individuals failed to properly register their spending behavior and the consequent balance due on her/his account.

Table 4: Consumer behavior and financial decision making process with anxiety on credit card repayment capabilities as dependent variable

	MODELS								
	I	II	III	IV	V	VI	VII	VIII	IX
Gender	0.032 (0.85)	0.021 (0.90)	0.023 (0.89)					0.191 (0.11)	
Race	−0.524 (0.01)***	−0.436 (0.04)**	−0.436 (0.04)**			−0.235 (0.18)		−0.275 (0.12)(	−0.229 (0.19)
Academic Status	−0.012 (0.88)	0.005 (0.95)							
Age	−0.008 (0.83)	−0.006 (0.88)							
FLitRate		−0.597 (0.10)*	−0.601 (0.09)*	−0.484 (0.18)					
Misspay				−0.597 (0.10)*	−0.601 (0.09)*	−0.484 (0.18)	−0.597 (0.10)*	−0.601 (0.09)*	−0.484 (0.18)
Rfreq				0.090 (0.36)	0.118 (0.09)*	0.145 (0.04)**	0.132 (0.06)*	0.09 (0.20)	0.137 (0.06)*
PrtPay				−0.307 (0.30)	−0.151 (0.55)	−0.281 (0.28)	−0.249 (0.33)	−0.296 (0.26)	−0.384 (0.15)
Surp				0.290 (0.01)***	0.255 (0.00)***	0.256 (0.00)***	0.271 (0.00)***	0.233 (0.00)***	0.249 (0.00)***
Overspd				0.144 (0.26)	0.221 (0.00)***	0.211 (0.01)***	0.236 (0.00)***	0.219 (0.01)***	0.246 (0.00)***
FePar						0.313 (0.02)**			0.276 (0.05)**
FinEdImp							0.100 (0.02)**		
D2LCCD								0.500 (0.00)***	
D2L									0.129 (0.364)
Cosign									0.180 (0.24)
Obs	164	164	164	158	303	302	303	302	300
LR statistic	6.782579	9.564036	9.541839	3.49E+01	64.845	71.244	70.333	79.368	72.548
Probability(LR stat)	(0.148)	(0.089)	(0.02)**	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
Akaike info criterion	2.731	2.726	2.702	2.562	2.542	2.537	2.531	2.512	2.546
Schwarz criterion	2.882	2.897	2.834	2.756	2.652	2.672	2.653	2.659	2.707
Hannan-Quinn criter.	2.793	2.795	2.756	2.641	2.586	2.591	2.58	2.571	2.610

***, **, * statistically significant at the 1%, 5% and 10% level respectively.

Notes: Variables used in the estimations are defined as follows. *Anxiety* is the level of self-reported anxiety in relation to the capacity to repay your credit card monthly bill, and it is measured on the 1 through 5 scale, where 1 = not anxious at all and 5 = extremely anxious. *Gender* is a dummy variable that takes the value of 1 if female and 0 otherwise. *Age* is defined in years at the time of the survey; Academic Status (*AS*) takes the value of 1 = Freshmen, 2 = Sophomore, 3 = Junior, 4 = Senior and 5 = Grad Student; *FLitRate* is the Financial Literacy Rate and it is measured using 5 financial literacy questions, and then using the number of correct answers a percentage value of correctness is computed; *MissPay* refers to the number of payments missed in the last 12 months; Repayment Frequency (*RFreq*) is the behavioral variable measuring the patterns of repayment, with 1 = pay in full, 2 = pay in full some and others no, 3 = pay more than minimum, 4 = pay only minimum, and 5 = pay less than minimum. *PrtPay* is a dummy variable taking the value of 1 when parents are in charge of repaying the credit card. *FePar* is a variable that takes a value of 1 if parents are the main source of financial education; *FinEdImp* is an interaction effect variable that includes FePar and then the level of education the mother holds, with 1 = less than high school, 2 = high school, 3 = some college and 4 = finished college. *Overspend* is a variable that measures the behavior of individuals regarding whether the individual knowingly buys using a credit card and not have money to pay it when balance is due, the variable takes the values of 0 = never, 1 = rarely 2 = Sometimes, and 3 = Frequently. *D2L* is a dummy variable where individuals express interest in learning more about financial topics in general, whereas *D2LCCD* is a dummy variable whereby students indicate their desire to learn more about credit card debt management. *Surp* is a variable that measures the self-reported level of surprise regarding the how high the balance on the credit card(s) is on the monthly statement, with 0 = never, 1 = rarely, 2 = sometimes and 3 = frequently; and *Cosign* is a dummy variable taking the value of 1 if the individual has a cosigner on the credit card.

In addition, while some individuals noted that they miss payments because of lack of knowledge of an existent balance, not knowing that the account has a balance is a sure way to miss payments and later to increase anxiety. Issues pertainingto mental accounting become evident here as well.

The second variable that we explore is repayment frequency (*Rfreq*) on credit card. Recall that when *Rfreq* takes a value of 1, it indicates repayment in full every billing cycle and higher values represent paying less than full. Thus, a positive coefficient indicates that as repayment frequency worsens then the probability of higher anxiety increases. Notice that the estimated coefficient for *Rfreq* is sufficiently stable to alternative model specifications in terms of magnitude and statistical significance.

