Success, Failure and Decisions in Corporate Finance: An Experimental Approach

Abstract

There is evidence that the choice of financial leverage is influenced by previous experiences. When individuals are subjected to experiences with failure, they change their financial leverage decisions correlating negatively it with operational risk. This paper is the first to evaluate how experiences with success and failure influence future financial decisions, integrating the personal characteristics of the individuals making the decisions. Using an experimental method we simulate experiences of success and failure, and then observe the decisions made regarding the financing of projects with different degrees of operational risk. Our results support the evidence that failures affect the decision making process in corporate finance. Individuals that have experienced failure present higher probabilities of assigning a negative correlation between a project's operational risk and its debt levels, than subjects that have experienced success; this supports the idea that failure promote learning, whereas success not. In other words, failures incentivize individuals to reassess their heuristic based decision making processes, and turn towards a process centered on cognitive effort.

Keywords: Corporate Financial Decision Making * Experimental Finance * Cognitive Architecture

Introduction

What can managers learn from success and failure? Regarding experiences, the existing literature that deals with reinforcement learning indicates that people repeat past decisions that had favorable results; this is one of the principles on which the use of heuristics in decision making is based (Tversky & Kahneman, 1974). In a financial context, Kaustia & Knüpfer (2008) state that when subscribing IPOs investors cannot step back and abstract themselves from their experiences when evaluating new decisions. Because of this, they tend to assign too much relevance to past results as decision making tools, compared to a rational decision making process. Additionally, from an experimental perspective, Thaler & Johnson (1990) provide evidence of the house money effect regarding the propensity towards taking risks, indicating that monetary losses increase an individual's risk aversion. In this paper we find experimental evidence that previous experiences with success and failure affect decisions in corporate finance.

The existing literature has investigated the implications that experiences with success and failure have, relating them to behavioral biases such as overconfidence, through the phenomenon of self-attribution (Wolosin, Sherman, & Till, 1973; Miller & Ross, 1975; and, Langer & Roth, 1975). Barber & Odean (2000), and Gervais & Odean (2001), indicate that people learn from themselves

and the world around them, but not through introspection, rather through the observation of their experiences. In this way, the overconfidence bias occurs when people tend to give themselves more credit for their successes, than for their failures. Additional evidence indicates that this bias is higher in the initial stages of an individual's career, when the individual's ability to objectively evaluate his successes and failures is limited due to his lack of experience; individuals with more experience, on the other hand, are able to better recognize their abilities, thus decreasing the importance of their past results. Baker & Wurgler (2013) propose that these kinds of biases influence financial decisions, having an impact on the economic value of a company. In this regard, Heaton (2002) and Malmendier & Tate (2005) observe that overconfidence in managers leads to their undervaluing debt risk with respect to equity, incentivizing higher levels of indebtedness.

A second bias is the use of anchors. Epley & Gilovich (2005) point out that people face complex decisions on a daily basis, and that some errors in those decisions can be explained by the fact that people think very little. Accordingly, Tversky & Kahneman (1974), Kahneman (2003), Epley, N., Keysar, B., Van Boven, L., & Gilovich, T. (2004), and Epley & Gilovich (2005) note that subjects commonly base their decisions on anchors; in other words, intuitive ways of responding to future problems using past experiences and/or information as reference points[1]. For example, Dougal, Engelberg, Parsons, & Van Wesep (2011) have found evidence that debtors and loaners use for current debt contracts, past debt conditions in contracts as anchors or reference points.

In this context, our paper examines the effects that experiences, with success and failure, have on decisions related to corporate finance. To do this, we conducted an experiment based on the cognitive architecture theory proposed by Kahneman (2003), which states that the decision making process is made up of two systems: system 1 which is governed by processes of perception and intuition, and system 2 which is based on cognitive effort. In the first system, decision making is done using low levels of cognitive effort, in a fast, parallel, automatic, emotional and associative manner, where learning is minimal. In the second system, decision making is done using high levels of cognitive effort, in a flexible, neutral, slow, serialized, and controlled manner, and is governed by rules. In this way, this paper deepens the understanding regarding the decision making processes involved in corporate finance, relating them to personal characteristics such as happiness, motivation, risk aversion, overconfidence, and impatience. Additionally, our work studies sequential

[1] Judgment errors would decrease if people were willing to stop for a moment and think a little, thus making an effort before making decisions (Koriat, Lichtenstein, & Fischhoff, 1980; Epley, N., Keysar, B., Van Boven, L., & Gilovich, T., 2004; and, Dunning, D., Griffin, D. W., Milojkovic, J.D., & Ross, L., 1990). Kool, McGuire, Rosen, & Botvinick (2010) point out that people tend to avoid decisions that require high levels of mental effort or cognitive processing; this behavior is known as the Law of Minimum Effort. Evidence indicates that when a task requires high levels of mental effort and considers high internal costs, decision making can become sub-optimal when individuals use heuristics that simplify the answer to these problems (Tversky & Kanheman, 1974).

financing decisions which consider the dynamic aspects of choices, approaching the study of individual behavior in the decision making process, and consequently contributing to a better understanding of this process in real contexts (Ackert, Charupat, Church, & Deaves, 2006).

