INTERNATIONAL REVIEW OF ECONOMICS AND MANAGEMENT
ISSN: 2148-3493 IREM
DOI: 10.18825/irem.78450 Volume 4, Number 1, 2016, 29-44.

INCENTIVE ROOTS OF MANAGERIAL (EXCESSIVE) RISK TAKING AND AN ASSESMENT OF POLICY RESPONSES

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Abstract

There are many incentive factors affecting managers' risk appetite. This study reviews the incentive literature and analyses arguments highlighting the impact of implicit and explicit incentives on managerial risk taking and the results of empirical studies on the issue. The paper also assesses main policy responses against excessive risk taking and concludes that current policies centered on fixing contractual schemes are not adequate to fix these incentive problems.

Keywords: Incentives, Risk taking, Investment, Managerial Compensation
JEL Codes G01, G14, G18, G38, M12, M52

I. INTRODUCTION

A widely debated issue in the financial crises of 08-09 has been the potential role of (excessive) risk taking in the financial crises of 08-09. It is widely believed that managerial incentives for excessive risk taking played an important role in the crisis. Many economists such as Blinder (2009), or Stiglitz (2010) pointed out this issue. Indeed, even executives consider excessive risk taking as one of the main causes of the crisis.† In a recent survey of PricewaterhouseCoopers (2008), over 70% of executives surveyed in financial sector argue that excessive risk taking is one of the crucial factors that triggered the financial crisis. This opinion is also shared by governors and policymakers. For example, in their September 2009 meeting, G-20 leaders announced their commitment ''…to act together to . . . implement strong international compensation standards aimed at ending practices that lead to excessive risk taking.'' There is a consensus on that in order

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† Throughout paper, we define excessive risk as the risk level beyond the optimal one maximizing firm value.
Date of submission: 04.03.2016
Date of acceptance: 26.04.2016

to ensure financial stability and to prevent future crises, it is essential to fix managerial incentives leading to high risk taking. For this purpose, we need a better understanding of what kind of incentives managers have to take excessive risk. This paper reviews incentive literature to outline managerial incentives related to excessive risk taking and assesses main policy responses during and after the crisis against excessive risk taking.

The paper is organized as follows. Section 2 presents a brief review of the managerial conservatism literature and main arguments suggesting that managers have incentives to take insufficient rather than excessive risk. Section 3 presents an outline of the implicit incentives related to excessive risk taking. In this section, we specifically focus on the role of career concern driven incentives. Section 4 considers explicit incentives and analyses the effect of stock options on managerial risk taking. Section 5 presents an assessment of policy responses targeting these incentive problems.

II. MANAGERIAL CONSERVATISM?

The standard view in the literature since Sharpe (1970) is that managers have incentives to take *insufficient* rather than excessive risk compared to the optimal level for shareholders (the firm). The main argument behind this view depends on the differences in shareholders' and managers' ability to diversify their wealth risk. Scholars argue that shareholders can diversify their wealth across many firms so it is more natural to consider them as risk neutral in investment decisions. However, important amount of managers' wealth and their human capital are tied to the continuation of the firm. So, they are more close to risk aversion in investment decisions (e.g., Milgrom and Roberts, 1992). Therefore, under the assumption that high returns come with high risk, scholars conclude that this misalignment of incentives between managers and shareholders leads risk averse managers to minimize investment risk and to underinvest compared to the optimal level for the risk neutral shareholders. Hence, in a standard environment without any other preference misalignment between managers and shareholders, the main issue should be to increase risk appetite of managers in order to align risk preferences of managers and shareholders (Sharpe, 1970; Milgrom and Roberts, 1992; Hall and Murphy, 2002).

Building on these arguments, a large body of papers in the *managerial conservatism* literature has focused on solving insufficient risk taking or underinvestment problem (e.g., Zwiebel, 1995; Nohel and Todd, 2005; Malcomson, 2011). A fundamental insight emerging from this literature is to design compensation contracts that increase managerial risk appetite. According to

this view, contracts such as stock option, golden parachutes or other convex compensation schemes that insure managers from down-ward risks of investment projects, while allowing them to get benefit from increasing risk are the optimal contractual structures maximizing shareholder value (e.g., Smith and Stulz, 1985). Hence, contract structures that are now believed as one of the crucial factors causing to 08-09 financial and economic crisis are presented as the optimal contracts in managerial conservatism literature.[‡]