Interestingly enough we find that *Rfreq* is highly correlated with the dummy variable *D2LCCD* (desire to learn on how to manage credit card debt), and thus when used concurrently *Rfreq* becomes statistically insignificant. In this regard, *D2L* about financial issues is not significant, only when it is specific about Credit Card debt management. We will get back to this in a moment.

Rfreq is a very interesting variable to analyze because it reflects the actual behavior of individual regarding purchasing and buying through the use of credit cards. For instance when repayment is in full then we can argue that individuals have adequate budgeting skills and fulfill their obligations as intended. However, any other form of repayment reflects behavioral issues leading to month-to-month credit card debt accumulation. To this end, higher values of *Rfreq* indicate that an increase in anxiety could be taken as evidence of at least two forces.

i) Bad repayment (less than pay-in-full) significantly contributes to increase anxiety as individuals recognize her/his inability to repay,

ii) *Rfreq* (bad) represents unhealthy spending habits that lead to inefficient repayment patterns, which leads to higher anxiety, given that individual is unable to fulfill her financial obligations.

The next variable, *PrtPay*, is a dummy variable taking the value of 1 when the parent is the individual paying the credit card. As expected *PrtPay* holds a negative sign, that is when parents pay anxiety is lower, yet the coefficients are not statistically significant at any level of confidence. Here we have made the assumption that when parents pay, they pay in full. Now the fact that anxiety increases when parents pay the credit card may result from parents transmitting anxiety to their children at the time of payment of the credit card. This effect would be in line with the transgenerational learning effect we found elsewhere (Smith and Barboza 2014). Because of its importance in our argumentation, we will get back to it later.

The next three variables appear to be fundamental pieces in understanding the sources of anxiety in credit card repayment capabilities. The first two refer to individual preferences (hyperbolic discounting to be specific) and naïve purchasing behavior in line with marked present-bias and overconfidence; and the third deals with the transgenerational financial education effect from parents to children.

Now, the first behavioral variable, *Surp*, measures whether an individual is surprised (0 = never, 1 = rarely, 2 = sometimes, 3 = frequently) on the amount of credit card balance at the end of each billing cycle. To this end the more surprised the more likely

anxiety is experienced. *Surp* serves as an approximation for a failing mental accounting registry where the individual fails to properly keep track of spending habits. Particularly, these failing accounting practices directly relate to credit card purchases and not to cash expenses[7]. Hence individuals revealing being more surprised (higher frequency) imply that in her/his mental account they overestimates the effective capacity for repayment at the time of the purchase. Here it would be interesting to know if this surprised factor is time-dependent in relation to when the credit card bill arrives: that is, if surprised effect increases as time passes by in the billing cycle. Surprised also holds the largest coefficient size providing strong evidence of the magnitude that incapability to properly keep record of monthly spending has on the level of anxiety. We hypothesize that a higher present-bias factor, that is stronger hyperbolic discount on consumption preferences, creates a higher negative spillover effect on the level of anxiety. Anxiety, consequently, is an increasing function on surprised factor. In sum, individuals become surprised on the accumulated balance as a function of their inability to keep a proper/accurate mental account of the degree of present-bias, impatience and naïve behavior.

The analysis of behavioral variables leads to Overspending (*Overspd*). This variable asks students if they have engaged in purchasing behavior/actions when (s)he knew that (s)he will not have enough money to pay the bill when it came due. Empirical estimates yield a positive and highly statistically significant coefficient, indicating that *overspd* results in higher levels of anxiety, as hypothesized. Anxiety generated by this behavior speaks again of issues of lack of self-control, combined with strong present-bias. The individual derives satisfaction from overconsumption at the expense of unhealthy financial behavior, leading to further anxiety. Furthermore, the individual knows that by overspending a month-to-month balance will continue to accumulate, further increasing the level of anxiety when the next billing cycle comes. It is almost as if the (financial) anxiety rush produces some level of damaging satisfaction that those overspending enjoy. This is a serious consequence of unhealthy financial behavior that may have long-term consequences.

The magnitude of the *overspd* coefficient is highly comparable to that from surprised, and they are both statistically significant when used in the same models – IV through IX. Also, recall that in early model estimations, *FLitRate* had the expected positive effect on anxiety (higher Fin Literacy implied lower anxiety). However, this positive effect from more financial educated individuals is overpowered by present-bias behavior and impatience relating to self-control issues.