The hypothesis in this article is that failures alter the decision making process. This change would imply that, when evaluating complex decisions, individuals that experienced failures substitute the use of anchors (system 1) with a process involving higher levels of cognitive effort (system 2). To explore this hypothesis, we performed an experiment based on two treatments (experiences with success and with failure), plus a control group (without treatment), to 294 business school undergraduate and graduate students, where the experimental variable is the experience with success and with failure generated through a business game simulation. Specifically, we administer to each individual (except those from the control group), a positive shock (positive feedback for their prior decisions that resulted in an experience that ended with success), or a negative shock (negative feedback for their prior decisions that resulted in an experience that ended with failure). The next step required the participants to face the decision of choosing financial leverage for projects with different levels of operational risk. Based on this experimental design, we studied the effect of the previous experiences on the decision making process for financing.

The main result of this paper is that when deciding about indebtedness, and contrary to the individuals that were subjected to success feedback, the individuals subjected to failure feedback make financial leverage decisions considering the operational risk of the project as an input in their decision making process. Specifically, we observed that the individuals that experience failure negatively correlate the financial leverage with the operational risk in order to maintain bounded the total project risk. This result is in line with risk and capital structure theory proposed by Hamada (1972), where the systematic risk has two components: the operational risk of assets, and the financial risk which is related to the capital structure, the financial cost, and the economic value of a company. In other words, and contrary to individuals who experience success, individuals that experience failure keep the systematic risk of a company controlled by negatively relating the operational risk and the financial leverage.

Out interpretation of this result suggests that failure generates learning, while success does not. The evidence indicates that individuals subjected to failure change their decision making processes, improving the results of these processes, because they stop basing their decisions on anchors (system 1) and start considering the operational risk when adjusting their anchor through a process of cognitive effort (system 2), which is in line with cognitive architecture. In this sense, we can state that failure generates learning because it implies a change in the decision making process. McArdle (2010) indicates that any change to the usual way that people think, feel, or behave, is learning; for

example, changing the way that a subject observes a phenomenon helps develop abilities for solving problems and/or improving decision making processes in a better fashion.

The structure of this paper is the following: Section 1 describes the design, predictions, and experimental processes, the results are informed and discussed in Section 2, and we conclude in Section 3.

Experimental Method and Prediction

We conducted a two stage experiment where participants made sequential decisions using a virtual platform (see Table 1). In the first stage we varied a treatment: success versus failure, using a business game simulation where participants made financial decisions. Individuals subjected to success (failure), regardless of their decisions, received positive (negative) feedback so as to artificially generate experiences of success (failure) in them (see Table 1, Sequential decisions 1, 2, and 3).

In the second stage of the experiment, the individuals choose financial leverage among projects with different levels of operational risk (high and low). This design pretends to evaluate the degree of correlation between the operational risk of the project (represented by the cash flow variabilities), and the financial leverage chosen by the participants.

(Insert Table 1)

Experimental predictions

To examine the impact of success/failure, we designed an experiment that gives positive/negative feedback regarding past financial decisions, which we then compared to each participant's leverage decision, contrasting both behaviors: assigns financial leverage considering the operational risk of each project, according to Hamada (1972), or assigns financial leverage using self-generated anchors, according to Epley & Gilovich (2005).

Hypothesis 1: Successes do not change the decision making process

We contrasted the decisions of the participants that received the success treatment with the control group to test hypothesis 1. Specifically, we evaluate whether the participants used system 2 to negatively correlate the financial leverage with the operational risk, or whether they used system 1 where they assigns financial leverage using self-generated anchors. For this we compare the leverage of two sequential projects with different operational risks (see Table 1, Sequential decisions 4 and 5), and calculate the difference between both. If the difference was not statistically significant, we assume that the individuals used anchors (system 1) because they do not adjust their decisions respect to the initially chosen financial leverage according to the higher operational risk of the second project.