III. IMPLICIT INCENTIVES FOR EXCESSIVE RISK TAKING: CAREER CONCERNS

The analysis of career concerns has been extensively studied both in economics and management science after its first recognition by Fama (1980). The central idea in career concern models is that ability of a manager or an employee is initially uncertain for the firm (or additionally for the manager himself), but it is endogenously learnt by them over time.[§] As a result, a manager's past performance provides a basis for predicting his future performance. As the manager is aware of that his current performance reveals information about his ability (or productivity), he will adjust his actions to affect the assessment of the firm. Career concern literature emphasizes that this motivation may cause misalignment of the firm's and the manager's preferences.[**]

First studies analyzing the impact of career concerns on risk taking behavior of managers argue that career concerns lead managers to underinvest (Holmstrom, 1982 /1999; Holmstrom and Ricart-i Costa, 1986). In a model in which managerial ability is initially uncertain (for both of the shareholders and the manager himself) and ability is inferred over time, Holmstrom (1982) shows that managerial past performance constitutes a rational expectation criteria for a manager's future performance. Holmstrom argues that since a firm's expectation about its manager's future

[‡] Hereby, we should note that the arguments developed after the financial crisis of 08-09 pointing out convex compensation schemes' role on excessive risk taking do not necessarily imply that conclusions derived by managerial conservatism literature is definitely misleading. Since, scholars in that literature do not argue that insufficient risk taking result is independent of environment or sector structure. Moreover, one may still explain excessive risk taking with unoptimally intense use of such kind of contracts in financial sector, even if a risk averse manager has initially insufficient risk taking incentives as pointed out in managerial conservatism literature.

[§] Existing evidence supports the common assumption in career concern models that managerial ability matters in the firm (Chevalier and Ellison 1997; Sirri and Tufano 1998; Del Guercio and Tkac 2002; Falato, Li and Milbourn, 2010).

[**] In this section, among the implicit incentives, we solely focus on the career concerns. However, we should note that career concerns, either in the form of reputation, or in the form of layoff risk, also opens places for, and is related to other implicit incentives for excessive risk taking such as peer effects or market pressure. Many theoretical studies (Hirshleifer and Thakor, 1994, 1998; Hermalin and Weisbach, 1998, 2012; Adams and Ferreira, 2007; Bushman, Dai, and Wang, 2010; Citci and Inci, 2016) suggest that managerial turnover is related relative performance evaluation, and so peer effects and market pressure. Empirical studies also show that managerial turnover is in fact related to relative performance of managers (Coughlan and Schmidt, 1985; Warner, Watts, and Wruck, 1988; Gibbons and Murphy, 1990; Murphy and Zimmerman 1993; Pourciau, 1993; Parrino, 1997; Defond and Park, 1999; Kaplan and Minton, 2012). Therefore, effects of career concern and other implicit incentives on managerial risk taking go hand in hand and when we talk about career concern in the paper, we also mean other related implicit incentives.

performance depends on his past investment records, a risk averse manager will have incentive to hide information from the firm as much as possible. This leads the risk averse manager to not invest at all.[††] Since, the manager can hide as much information as possible by this way.

Scholars later have provided different hypotheses showing that career concerns of managers may lead them to overinvest. Moreover, some models show that career concern may lead even risk averse managers to take higher risk compared to the optimal one for a risk neutral firm. Some papers focus on the reputation concerns of money managers and the possibility of signaling of managerial ability. Huberman and Kandel (1993) present an asymmetric information model where a manager receives return from the outcome of the investment. His reputation determines both the size of the portfolio under his management and the fees he receives for this management. There are both high and low quality managers in the market and a manager's reputation is tied to the market's assessment on his ability. In such a model, Huberman and Kandel hypothesize that managers can use portfolio weights to signal their managerial abilities, and reputation concerns may lead managers to overinvest in risky assets. Huberman and Kandel do not provide an answer for whether contractual incentives may solve this overinvestment problem. However, Huddart (1996) comes up with a similar model showing that the possibility of signaling of managerial ability and reputation concerns of money managers give them incentive to increase the variance of fund returns that they manage, and he suggests that a linear combination of stock ownership and fixed wage mitigates the problem.