When it comes to measuring the main source of financial education, several options were given to students to select from such as parents, teachers, peers, news, etc. Out of all these possibilities only Parents (*FePar*) is statistically significant. *FePar* takes the value of 1 if parents are the main source of financial education. Elsewhere, such as in Smith and Barboza (2014), the authors found that parents' financial education creates a positive transgenerational effect marked by knowledge spillover effects, leading to

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[7] An alternative interpretation of a surprise factors would be related to poor cash management practices. For instance, individuals with strong present-bias behavior may spend their cash holding in the first days soon after income flow is received. This would create a cash constraint for the rest of the income cycle. In the presence of access to credit cards, lack of cash can be bridged with credit cards purchases. The rationale surrounding surprise factors is similar to this scenario yet with different cause-effect mechanisms.

individuals to be able to hold less debt and maintain better repayment patterns. As we will see later, we find similar evidence regarding the role that parents play in creating better/more adequate repayment rates. For now, in the case of anxiety levels, the evidence indicates that parents driven education on financial topics, also results in a higher probability to have more anxiety. This result is new and somewhat unexpected. To the best of our knowledge, this is the first time that empirical evidence provides support to the idea that parents' financial driven education is a source of anxiety. A plausible explanation for this result is that parents' education on financial issues/topics serves as a warning signaling process regarding the negative consequences of financial misuse of credit cards. If anxiety induced by parental education serves as a positive incentive for children to avoid falling behind on credit card repayment, that is, while they may get anxious, they could repay in full. Under these assumptions, higher anxiety may be to some extent desirable.

On the other hand, it is likely that parents' previous financial negative experiences with credit card debt and/or repayment may also be observed and assimilated by children (students). Consequently, students learn (through negative knowledge spillover effects) to be anxious about credit card use and repayment, regardless of the balance at the end of the month. If true, then the exploratory results of this research are groundbreaking, in providing evidence that parents' financial experiences and its transmission in the form of financial education is an important and significant source of anxiety. That is anxiety has a significant exogenous component that is family specific, just as culture and other values may be. In other words, it appears that anxiety becomes endemic and transmitted from parents to children. This said, some degree of anxiety may be a good thing to have, provided that it serves the purpose to educate children in regards to financial matters and improves her/his overall financial performance. Nevertheless, assuming that more education eliminates anxiety may not be the working mechanism for improved and efficient financial education.

To further test the above-mentioned arguments regarding financial education and its effects on anxiety levels, we create an interaction effect variable, *FinEdImp* which includes two elements of the financial education puzzle. First, whether parents are the main source of financial education; and secondly it accounts for the education level of the mother (1 = mom did not finish high school, 2 = high school grad, 3 = some college education, 4 = college grad). Using this variable, we are able to test not only for the parents being the main source of financial education, but more importantly we correct by the level of education the mother has. We expect that the more educated the mother is the higher the level of education spillover effects we should observe. As expected, *FePar* and *FinEdImp* are highly correlated and thus we should only use one at a time. Since we already know the effect that *FePar* has on anxiety, we tease the data and now include *FinEdImp* – Model VII. Results of this estimation yield a positive and highly statistically significant coefficient, indicating that the more educated the mother is then the higher the possibility of anxiety reaching higher levels. This added evidence provides further support to a learning spillover effect on the negative aspects of holding credit card debt and therefore, we argue, anxiety aspects work as a warning system. Parents seem to play a fundamental role in raising anxiety levels to further prevent children from engaging in

financial damaging behavior. As noted anxiety becomes endemic and in a way exogenous to children.

We also asked students to reveal their preferences in terms of possible areas for desire to learn about financial topics. The overall desire to learn variable (which is a dummy variable) shows no statistically significant effect on anxiety; however, when asked about *D2L* on credit card management specifically, the estimated coefficient for *D2LCCD* is highly significant and positive. Revealed preferences for credit card debt management knowledge result in higher levels of anxiety on Credit Card repayment capabilities. As before we assume that the desire to learn is not endogenous to the individual, prior to have any experience on credit card use, but more so a consequent behavior after having experienced the use and possible problems with credit cards. On the other hand, it would be highly recommended to institute learning prior to the actual use of credit cards. Financial education, practical education, may be a proper model to introduce this learning-by-doing experience prior to the actual use of the credit cards. Finally, we also asked whether the individual had a cosigner on the credit card and if the cosigner was the responsible party to repay the credit card. However, cosigner has no statistically significant effect on anxiety.

4.2 Repayment frequency

We further tease the data and explore the determinants of credit card repayment patterns, that is, *Rfreq* now as the dependent variable. Table 5 reports the results of such estimations.

As before, the basic model estimations including only the demographic variables indicate that *AS* is inversely related to Repayment Frequency, that is as *AS* increases repayment frequency worsens. In addition, minorities tend to fall behind in repayment in comparison to non-minorities. Older people also tend to fall behind on payments possibly as credit card use increases with age and a month-to-month balance begins to build up. However, only *AS* is statistically significant to further model specifications – Models IV and on – as we will see next. *Gender* has the expected negative sign, that is females tend to have better repayment behavior than men, but it is not statistically significant.

Let us begin with *FLitRate*, that has the expected negative sign and it is consistently statistically significant, especially when combined with other behavioral variables in Model V and on. Individuals demonstrating a greater financial literacy competency are less likely to carry month-to-month balance and more likely to pay in full every billing cycle. As noted this result is in line with the theory.