Our prediction is that both the success individuals and the control group use anchors for making decisions regarding financing, which is in line with behavior observed in the law of minimum mental effort (Koriat, Lichtenstein, & Fischhoff, B., 1980; Epley, N., Keysar, B., Van Boven, L., & Gilovich, T., 2004; and, Dunning, D., Griffin, D. W., Milojkovic, J. D., & Ross, L., 1990). Kool, McGuire, Rosen, & Botvinick (2010) indicate that people tend to use anchors to avoid decisions that require high levels of mental effort or cognitive processing. In this way, successful individuals will not adjust the financial leverage with respect to the operational risk, and will anchor their final decisions to a value that is very close to the initial one. In summary, the initial decision acts as a reference point for the final decision.

Hypothesis 2: Failures change the decision making process

In order to evaluate the impact of failures on the financing decision making process, we contrasted the decisions of the participants that received the failure treatment with those that received the success treatment. To do this we evaluate whether the participants use system 2 to negatively correlate the financial leverage with the operational risk, or whether they used system 1, dominate by self-generated anchors. Then we compare the leverage between two sequential projects with different operational risks (see Table 1, Sequential decisions 4 and 5), and then calculate the difference between both. If the difference was positive and statistically significant, we assume that the individuals consider the operational risk (system 2) because they adjust their decisions with respect to the initially chosen financial leverage according to the greater operational risk of the second project.

Our prediction is that the individuals that previously failed will assign the financial leverage considering the operational risks of the projects. In this way, failure expressed as negative feedback, acts as an explicit warning favoring a change in the decision making process, making individuals adjust their decisions with respect to the initial anchor. In consequence, individuals that failed will choose leverage negatively correlating it to the operational risk of the project so as to keep the total risk of the project bounded. Epley & Gilovich (2005) indicate that the adjustment of an anchor requires thinking with effort which is laborious, conscious, and deliberated, motivated by incentives to be exact, or explicit warnings to avoid errors.

Experimental procedures

All of the participants are university students in their fourth or fifth years of studying business related careers in the Universidad Adolfo Ibáñez. Individuals participated voluntarily and only once in the experiment; the classification of the experimental group was random. Table 2 shows the demographic variables of the sample showing favorable evidence for the group randomness

hypothesis. The average age of the participants is 22.81 years. The average work experience of the sample is 3.78 months. The number of economics and finance classes successfully completed is 7.5. The experiments were applied during the years 2013 and 2014. The incentive to participate and correctly answer the questions of the experiment was a bonus in the participant's academic evaluations. At the start of the experiment the participants received instructions regarding the experiment (we have included the translated version of the instructions given to the participants in the appendix).

Insert Table 2

Empirical Results

Leverage choices: Univariate test

Table 3a shows the financing decisions. The average financial leverage selected by the subjects subjected to the success treatment is 43% for both the low and high operational risk projects, consistent with hypothesis 1. This result indicates that the participants do not adjust the financial leverage according to the operational risk of the project, using the leverage level of the initial project as a reference point. The group that does not receive treatment behaves similarly, assigning 43% leverage for the project with low operational risk, and 39% for the project with high operational risk; this is not, however, a statistically significant difference.

This in line with Dougal, Engelberg, Parsons, & Van Wesep (2011) who find that financing decisions are strongly influenced by past indebtedness decisions and by the conditions of these contracts, thus representing a dependency on the use of anchors or reference points. They additionally pointed out that this effect actually increases when the contexts of the decisions are uncertain, when the future decision is too close in time to the past decision, and when the decision makers are one and the same; these conditions are similar to those of the experiment.

Related to the individuals subjected to the failure treatment, we observe that they chose different levels of indebtedness for each project, negatively correlating them with their operational risk, which is coherent with the Hamada (1972) theory. Table 3a shows an average leverage of 45% and 37% for the low and high operational risk projects, respectively, resulting in a statistically significant difference. This result is evidence that failure generates a change in the decision making process, implying that the use of anchors is replaced by a process with greater levels of cognitive effort.

(Insert Table 3a)

About to the effect of personal characteristics on the decision making process in financial decisions, Baker & Wurgler (2013) indicate that overconfidence and optimism influence the financing

decisions in the sense that overconfident managers acquire greater leverage. Langer & Roth (1975) and Miller & Ross (1975) propose that an overconfidence generator is a self-attribution phenomenon, which establishes that individuals tend to attribute their success to their own abilities, while attributing their failures to bad luck or third party actions[2].

Another dimension related to financing decisions is risk aversion and time preference. Graham, Harvey, & Puri (2013) find a relationship between the personal characteristics of the managers, such as optimism and risk aversion, and the financial policies of the companies. Associate to the risk aversion effect, Malmendier, Tate, & Yan (2011) demonstrate that past experiences influence risk aversion in individuals, thus affecting their financing decisions. For example, managers that lived through the Great Depression are more averse to using debt than managers that did not live through this time period, while managers that served during the Second World War choose more aggressive capital structures characterized by a higher proportion of financial leverage. As a consequence, these authors demonstrate that past experiences and behavioral traits persist, helping to explain the invariability of capital structure through time phenomenon, and linking risk aversion and experiences with financial decisions (Malmendier, Tate, & Yan, 2011).