Hermalin (1993) sheds light on another channel where career concerns of managers give them incentive to take high risk. Hermalin presents a model in which return of an investment is increasing function of managerial ability and this ability is initially unknown for both of the firm and the manager. Hermalin finds that if the project choice is observable by the firm, a risk averse manager can decrease the variance of the posterior estimate of her ability by choosing the riskiest project with the highest variance, as a result of which the firm puts more weight on its prior inference of the manager's ability. The intuition for this result can be observed with an extreme example. A manager can minimize his reputational risk by choosing projects with infinite risk (variance), because these investments prevent any information revealing about his ability. In this regard, these investments have the same informational effect with not investing at all. Hence, similar to Holmstrom (1982), Hermalin argues that a risk averse manager with career concerns may have incentive to hide information from the firm about his actual ability in order to minimize

[††] Risk aversion of a manager is still a necessary assumption for the underinvestment result. In Holmstrom's setting, a manager's dislike of investment does not come from his wealth's dependency to the firm's continuation, but because an investment project will reveal information about his managerial ability which affects his future compensation.

reputational risk. However, in contrast to Holmstrom (1982), he shows that a manager can also achieve this goal by choosing the riskiest project available, rather than not investing at all.

Citci and Inci (2016) further show that career concern of a manager in the form of employment risk may provide strong incentives him to take excessive risk and even to choose negative NPV investment projects. Their idea depends on that choosing risky investments with high probability of failure provide managers chance to blame luck in the case of lower return levels. To elaborate, consider a market in which investment projects differ in their probabilities of failure and potential returns, and there is a high risk-high return technology in the sense that a project with a higher probability of failure has a higher return in the good state and higher loss in the bad state. This technology is similar to the one inherited in bank loans or CDOs which are split into different tranches according to their default risk and returns. In such an environment, they show that a manager can increase the firm's expectation about his ability by choosing high risky investments with lower expected returns and higher probabilities of failure, even some with negative NPVs. Consider that a manager chooses high risky investment and the firm predicts the chosen risk level. Whenever the firm observes a return that may be product of either a talented manager or an untalented one, it statistically concludes that the observed return is more likely the product of bad state realization of a talented manager rather than the good state realization of an untalented one, as the probability of failure is high for the chosen project. They argue that by following this strategy, a manager can improve his career concern. Moreover, they allow for any linear combination of fixed wage and stock compensation and show that there are market structures in which contractual incentives are not helpful in preventing managers from choosing projects with negative NPVs.

Besides theoretical analyses, many studies have empirically tested the effect of career concerns on the risk choice of managers. One way to test this effect is to compare old and young managers' herding behavior. Since an old manager will have less career concern compared to a young manager and career concern diminishes as the managers get closer to their retirement, one can use managers' age as a proxy for career concern. Also, one can argue that herding indicates more conservative behavior, because following the crowd and the general pattern in the market will be less risky for both of the firm and the manager. The results on managers' age and herd behavior is somewhat mixed. Hong, Kubik, and Solomon (2000), and Lamont (2002) find that inexperienced young forecasters herd more and their forecasts diverge less from consensus forecasts compared to ones of older forecasters. Conversely, Graham (1999), Li (2002), and Menkhoff, Schmidt, and Brozynski (2006) provide evidence for the opposite.

A more direct way to test the relation between career concern and risk taking is to analyze investment behavior of managers. Avery and Chevalier (1999) analyze the managerial labor market for mutual fund managers and they conclude "…younger managers do indeed take on less unsystematic risk than their older counter-parts." However, Boyson (2010) examines investment patterns of hedge fund managers and finds strong negative correlation between managerial experience and managerial risk appetite. We should note that between these two studies with opposite results, the analysis of Boyson (2010) is more relevant to examine the career concern effect because in hedge funds, agency costs are lower and career concerns change more significantly over time. For example, Boyson, (2003) reports that although 67% of fired mutual fund managers remain in their industry, it is not the case for fired hedge fund managers.

Moreover, Serfling (2012) and Li, Low, Makhija (2011) examine the effect of career concern on managers' real investment decisions. Serfling (2012) studies the firms listed on Execucomp database for the period 1993 and 2010 with over 13,000 executive-year observations. He finds that older managers invest less in R&D and they are more likely to make risk reducing acquisitions. Li, Low and Makhija (2011) examine real investment decisions across all sectors of the economy, with a sample of 62,414 firm-year observations. They provide evidence for that younger managers make bigger investment projects compared to their older counter-parts. Both of these studies are very suggestive for the view that career concern increases managers' risk appetite.