However, the most prominent results in the estimations of credit card repayment behavior come from adding anxiety. The anxiety variable has an unexpected positive sign, i.e. more anxiety leads to worse credit card repayment patterns. In addition, this estimate is robust to all alternative model specifications as shown in Table 5. In this alternative model configuration, we argue that anxiety has to be a pre-existent behavioral condition and not necessarily a post bill payment event. Recall that we have asked subjects «how anxious do you feel when the bill is due?», not how anxious they were after they pay

Table 5: Consumer behavior, financial literacy and anxiety with credit card repayment behavior as dependent variable

	MODELS									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Gender	-0.192	-0.276	-0.329	-0.316	-0.359	-0.231	-0.247	-0.249	-0.222	-0.216
	(0.35)	(0.20)	(0.13)	(0.15)	(0.11)	(0.32)	(0.29)	(0.29)	(0.34)	(0.36)
Age	0.075	0.080	0.069	0.056	0.038	0.041	0.038	0.038	0.035	0.035
	(0.04)**	(0.03)**	(0.06)*	(0.14)	(0.33)	(0.30)	(0.34)	(0.34)	(0.37)	(0.37)
Academic Status	0.236	0.275	0.252	0.263	0.263	0.186	0.177	0.176	0.181	0.171
	(0.01)***	(0.00)***	(0.01)***	(0.01)***	(0.01)***	(0.07)*	(0.09)*	(0.09)*	(0.08)*	(0.10)*
Race	-0.489	-0.269	-0.262	-0.170	-0.044	0.155	0.179	0.181	0.134	0.159
	(0.04)**	(0.28)	(0.30)	(0.51)	(0.87)	(0.58)	(0.53)	(0.52)	(0.63)	(0.58)
FLitRate		-0.595	-0.750	-0.645	-0.815	-1.027	-1.059	-1.066	-0.908	-0.859
		(0.17)	(0.09)	(0.15)	(0.08)*	(0.03)**	(0.03)**	(0.03)**	(0.06)*	(0.08)*
Anxiety		0.274	0.269	0.266	0.306	0.210	0.206	0.206	0.206	0.181
		(0.00)***	(0.00)***	(0.01)***	(0.00)***	(0.05)**	(0.05)**	(0.05)**	(0.05)**	(0.11)
Number of Credit Cards			0.230	0.239	0.230	0.146	0.133	0.133	0.134	0.129
			(0.01)***	(0.01)***	(0.01)***	(0.12)	(0.16)	(0.16)	(0.16)	(0.17)
DCC				-0.201	-0.116	-0.042	-0.029	-0.028	-0.053	-0.060
				(0.07)*	(0.32)	(0.73)	(0.82)	(0.82)	(0.66)	(0.62)
FePar					-0.757	-0.844	-0.695	-0.726		
					(0.00)***	(0.00)***	(0.01)***	(0.21)		
Overspend						0.494	0.468	0.469	0.429	0.407
						(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.01)***
COSPAR							-0.368	-0.367	-0.489	-0.486
							(0.26)	(0.27)	(0.12)	(0.30)
FinEdImp								0.010	-0.173	-0.174
								(0.95)	(0.02)**	(0.03)**
Surp										0.095
										(0.49)
Cosign										-0.011
										(0.98)
Obs	159	159	159	159	159	158	157	157	157	157
LR statistic	25.37065	36.74247	43.45658	46.71975	57.68096	71.2277	72.08481	72.08848	70.46117	70.92997
Probability (LR stat)	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
Akaike info criterion	1.892524	1.84616	1.816511	1.808567	1.752207	1.685183	1.698092	1.710807	1.708434	1.730925
Schwarz criterion	2.027633	2.019872	2.009524	2.020881	1.983823	1.937169	1.970623	2.002805	1.980965	2.04239
Hannan-Quinn criter.	1.94739	1.916702	1.894892	1.894786	1.846264	1.787518	1.808777	1.829398	1.819118	1.857422

***, **, * statistically significant at the 1%, 5% and 10% level respectively

Notes: Variables used in the estimations are defined as follows. *Anxiety* is the level of self-reported anxiety in relation to the capacity to repay your credit card monthly bill, and it is measured on the 1 through 5 scale, where 1 = not anxious at all and 5 = extremely anxious. *Gender* is a dummy variable that takes the value of 1 if female and 0 otherwise. *Age* is defined in years at the time of the survey; Academic Status (*AS*) takes the value of 1 = Freshmen, 2 = Sophomore, 3 = Junior, 4 = Senior and 5 = Grad Student; *FLitRate* is the Financial Literacy Rate and it is measured using 5 financial literacy questions, and then using the number of correct answers a percentage value of correctness is computed; *MissPay* refers to the number of payments missed in the last 12 months; Repayment Frequency (*RFreq*) is the behavioral variable measuring the patterns of repayment, with 1 = pay in full, 2 = pay in full some and others no, 3 = pay more than minimum, 4 = pay only minimum, and 5 = pay less than minimum. Number of Credit Cards *NCC*, is the total number of credit cards the subject holds. *DCC* is a dummy variable that takes the value of 1 if individuals discuss credit card issues with parents. *PrtPay* is a dummy variable taking the value of 1 when parents are in charge of repaying the credit card. *FePar* is a variable that takes a value of 1 if parents are the main source of financial education; *FinEdImp* is an interaction effect variable that includes FePar and then the level of education the mother holds, with 1 = less than high school, 2 = high school, 3 = some college and 4 = finished college. *Overspend* is a variable that measures the behavior of individuals regarding whether the individual knowingly buys using a credit card and not have money to pay it when balance is due, the variable takes the values of 0 = never, 1 = rarely 2 = Sometimes, and 3 = Frequently; *D2L* is a dummy variable where individuals express interest in learning more about financial topics in general, whereas *D2LCCD* is a dummy variable whereby students indicate their desire to learn more about credit card debt management. *COSP2IR* is a dummy variable taking the value of 1 if parents are the main source of financial education and also the cosigner on the credit card(s); *Surp* is a variable that measures the self-reported level of surprise regarding the how high the balance on the credit card(s) is on the monthly statement, with 0 = never, 1 = rarely, 2 = sometimes and 3 = frequently; and *Cosign* is a dummy variable taking the value of 1 if the individual has a cosigner on the credit card.