Linked to time preference, Graham, Harvey, & Puri (2013) indicate that there is a relationship between the level of impatience and time preferences of managers and their financial decisions through incentives mechanisms. Additionally, people that are more impatient tend to have self-control problems, increasing the probability of negative results associated to an excess in consumption, obesity, addictions, reduced human capital, and reduced retirement savings (see Ifcher & Zarghamee, 2011, for a summary).

Furthermore, Gilbert (2009) provides evidence that supports the idea that emotions, specifically happiness, play an important role in decision making. For example, happier people feel more confident about their personal capabilities allowing them to save more and make investments with higher levels of risk (Lage, 2011). In the same sense, Van Winden, Krawczyk, & A. (2011) state that emotions are a determining factor in the behavior of individuals when evaluating investments and taking risks.

Table 3b shows the leverage decisions according to the personal characteristics of the participants. Related to risk aversion (Table 3b Panel A), we can see that individuals subjected to the failure treatment with high levels of risk aversion choose leverage considering the operational risk of the

[2] Fiske & Taylor (1991) indicate that faced with experiences of success, individuals are more inclined to experience the self-enhancing attributions phenomenon; in other words, they tend to think that their own abilities determine their success, while those that experience failure are more inclined to experience the self-protective attributions phenomenon where conditions in their surroundings would explain their failure. Langer E. (1975) and Langer & Roth (1975) indicate another related element called illusion of control, where individuals behave with the belief that their personal involvement can influence the result of random events. In this sense, the overconfidence phenomenon would occur when factors generally associated to improvements in performance within situations that require ability, knowledge, and skill, would also occur in situations governed, at least partially, by luck or risk.

project. However, those with low levels of risk aversion are more inclined to use anchors. In fact, leverage for projects with high and low levels of operational risk is 40% and 48%, respectively, while the low aversion group does not show statistically significant differences in indebtedness in both projects, which is evidence of the use of anchors.

With regards to the effect of the rest of the personal variables on the decision making process, Table 3b shows that individuals with higher levels of happiness, time preference, motivation, and overconfidence, make financing decisions using anchors with respect to the subjects with lower levels of these variables. However, individuals subjected to the success treatment, who use anchors to assign the financial leverage, change their behavior when they have lower levels of happiness, time preference, motivation, and overconfidence because they make decisions that negatively correlate the operational risk of the projects to the financial leverage.

From the aforementioned we infer that, just as indicated by Malmendier, Tate, & Yan (2011), personal characteristics influence the financial decision making process. Specifically, individuals that experience success tend to assign financial leverage through system 1 using anchors; however, this behavior would change in the case of successful individuals with high levels of risk aversion. This result is similar when studying time preference. Successful individuals with low levels of impatience tend to make greater adjustments to the anchor when assigning financial leverage.

(Insert Table 3b)

Leverage choices: Multivariate tests

We use a multivariate Logit model to explore the influence of personal characteristics, specifically happiness, motivation, risk aversion, overconfidence, and impatience, on the financial decision making process. Happiness is measured using the OHQ (Oxford Happiness Questionnaire), (Hills & Argyle, 2002); risk aversion, impatience, and overconfidence are measured using the psychometric tests proposed by Graham, Harvey, & Puri (2013); motivation is measured using the SIMS (The Situational Motivation Scale), (Guay, Vallerand, & Blanchard, 2000). The model also includes control variables such as age, gender, work experience, and academic ranking.

$$ln\left\{\frac{P}{1-P}\right\} = \alpha + \delta * E_i + \beta_i * X_i + \gamma_i * C_i + e_i$$

The dependent variable P_i is the probability of negatively correlating the financial leverage with the operational risk of the project; α is the constant; δ represents the regression coefficient of the experimental variable; E_i represents the experimental variable, equal to 1 if the individual belongs to the success treatment and equal to 2 if the individual belongs to the failure group; β_i represents the regression coefficients of the group of independent variables related to personal characteristics; γ_i corresponds to the estimated coefficients for the control variables; X_i and Ci correspond to the

independent and control variables; e_i refers to the error term. To test the proposed hypotheses, the size and magnitude of the coefficients estimated through the Logit model are analyzed, comparing each of them to an unrestricted model through the Lagrange multiplier test[3].