To summarize, the managerial conservatism literature and the studies following Holmstrom (1982) argue that managers have implicit incentives to take insufficient risk. However, many other theoretical studies modeling the effect of career concern on risk taking behavior of managers emphasize that under plausible conditions, career concerns provide managers incentives to take high risk. These incentives may stem from signaling motivation as in Huberman and Kandel (1993), Huddart (1996), or from the motivation of hiding information about their actual ability as suggested by Hermalin (1993), and from possibility of increasing the firm's expectation about their ability as in Citci and Inci (2016). Although the results in the empirical literature are not conclusive on the issue, the majority of empirical tests suggest that career concerns increase managerial risk taking. Hence, based on existing evidence and our review of the literature, we conclude that career concern and other related implicit incentives (peer effect and market pressure) are important candidates to explain managers' excessive risk taking incentives.[‡‡]

[‡‡] The famous quote of Chuck Prince, the former CEO of Citigroup, well supports the role of market pressure and implicit incentives in managerial (excessive) risk taking. In the time of beginning of the financial crisis, he said in his interview with Financial Times:

IV. EXPLICIT INCENTIVES: CONTRACT SCHEMES

Among the potential factors causing high risk incentives of managers, much emphasis is put on the role of contractual schemes in explaining managerial excessive risk taking. For example, the argument leads the Obama administration to discuss ways to change compensation practices "to more closely align pay with long-term performance" of the corporations. It is reasonable to consider convex compensation schemes such as stock options or analogous bonus plans as important potential candidates in explaining excessive risk taking of managers. Since, with these compensation structures, managers only participate in the gains, but not share the losses. In this section, we briefly review both the theoretical and empirical studies analyzing the effects of this kind of compensation structure on risk taking behavior of managers. We specifically focus on the effect of stock options, since equity-based pay has constituted a notable proportion of managerial compensation since 1990s.

It is widely believed that granting stock options to managers increases their willingness to take risk. The intuition behind this view is that stock options provide convex payoffs and their returns increase with the risk (in terms of volatility) of underlying stock. Therefore, an option type contract can potentially increase a manager's risk appetite (e.g., Agrawal and Mandelker, 1987; Hirshleifer and Suh, 1992).

However, the theoretical literature on this issue is unsettled. In spite of the intuitive appeal of this line of reasoning, its validity depends on the following conditions: characteristics of options, preferences and outside wealth of managers. For example, Lambert, Larcker and Verrecchia (1991) present some comparative statics for risk averse managers and show that stock options decreases managers' willingness to take risk for certain parameter values. The intuition behind their result is that although the expected return of stock option increases with the variance of the underlying stock, options involve risk and risk aversion of managers may increase if they are compensated with options. In a similar vein, Guay (1999) and Ross (2004) discuss whether stock options can lead managers to take more risk depends on the utility function of managers. Specifically, Ross (2004) shows that there is no single convex compensation schedule decreasing all risk averse managers' risk appetite. Moreover, Carpenter (2000) demonstrates that options deep in the money leads to

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"When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance. We're still dancing."

decreases in managerial risk taking. Therefore, although the simple intuition indicates that stock options increases managers' willingness to take risk, more detailed analyses show that the positive correlation between the use of stock option and managerial risk taking depends on conditions.[§§]

On the empirical side, the results widely support that stock options increase managers' willingness to take risk. Many papers provide evidence on that stock options are correlated with higher managerial risk taking. Tufano (1998) finds that in gold mines managers with compensated with more stock options less hedge gold price risk. Rajgopal and Shevlin (2002) derive a similar conclusion. Guay (1999) shows that the convexity of a manager's compensation scheme increases R&D expenditures of the firm. The existing evidence also indicates that the use of stock option increases investment heavily in uncertain categories such as the number of acquisitions (Sanders, 2001) and the riskiness of acquisitions (Wright *et al*., 2002). Moreover, Coles and Naveen (2006) shows that convexity of managers' compensation contracts is positively correlated with increases both in R&D and in the firm leverage. Similarly, Sanders and Hambrick (2007) show that the use of stock option increases investment in R&D, acquisition and capital expenditures which are risky fields to invest in.

So far, the review of the theoretical and empirical literature about stock options indicates that stocks options encourage risk taking practice. However, this does not necessarily imply that stock options induce *excessive* risk taking. Thus, the main question is still unsettled. *Do stock options and other convex compensation schemes lead to excessive - too much - risk taking?* One can argue that explosion in the use of these compensation practices after 1990s have lead managers to take excessive risk.[***] If stock options encourage risk taking, then the excess use of them in executive pay may result excessive risk taking. However, the validity of this argument requires an explanation for the excess, unoptimally intense, use of stock options in managerial compensation, if there is. Thus, this argument opens another question: do corporations provide unoptimally high level of stock options to managers that may lead to excessive risk taking? And if so, why do corporations provide these incentives leading to excessive risk taking that damages the firm value? One naïve answer may be that the board or the shareholders are not aware of that provided level of stock options is excess. Other explanations should involve the argument that this intense use of stock options in executive pay -if it is the cause of excessive risk taking- is also in line with

[§§] If the risk aversion assumption is removed, then the statement about options encouraging risk taking holds unconditionally.