the bill. This is to say; the level of anxiety is recorded prior to actual repayment behavior is executed. Also, recall that in the estimations with anxiety as dependent variable, the relationship between anxiety and repayment was assumed to work in the reverse order, that is bad repayment fuels anxiety. Now in the second set of estimations we observe that already being anxious results in individuals making less than pay-in-full repayments with a higher probability, and consequently more likely to accumulating month-to-moth balance or increasing an existent balance already. Anxiety prompts individuals to anchoring (Keys and Wang 2015). Of course, this anxiety effect is not the only element that may negatively affect repayment, but surely it is one that the literature and respective empirical evidence has overlooked.

An alternative possible explanation for this unexpected result could be that respondents already displaying a bad repayment history today, also had bad repayment in the previous billing cycles. Thus, the preexistent bad repayment history in the past may lead to more anxiety, creating a feedback process where the two variables are correlated[8]. While we are not able to validate or deny this possibility, our data indicates a correlation value of 0.2492 between *Anx* and *Rfreq*.

As we continue there are several elements worth exploring in order to attempt to uncover this unexpected relationship. For instance, it would be extremely useful to have data in time-series format to be able to explore the dynamic properties of anxiety and repayment behavior. This is clearly not possible at this time, but surely interesting to explore in future research as data may become available. For instance, data of that nature would allow for causality testing and also simultaneous equations estimations. It would also be interesting to determine if anxiety is endogenous to credit card behavior or exogenous and endemic from parental experiences transmitted through transgenerational effects. However, despite these possible limitations, what we know with good confidence is that higher anxiety results from higher probability of falling behind on credit card repayment. We also assume, without much effort, that month-to-month balance creates more anxiety; and this anxiety then results in worse repayment patterns to further develop along the lines of anchoring.

Alternatively, it is also feasible that for individuals with high monetary constraints (cash-constrained), paying in full may actually result in more anxiety. If this were to be the case, then higher anxiety (capacity to repay) serves as a leading indicator of the repayment capacity itself; and thus repayment in full in such a cash constraint scenario would only increase anxiety! Clearly further research is needed to prove this point.

As it was shown elsewhere (Smith and Barboza, 2014) our results provide robust evidence of the transgenerational effect and knowledge spillover effects from parents to children regarding credit card repayment. Those that learn primarily from parents (*FePar*) and actively discuss credit card management (*DCC*) with them, tend to have better repayment patterns, and are less likely to fall behind, miss payments and carry a month-to-month balance. The coefficients for our three educational variables *DCC*, *FePar* and *FinEdImp* are all negative (expected) and statistically significant. However, since they all measure highly related concepts then they are not significant when modelled together; that is

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[8] We thank an anonymous referee for this insightful comment.

they present multicollinearity. Thus, we present them first jointly and then separately to demonstrate this point. The important aspect is that the transgenerational effect is present and strong under alternative measures.

In terms of spending behavior and mental account issues, we observe first that our overspending (*Overspd*) variable is a major and statistically significant factor in explaining poor credit card repayment patterns. As expected impatient behavior on the individual side leading to make purchases knowing that they cannot repay, materializes in unhealthy credit card use. The prevalence of significant present-bias behavior and consumption impatience have a high price, that for some not really understood reason some individuals are willing to pay for[9], even after we account for a positive knowledge spillover effect from parents. To this end, claiming ignorance on the consequences of overspending is not a realistic explanation for this behavior. Somewhat individuals believe that this behavior is desirable. Furthermore, despite the fact that higher levels of financial literacy (at least as measured in this study) lead to more appropriate repayment patterns, present-bias, impatience and lack of self-control seem to have dominant effects. The rest of the variables are not statistically significant.

4.3 Probabilities and marginal effects

4.3.1 Predicted probabilities for anxiety

Using the estimation results from Table 2, and after some tedious computations, we are now able to compute the respective probability results. Table 3 reports the corresponding predicted probabilities for all models (Table 2) with anxiety as dependent variable. The results are very consistent and stable across alternative model specification. In general, we can say, that based on the evidence computed most students would report not being anxious, and thus the Prob $(y = 1|x)$ ranges from 40.82% to 44.57%. By the same token, we also observe that a larger majority of students will report to be some to somewhat anxious, (Prob $(y = 2$ & $y = 3 |x) = 47.27\%$-52.28%). These results indicate that a good amount of students already encounter and have to deal on a regular basis with levels of anxiety that cannot be neglected. Furthermore, our estimates also indicate that a concerning Prob $(y = 4|x)$ of roughly 5.5% suffer from significant anxiety, and almost 3% suffer from extreme anxiety. Considering the age composition of our sample (relatively young adults), it is alarming to observe the resulting estimated probabilities in relation to anxiety on credit card repayment capabilities. It is also relevant to recall that this anxiety is not a one-time event, but reported as a consistent and endemic issue that subjects experience on a regular 30 day cycle[10].