Related to the multivariate Logit models presented in Table 4, we observe that the experimental variable is negative and statistically significant, controlled by the personal characteristics, experience, academic performance, and psychological characteristics of the individuals. This is evidence that, with respect to the individuals subjected to experiences of success, the individuals subjected to experiences of failure have a higher probability of assigning a negative correlation between the operational risk of the projects and the debt level. One interpretation of this result is that failure motivates individuals to rethink their heuristic based decision making processes, and replace them with a process centered on cognitive effort, confirming the idea that failure generates learning while success does not (McArdle, 2010).

Furthermore, we see that there is a direct relationship between risk aversion and the probability of negatively correlating the operational risk of a project with its financial risk (see Table 4, Column B). In this sense, we see the existence of a second order effect between the degree of risk aversion and the experimental variable (see Table 4, Column G). This can be interpreted as individuals that are subjected to experiences with failure and have higher degrees of risk aversion, have a higher probability of correctly assigning each project's leverage, with respect to individuals that are subjected to failures and have lower degrees of risk aversion. These results are in line with Malmendier, Tate, & Yan (2011), who indicate that experiences with failure influence the degree of risk aversion of managers, consequently affecting their financing decisions by using less leverage.

One interpretation of the previous results is that, as a consequence of the failure and the ensuing increase in their risk aversion, individuals in the failure group change their minimum cognitive effort conduct, subsequently making precise, less subjective, and statistically significant decisions when assigning a negative correlation between the operational risks of the projects and the debt level. On the other hand, the success group, as a result of the success, increases its tolerance to risk, and does not therefore assign value when making a greater cognitive effort, tending towards the use of heuristics. In line with Shah & Oppenheimer (2008), a decision based on heuristics implies low levels of mental effort, generating low internal costs. Therefore, when individuals perceive that the benefits associated to the decision are less than the costs, they do not change their decision making processes and continue using heuristics. In this sense, experience with failure when risk aversion

[3] The Lagrange multiplier test lays the groundwork for comparing nested models, accepting or rejecting the statistical validity of each of them. Executing this hypothesis test is possible because, just like Breusch and Pagan (1980) indicate, the Lagrange multiplier test tests the effects of the first order conditions for a maximum imposed verisimilitude ratio in the hypothesis.

increases makes the individual increase the value of avoiding mistakes, and therefore assigns greater benefits to the decision, subsequently incentivizing making decisions with greater cognitive efforts.

From a psychological point of view, the previous results would be associated to the *reinforcement learning* and *outcome bias* theories. The first theory indicates that choices made by individuals strongly depend on the results they got when doing the same thing in the past, even if the circumstances have changed, and they therefore don't question the decision making process (Erev & Roth, 1998; Camerer & Hua Ho, 1999; and, Kaustia & Knüpfer, 2008). The results show that individuals use an intuitive system based on self-generated anchors, and that recent success reinforces this behavior encouraging them to continue making decisions intuitively, regardless of the context, even if the manner in which the information is presented changes. On the contrary, experiences with recent failures serve as evidence that heuristics do not work, incentivizing individuals to change their decision making processes for one based on cognitive effort. The second theory indicates that experiences with success reinforce the *outcome bias* theory, making it difficult for individuals to concentrate and use cognitive processes, leading to mistakes in complex decisions. Baron & Hershey (1988) indicate that individuals tend to evaluate the quality of a decision, the thought processes associated to it, and the ability to make the decision more favorably when the result of the decision is positive, compared to when its negative. On the contrary, they propose that when the result is not favorable, subjects reanalyze the decision so as to evaluate themselves and establish new criteria for future decision.

(Insert Table 4)

Leverage choices: Additional test

In order to prove that the previous results persist, two additional tests are performed. The first has to do with a change in the design of the experiment with the inclusion of an external anchor equal to 75% financial leverage for both projects[4]. The purpose is to evaluate if the results are the same within the context of an external anchor, due to the fact that Epley & Gilovich (2005) and Epley, N., Keysar, B., Van Boven, L., & Gilovich, T. (2004) point out that it's possible to distinguish between two types of anchors: internal anchors (self-generated), and external anchors (supplied by third parties), where the former require, compared to the latter, greater mental effort when adjusting with respect to the initial value. The second test modifies the Logit multivariate estimation model for an OLS, where the dependent variable corresponds to the leverage adjustment with respect to the initial

[4] The experiment is the same as the previous one with the difference that the average leverage of the industry where the projects belong, 75%, is informed. Regardless of the absolute level of leverage fixed as an external anchor, the value chosen is established at the same level for two projects with different operational risks, with the goal of measuring the degree of adjustment with respect to the external anchor when choosing the leverage.

self-generated anchor. The idea is to prove that the results do not depend on the estimation method nor the variable used to determine the financing decision.