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[9] Individuals that are unable to pay in full every month when they have made purchases knowing they could not pay, are paying interest rate fees on the outstanding month-to-month balance, and are also willing to see their level of anxiety increase as a result of repayment behavior.

[10] The frequency behavior of anxiety levels during the billing cycle is unknown however.

Table 6: Estimated probabilities for the model with anxiety as dependent variable (%)

	I	II	III	IV	V	VI	VII	VIII	IX
Prob (y = 1|x)	44.21	44.57	44.40	40.15	40.54	40.48	41.13	42.22	40.82
Prob (y = 2|x)	25.22	25.62	25.64	28.47	31.20	31.62	31.45	31.97	31.92
Prob (y = 3|x)	22.07	21.65	21.72	23.52	20.62	20.66	20.31	19.42	20.23
Prob (y = 4|x)	5.62	5.35	5.39	5.25	5.66	5.44	5.33	4.86	5.29
Prob (y = 5|x)	2.87	2.81	2.85	2.61	1.98	1.80	1.78	1.54	1.73

Note: y = 1 refers to no anxiety, y = 2 refers to some anxiety, y = 3 refers to somewhat anxious, y = 4 refers to anxious y = 5 refers to extremely anxious.

Table 7: Marginal effects on anxiety levels as dependent variable (model VI)[a]

	$\partial P1/\partial x$	$\partial P2/\partial x$	$\partial P3/\partial x$	$\partial P4/\partial x$	$\partial P5/\partial x$
Model VI	(0.405)	(0.316)	(0.207)	(0.054)	(0.018)
Race	0.091	−0.012	−0.047	−0.022	−0.010
	(0.496)	(0.304)	(0.160)	(0.032)	(0.008)
Misspay	−0.066	0.009	0.034	0.016	0.008
	(0.339)	(0.325)	(0.240)	(0.070)	(0.026)
Rfreq	−0.056	0.007	0.029	0.014	0.006
	(0.349)	(0.324)	(0.235)	(0.068)	(0.024
PrtPay	0.109	−0.014	−0.056	−0.026	−0.012
	(0.514)	(0.302)	(0.151)	(0.028)	(0.006)
Surp	−0.099	0.013	0.051	0.024	0.011
	(0.306)	(0.329)	(0.257)	(0.078)	(0.029)
Overspd	−0.082	0.011	0.042	0.020	0.009
	(0.323)	(0.327)	(0.248)	(0.074)	(0.027)
FePar	−0.121	0.016	0.062	0.029	0.014
	(0.283)	(0.332)	(0.269)	(0.084)	(0.032)

Note: Marginal Effects only reported for Model VI from Table 5.

[a] Adjusted Probabilities reported in parenthesis below marginal change.

The evidence from the Probability Table 6 is a good indication of the significant, yet overlooked, problem of anxiety among your adults (college students), and brings up the concern as to how to deal with and more importantly learn to manage it and control it. To this end, the probabilities reported are a direct function of the marginal effects derived from changes in the dependent variables. To further study the nature and magnitude of these events, we turn to the marginal effects table (Table 7), where we estimate the corresponding changes in anxiety probabilities, making use of Model VI from Table 5.

4.3.1.1 Marginal effects

The analysis we develop in the previous section, under Anxiety, gives the backbone to better understand the effects of changes in the explanatory variables on probabilities of anxiety. Recall that the estimated coefficients indicate the overall expected changes at the end of the probability distribution function. In the context, recall as well that a negative coefficient implies that as the explanatory variable increases the probability of ending at the low end of the distribution decreases, and the probability of ending at the highest end of the distribution increases. In the event of positive coefficients, as the explanatory variable increases the probability of ending at the high end of the distribution decreases. However, the direction of effects is unclear for probability values different than the extremes (Lowest and Highest Value), thus the marginal effects analysis provides us

with the necessary estimates to assess the magnitude and direction of the effect. Also recall that the marginal effects analysis is based off all variables evaluated at their mean value[11]. With these considerations we can now proceed to compute the marginal effects and related probabilities. Let us begin with our main variable of interest, anxiety. In what follows we report the marginal effects based off Model VI from Table 5 only[12].

There are several elements to point out from the estimated marginal effects on probabilities. First notice from Table 4 above that the marginal effects have a reverse sign in comparison between Prob $(y = 1|x)$ in relation to the other probability ranges. This is to say, that any marginal change on the selected explanatory variables has to be measured against changes in the base probability of not suffering from anxiety. The second element to notice and pay particular attention is that the sum of marginal effects must be zero across explanatory variables, a condition also met by all variables. As expected the marginal changes in probabilities are in line with the direction of the estimated coefficients reported in Table 5.