The results with the failure group do not change when an external anchor is provided (see Table 5, Panel B), because the individuals continue to negatively correlate the leverage with the operational risk of the projects. However, the results are not robust for the success group when including an external anchor. Table 4, Panel B shows that individuals with previous experiences with success negatively correlate leverage with the operational risk, unlike individuals subjected to success in the previous experiment who made decisions based on self-generated anchors (see Table 5, Panel A). This is evidence that the external anchor acts as a warning signal, annulling the effect of the success–failure experimental variable, helping individuals make better decisions. Epley & Gilovich (2005) determine the existence of different behaviors with respect to individuals subjected to making decisions with self-generated anchors and external anchors. In this sense, they show that individuals faced with making decisions with external anchors show a higher degree of adjustment with respect to those who only use self-generated anchors.

An additional result that is a consequence of the change in the design of the experiment is seen when comparing the leverage levels of the failure and success groups. In the experiment with self-generated anchors (see Table 5, Panel A, Column 2), we see that there are statistically significant differences in the leverage assigned by both groups in the high operational risk project, whereas the leverage level of the failure group is less than that assigned by the success group. This is evidence of the effect of failure on risk aversion in financial decisions (Malmendier, Tate, & Yan, 2011). However, this result reverts itself in the case of external anchors (see Table 5, Panel B, Column 4), where we see that the failure group assigns higher leverage with respect to the success group. A conjecture related to this result is that failure increases risk aversion in individuals, incentivizing them to prefer leverage that is closer to the external reference point, and imitating the rest so as to avoid failure, minimizing the psychological impact of losses, in line with the prospect theory of Kahneman & Tversky (1979).

In the second additional test (see Table 4, Panel 2), we see that the results remain the same when the estimation method and the dependent variable vary. In this sense, individuals belonging to the failure group show greater adjustment with respect to the initial anchor, negatively correlating the operational risk of the projects with financial leverage. In the same manner, we see that the effect of failure on the leverage decision increases the risk aversion of the individuals, consistent with the previous results.

CONCLUSIONS

It's important to understand the factors that explain the use of a specific cognitive system in the context of corporate finance, because they directly affect the stockholder's value creation processes through financial decisions. In this regard, the focus of this paper is to study how experiences with success and failure influence financing decisions, deepening the understanding of the cognitive mechanisms used for evaluating these decisions (heuristic, like system 1, and cognitive effort, like system 2). The results indicate that individuals that experience failure in past decisions learn from them and change their decision making processes in the future, with respect to subjects that experience success. Additionally, the evidence shows the existence of a second order effect between experiences and risk aversion noting that, regardless of past successes and failures, individuals with higher levels of risk aversion have a greater probability of using high effort cognitive processes in the decision making process.

Following this line, we see that failure generates learning because it generates a process of evaluation of the decision making process. In this sense, learning is a relevant factor for the success of organizations because learning implies changes and improvements. In this sense, the results allow us to think about the development of managerial learning models where the focus is on the decision making process, and not only on the results. These models should consider three components so as to be able to help organizations review their suppositions, methodologies, and theories: (a) a timely feedback system for the quality of the result (management control system); (b) a component that allows for the objective study of the quality of the decision making process (coaching and processes registries); and, (c) an incentives plan that assigns the same importance to experiences with success and failure, in terms of learning opportunities (incentives and organizational culture plans).

One result of the aforementioned is that contemporary financial decisions made by managers could be influenced by the success or failure of their past decisions; in other words, when the successes are greater than the failures, the level of risk in business would be exacerbated, whereas when the failures are greater that the successes the learning process derived from the failures would promote more conservative behavior with lower levels of risk. For example, financial and economic shocks such as the 2008-2009 crisis would not only have an effect in the short term by lowering the level of indebtedness of companies, but would also have an impact on long term financial decisions due to the fact that these decisions don't change in time because managers would be anchored to their past experiences. In summary, because past experiences affect future decisions, understanding the factors that explain the use of a specific cognitive system in the context of corporate finances is very important, due to the fact that they directly affect the stakeholder's value creation processes.

Finally, related to future lines of research, it would be interesting to extend this analysis to other corporate financial decisions with different levels of complexity and impact on the stakeholder's

value creation processes, such as mergers and acquisitions, asset splitting, dividends, and the repurchase of shares, among others.

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Table 1. Experimental design

Stage	Sequential Decision	Treatment		No treatment
		Success	Failure	Control

1	1	Business decision + positive feedback	Business decision + negative feedback	Nothing
	2			
	3			
2	4	Leverage low operative risk project		
	5	Leverage high operative risk project		

This table summarizes the experimental design. The experiment has two stages. In the first stage we varied a treatment: success versus failure. Individuals subjected to success (failure), regardless of their decisions, received positive (negative) feedback. In the second stage of the experiment, the participants choose financial leverage among projects with different levels of operational risk (high and low operative risk).