Let us begin by looking at the magnitude of the effects. Here we notice that the largest marginal effect comes from the dummy variable, *FePar* (Parents are the main source of financial education). When the variable takes the value of 1, the probability of not having any anxiety is lower by −0.121, and in return the probability of observing an increase in anxiety goes up. Particularly, the estimated results indicate that the largest change (increased anxiety) will happen in the P3 and P4 levels. This is to say that parental driven education regarding financial issues significantly increases the chances of students to feel anxious about credit card repayment. However, this initial impact is somewhat ameliorated when parents pay the credit card (*PrtPay*). Here as parents pay the credit card the level of anxiety is more likely to decrease as the Prob $(y = 1|x)$ increases and all other levels of anxiety tend to decrease. While parents may increase anxiety through educational efforts, they take some of that burden when they pay the credit card.

Secondly, the analysis of all other explanatory variables indicate that as they increase, the level of anxiety increases along with them. This is to say, as repayment frequency worsens anxiety increases; as students' report being more surprised on the credit card balance level anxiety increases; as they miss more payments anxiety increases; and as they report overspending anxiety increases.

Thus, the two most relevant factors are the *Surprised* and *Overspending* component of the individual's behavior. Here we observe that reporting to being surprised on how much she has spent in the billing cycle, increases the probability of being some to somewhat anxious by 0.075, and reduces the probability of not having anxiety by –0.099. By the same token, overspending has a cumulative change in probability toward some to somewhat anxious of a 0.062 increase and a decrease in no anxiety of –0.082. The combined effects of present-bias, lack of control and impatience have a significant increase in the probabilities of having significant anxiety.

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[11]   The marginal effect analysis is sensitive to the selection of initial values. As noted, in this paper we use the conventional approach to assume the value equal to the mean. Results would change depending on the selection of initial values.
[12]   The selection of the Model VI as the point of analysis is the authors' responsibility. Further analysis could be performed for the other models. We anticipate that the insights drawn from the Model VI are a good representation of the alternatives.

An interesting result is that of *MissPay*, where we observe that missing payments increases anxiety. We also observe that the change in probabilities of becoming anxious is lower than the previous two variables described. This could be taken as an indication that consumption behavior patterns are the main drivers of future anxiety when students use credit cards to conduct the purchase.

The results in Table 4 also point out to some very interesting insights regarding the changes in probability to becoming marginally anxious {Prob (y = 2|x)}, in comparison to the {Prob (y = 3|x) and Prob (y = 4|x)}, some to somewhat anxious. Notice that in this context that marginal changes in the selected variables, all report larger changes in anxiety toward categories 3 and 4 than category 2. We interpret this as evidence that lower levels of anxiety are less likely once anxiety develops. Furthermore, becoming extremely anxious has about the same probability than just being minimally anxious[13].

4.3.2 *Predicted probabilities on repayment frequency on credit card*

Table 8 reports probabilities for our second set of estimations. Based on the most complete data that accounts for all variables, we report probabilities for four possible categories on repayment, ranging from Prob (y = 1|x) = pay in full, to Prob (y = 4|x) = only make minimum payment (anchoring). Notice that about 2/3 of the individuals report making payments in full every month. This is to be considered a good result. However, this also implies that about 1/3 of all individuals carry a month-to-month balance on her/his credit card. To this end, we also observe that those carrying a balance most likely hold more than one credit card as the Prob (y = 2|x) is approximately 15-22%. Furthermore, we observe that a significant proportion of individuals also make just above minimum payment or minimum payment, accounting for about 16% of all individuals.

The combined probability of about 1/3, in general and, in the later models of about 40%, to carry a month-to-month balance is significantly high and alarming. The evidence indicates that young adults (students) do tend to fall behind on their credit card payments. Because we did not ask the balance on the credit card, we cannot state the depth of the issue. This is clearly a topic for further research. However, our estimated probabilities do provide significant evidence in support of the tentative hypothesis that students suffer from high levels of impatience, tend to spend more than their income allows, and demonstrate either overconfidence in their repayment capabilities and/or fail to maintain an adequate (accurate) mental account of income and expenses. The results from the estimated probabilities and the coefficient estimates from Table 5, allows us to then compute the marginal effects. We select Model VII from Table 5 as our reference point[14].

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[13] We have omitted reporting the probabilities and marginal effects for the Credit Card Repayment Frequency models as they are not the main concern to this paper.

[14] Estimated probabilities and corresponding marginal effects could be computed for any model. We select Model VII as a representation, given that providing results for all models would become tedious and too extensive. The results herein provided should serve as a good illustration of the dynamics of credit card repayment behavior.

Table 8: Estimated probabilities for the model with credit card repayment as dependent variable (%)

	I	II	III	IV	V	VI	VII	VIII	IX	X
Prob (y = 1|x)	68.28	68.69	69.83	69.36	69.72	68.46	67.65	67.98	61.50	61.07
Prob (y = 2|x)	15.55	16.08	16.49	16.85	17.40	19.25	19.74	19.61	21.91	22.08
Prob (y = 3|x)	8.17	8.34	7.76	7.88	7.76	7.63	7.85	7.75	9.76	9.88
Prob (y = 4|x)	8.00	6.89	5.92	5.91	5.11	4.66	4.76	4.67	6.83	6.97

Notes: Prob (y = 1|x) = Pay in full; Prob(y = 2|x) = pay in full some and other carry month-to-month balance, Prob (y = 3|x) = pay more than minimum payments in all; and Prob (y = 4|x) = pay minimum payment only.