Table 2. Demographic characteristics of treatment and control groups

	Control	Treatment			
		Failure	Success		
	Number, mean value or percentage			Difference in mean	Ha: diff = 0 Pr(|T| > |t|)
Number of subjects	96	260	296		
Gender (% female)	34.38%	40.77%	37.16%	0.04	0.39
Age (years)	22.99	22.64	22.58	0.03	0.83
PSU	674.62	677.06	677.69	-0.18	0.96
Experience	3.71	3.81	3.92	-0.12	0.09
Academic Performance	1.60	1.58	1.61	-0.02	0.68

The table shows the demographics characteristics of the participants. Number of subjects is the number of individuals in each treatment group. Gender is the proportion of female in each treatment group. Age is the age of the participants. PSU is the score obtained in the University selection tests. Experience is the working experience expressed in months. Academic performance represents the relative grading ranking of the participants.

Table 3a. Experimental results and statistical tests

	Low Operative Risk				**High Operative Risk**				
	N	**Mean**	**P25**	**P75**	**N**	**Mean**	**P25**	**P75**	**Diff in mean**
Success	**109**	**0.43**	**0.20**	**0.60**	**110**	**0.43**	**0.20**	**0.60**	**0.00**
Failure	**87**	**0.45**	**0.20**	**0.70**	**87**	**0.37**	**0.15**	**0.60**	**0.07****
Diff in mean		**0.02**				**-0.06***			
Control	**98**	**0.43**	**0.20**	**0.60**	**98**	**0.39**	**0.20**	**0.50**	**0.04**
TOTAL	**294**	**0.43**	**0.20**	**0.60**	**295**	**0.40**	**0.20**	**0.60**	**0.03****

The table reports the mean, percentile 25th and 75th of financial leverage for each treatment group (Success, Failure and Control) and project (Low and high operative risk). Difference in mean shows the difference between financial leverage for low and high operative risk project. *** Statistical significance at 1%; ** Statistical significance at 5%; * Statistical significance at 10%.

Table 3b. Experimental results and statistical tests

	Risk Aversion (Panel A)					
	High level			**Low level**		
	Low Operative Risk	High Operative Risk	Difference in mean	Low Operative Risk	High Operative Risk	Difference in mean
Success	0.41	0.35	0.06	0.45	0.39	0.06
Failure	0.48	0.40	**0.08***	0.39	0.45	-0.06
Difference in mean	-0.07	-0.05		0.06	-0.06	
Control	0.42	0.34	**0.07***	0.47	0.43	0.04
TOTAL	0.44	0.37	**0.07****	0.44	0.42	0.02
	Time Preference (Panel B)					
	High level			**Low level**		
Success	0.44	0.39	0.05	0.46	0.35	**0.10***
Failure	0.42	0.43	-0.01	0.45	0.44	0.01
Difference in mean	0.02	-0.04		0.01	**-0.09***	
Control	0.43	0.39	0.04	0.42	0.38	0.04
TOTAL	0.43	0.41	0.02	0.44	0.39	0.05
	Overconfidence (Panel C)					
	High level			**Low level**		
Success	0.44	0.38	0.06	0.45	0.36	**0.10***
Failure	0.36	0.38	-0.02	0.48	0.47	0.01
Difference in mean	0.07	0.00		-0.03	**-0.11****	
Control	0.42	0.36	0.06	0.43	0.42	0.01
TOTAL	0.41	0.38	0.03	0.46	0.43	0.03
	Happiness (Panel D)					
	High level			**Low level**		
Success	0.46	0.40	0.06	0.44	0.35	**0.09***
Failure	0.40	0.40	0.00	0.46	0.47	-0.01
Difference in mean	0.06	0.00		-0.02	**-0.12****	
Control	0.41	0.40	0.01	0.45	0.38	0.06
TOTAL	0.42	0.40	0.02	0.45	0.40	**0.05***
	Self determination (Panel E)					
	High level			**Low level**		
Success	0.46	0.38	0.08	0.45	0.37	**0.08***
Failure	0.40	0.42	-0.02	0.46	0.45	0.01
Difference in mean	0.04	-0.04		-0.01	**-0.08***	
Control	0.41	0.39	0.02	0.45	0.39	0.06
TOTAL	0.42	0.40	0.02	0.45	0.41	**0.04***

The table report the mean of financial leverage for each treatment group (Success, Failure and Control) and project (Low and high operative risk). Happiness is measured using the OHQ (Oxford Happiness Questionnaire), (Hills & Argyle, 2002); risk aversion, impatience, and overconfidence are measured using the psychometric tests proposed by Graham, Harvey, & Puri (2013); motivation is measured using the SIMS (The Situational Motivation Scale), (Guay, Vallerand, & Blanchard, 2000). Difference in mean shows the difference between financial leverage for low and high operative risk project. *** Statistical significance at 1%; ** Statistical significance at 5%; * Statistical significance at 10%.

Table 4. Multivariate tests

	Panel (1) Logit models							Panel (2) OLS Models		
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Experimental	**-0,90****	**-0,96*****	**-0,71***	**-0,77****	**-0,80****	**-0,78****	**-0,64***	**-0.11****	**-0.12****	-0.08
Risk Aversion	**0,79*****	**0,71*****						**0.07****	**0.07****	
Time preference	-0,25		-0,15					-0.02		
Happiness Index	0,15			-0,01				-0.02		
Self Determination Index	**-0,09****				-0,05			-0.01		
Overconfidence	-0,42					-0,21		-0.05		
Risk Aversion * Exp							**0,45*****			**0.05*****
Age	0,04	**0,04**	-0,01	-0,01	-0,01	0,01	-0,01	-0.01	-0.01	-0.01
Gender	-0,65	**-0,66**	-0,44	-0,39	-0,42	-0,40	-0,59	**-0.09***	**-0.09***	**-0.09***
Experiencie	0,07	**0,09**	0,02	-0,01	0,01	-0,03	0,12	0.02	0.01	0.02
Academic Rank	-0,01	**-0,01**	-0,01	-0,01	-0,01	-0,01	-0,01	0.00	0.00	0.00
Constant	9,52	**5,40**	7,71	5,36	5,32	5,46	5,18	0.88	0.45	0.37
N Obs	140	**140**	140	140	140	149	144	140	140	144
LR X^2	22,06	**14,52**	7,03	6,48	7,00	6,73	15,34			
Prob > X^2	0,02	**0,02**	0,32	0,37	0,32	0,35	0,02			
Pseudo R^2	0,12	**0,08**	0,04	0,03	0,04	0,04	0,08			
Log Likelihood	-84,28	**-88,05**	-91,79	-92,06	-91,81	-91,94	-90,13			
LR Test		**0,62**	0,03	0,02	0,02	0,00				
Prob > F								0.21	0.08	0.02
R^2 Adj.								0.03	0.04	0.06
Prob > chi^2									0.70	

The table reports the logit and OLS coefficients:

$$ln\left\{\frac{P}{1-P}\right\} = \alpha_o + \delta_i * E_i + \beta_i * X_i + \gamma_i * C_i + e_i \text{ (1)} \qquad Y_i = \alpha_o + \delta_i * E_i + \beta_i * X_i + \gamma_i * C_i + e_i \text{ (2)}$$

In the panel (1) we report the results of the Logit models. The dependent variable P_i is the probability of negatively correlating the financial leverage with the operational risk of the project; In the panel (2) we report the results of the OLS models. The dependent variable corresponds to the leverage adjustment with respect to the initial self-generated anchor. (a) Logit Joint unrestricted model; (b – g) Logit restricted models; (h) OLS joint unrestricted model; (i – j) OLS restricted models. Experimental variables identified the treatment group, where 1 represent the success group and 2 the failure group. Happiness is measured using the OHQ (Oxford Happiness Questionnaire), (Hills & Argyle, 2002); risk aversion, impatience, and overconfidence are measured using the psychometric tests proposed by Graham, Harvey, & Puri (2013); motivation is measured using the SIMS (The Situational Motivation Scale), (Guay, Vallerand, & Blanchard, 2000). *** Statistical significance at 1%; ** Statistical significance at 5%; * Statistical significance at 10%.

Table 5. Additional test: with and without anchor

	Panel (A) Self-generated anchor			Panel (B) External anchor			
	Low Operative Risk (1)	High Operative Risk (2)	Difference in mean	Low Operative Risk (3)	High Operative Risk (4)	Difference in mean	Diff in diff
Success	0.43	0.43	0.00	0.54	0.49	**0.06***	0.06
Failure	0.45	0.37	**0.07****	0.59	0.54	**0.04****	**-0.03****
Difference in mean	-0.02	**0.06***		**-0.04***	**-0.06****		
Control	0.43	0.39	0.04				
TOTAL	0.43	0.40	**0.03****	0.57	0.51	**0.06*****	0.03

The table reports the mean of financial leverage for each treatment group (Success, Failure and Control) and project (Low and high operative risk). Panel (A) is the design of the experiment with self-generated anchor. Panel (B) is the design of the experiment with the inclusion of an external anchor equal to 75% financial leverage for both projects. Difference in mean shows the difference between financial leverage for low and high operative risk project. *** Statistical significance at 1%; ** Statistical significance at 5%; * Statistical significance at 10%.