4.3.2.1 Marginal effects

As before, (Anxiety model) the results provided in Table 9 look at the marginal effects of a selected group of variables on the probability of credit card repayment frequency. In this table, we report the marginal effects of changes in the independent variables (holding all other variables at their mean value) only for those variables that are statistically significant predictors of repayment behavior in Model VII-Table 5.

As it was already reported in the analysis of Table 5, we observe that Financial Literacy rate has a positive effect in increasing the probability of repaying in full every month. Particularly, an increase of 0.2 base points in the financial literacy index – that is obtaining one more correct answer out of the possible five asked – results in an increase of repayment in full of about 7.6%, and a reduction in all other less optimal repayment categories. This result is evidence that higher financial literacy does benefits individuals and makes them more aware, and more important act accordingly repaying credit card balance. Higher financial literacy results in lower or no month-to-month balance in credit cards.

Our second variable of interest is Anxiety. In this case, we observe that higher anxiety reduces the probability of repayment in full by 7.4%, and thus reduces the cumulative probability of repayment in full to about 60%. This reduction in the probability of repayment in full, is matched by an increase in all other repayment behavior in about the same proportion. This result is perhaps the most puzzling of all, as it was discussed earlier. The quantification of the event does indicate that an increase of one-step (see our anxiety classification) has a tremendous impact on the repayment capacity of credit card balance. As anxiety increases repayment becomes less optimal, and the chances of continuously falling behind on credit card repayment, and consequently accumulating a month-to-month balance increase significantly. Falling behind increases anxiety – as discussed earlier – and thus a vicious cycle develops.

FePar has the expected effect of improving repayment. In this case, for those discussing financial issues with their parents, they experience an increase of 15%, and overall better repayment probability of 86% to pay in full her/his credit card every month. The evidence in favor of the transgenerational educational spillover effects is robust across all model specifications.

Finally, overspending has a very high negative effect on repayment rates. Those individuals that knowingly overspend are at a very high risk to see their financial position deteriorate dramatically. An increase from one category to the next has (estimated linear effect) an impact of about 16.8% decrease in repayment in full capability. Consequently, those overspending begin to accumulate a month-to-month balance; which per our pre-

Table 9: Marginal effects on repayment frequency as dependent variable

	∂P1/∂x	∂P2/∂x	∂P3/∂x	∂P4/∂x
Model VII	(0.676)	(0.197)	(0.078)	(0.048)
Academic Status	−0.063	0.027	0.019	0.018
	(0.613)	(0.224)	(0.098)	(0.065)
FLitRate	0.076	−0.032	−0.023	−0.021
	(0.753)	(0.165)	(0.056)	(0.027)
Anxiety	−0.074	0.031	0.022	0.020
	(0.603)	(0.229)	(0.101)	(0.068)
FePar	0.150	−0.063	−0.045	−0.041
	(0.826)	(0.134)	(0.033)	(0.006)
Overspend	−0.168	0.071	0.050	0.046
	(0.508)	(0.269)	(0.129)	(0.094)

Note: Marginal effect impact reported only for statistically significant coefficients for Model VII Probabilities reported in parenthesis.

vious discussion may fuel anxiety. Since overspending is a behavioral characteristic and the manifestation of inner conditions, it is very likely that once a person overspends, she will continue doing so. The marginal largest increase in falling behind is represented by the largest change in the Prob $(y = 3|x)$ and Prob $(y = 4|x)$ categories. This is to say, overspending results in individuals moving faster into the minimum payment behavior category and reinforcing anchoring behavior. We hypothesize that anchoring results in increased anxiety; which feedbacks in worsening repayment patterns, as evidenced in our empirical analysis.

5 Conclusions

The results of models estimations with anxiety on credit card repayment capabilities and actual repayment behavior on credit card as dependent variables, yield relevant and useful information, regarding the role of parental financial educational spillover effects; possible endemic issues relating to anxiety; present-bias behavior and impatience; over-confidence; and somewhat limited positive effects of financial literacy to reduce anxiety. In fact, our results hint of a possible pervasive effect of financial literacy and education leading to increased financial anxiety. In turn increased anxiety may not lead to improve financial performance, at least in terms of credit card repayment behavior. This relationship clearly requires further research efforts.

More specifically, poor credit card repayment behavior leads to higher anxiety, as expected. Second, parental education regarding financial issues seems to be a source of financial knowledge, both actual and experiential; yet the evidence also points it to be a cause of anxiety. In a way, one could compare the transmission of anxiety as a warning system to prevent children from further damage/suffering. Think of it as a parent telling a child «do not touch a fire because you will get burned» kind of situation. If this is correct, then endemic anxiety may serve the purpose to stop individuals from engaging in financial behavior beyond their financial capabilities.

However, if endemic anxiety fails to prevent individuals from exercising inherent present-bias, lack of self-control and impatience, then it may lead to further poor financial behavior and more month-to-month balance accumulation. Unfortunately, our evidence

tends to support this view more than the previous; since higher anxiety increases the probability of anchoring and consequently accumulation of a month-to-month balance and increasing credit card debt.

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