[***] Frydman and Jenter (2010) documents that for S&P 500 CEOs, while stock option comprised %20 of compensation package of CEOs in 1992, it comprised 49% of CEO pay in 2000. Based on their findings, they conclude ''From the mid-1970s to the end of the 1990s, all compensation components grew dramatically, and differences in pay across executives and firms widened. By far, the largest increase was in the form of stock options, which became the single largest component of CEO pay in the 1990s''. In 2005, options were still the biggest component of executive compensation package (Frydman and Jenter, 2010).

shareholders' best interest. That means, excessive risk taking of managers that damages firm value has to be also preferred by shareholders.[†††]

There are some explanations suggesting that shareholders also prefer excessive risk taking. A well known one is the *too big to fail* argument. Proponents of this hypothesis argue that if a corporation plays a large, important role in a nation's financial or economic system, its failure may threaten the whole financial system and the national economy. Under these circumstances, government or public institutions prevent failure of such corporations and support them when they face difficulty in order to protect well-being of the national economy. This creates a moral hazard problem: shareholders of such corporations will have incentives to take a high risk - high return position, simply because in the good state they receive all benefit of high risk taking, while they are protected or share the cost of failure in the bad state. Hence, shareholders of such too big corporations will let or incentivize the executive of the corporation to take excessive risk. In a similar vein, Jensen and Meckling (1976) and the following corporate finance literature show that shareholders may prefer high risky positions, even at the expense of firm value. Because in the failure state, they share the cost of the failure with creditors if the firm goes bankrupt, but they get all benefit and do not share it with creditors in the success state. Besides these explanations, Lambert (1986) and Palomino and Prat (2003) theoretically show that when a manager chooses the effort level and investment projects, the optimal contract in some cases induces excessive risk. Hence, the explanations above point out the possibility of that shareholders or the board are indeed the ones demanding excessive risk taking, even at the expense of firm value, and they may incentivize managers to do so by the excess use of stock options in executive pay.

In summary, it is reasonable to expect that stock options (or convex compensation schemes, in general) encourage risk taking because of letting managers to participate in the gains, but not the losses. Although some theoretical studies put limitations on the validity of this view, empirical studies widely support that stock options induce higher risk taking. However, this does not necessarily mean that convex compensation schemes necessarily lead managers to take excessive risk. Excessive risk taking can be explained with the use of convex compensation schemes, only if the board or the shareholders, from one reason or another, incentivize the executives to do so by the *excess* use of this kind of schemes in executive pay. Hence, if contractual incentives are the main

[†††] Indeed, existing evidence indicates that institutional investors are the ones having the power to pressure managers (Froot, Perold and Stein, 1992; Graham, Harvey and Rajgopal, 2005; Chenk, Hong and Scheinkman, 2010). For example, Chenk *et al.* (2010) empirically analyze this issue and conclude ''Our analysis further points to the role of heterogeneous shareholder preferences for short-termism and risk-taking as an important determinant in the behavior of the firms. That is, our findings indicate that heterogeneity of firm compensation and risk-taking behavior are not related to entrenchment per se but sorting of investors with like preferences into these firms.''

cause of managerial excessive risk taking, then the problem goes behind these carrots and lies in the risk preferences of shareholders.

V. POLICY DISCUSSION AND CONCLUDING REMARKS

After the financial crisis of 2008-09, administrators and policymakers widely agreed that among others, one of the important factors triggering the crisis of 2008-09 is the managerial incentives leading to excessive risk taking in the financial sector. U.S Treasury Secretary Geithner in March of 2009 said ‘‘I think that although many things caused this crisis, what happened to compensation and the incentives in creative risk taking did contribute in some institutions to the vulnerability that we saw in this financial crisis’’. With this purpose, policymakers have already started to carry out regulations with a view towards ending practices that lead to excessive risk taking (e.g., Dodd-Frank Wall Street Reform, Basel III framework, Remuneration Code of FSA).

Among others, two crucial regulations placed in most of the new regulatory frameworks that aim to fix managerial incentives are the increasing power of the shareholder in executive pay and regulating compensation schemes. For example, the Remuneration Code of FSA in UK requires postponing incentive payments over a number of years and tying performance criteria to long-term profitability. Similarly, the American Recovery and Reinvestment Act prohibits TARP recipients from granting any bonus, but allows restricted stocks. Moreover, Dodd-Frank Wall Street Reform puts some principles increasing shareholders’ power on executive pay. However, our review of the literature on managers’ risk taking incentives indicates that these policies are not adequate to solve the excessive risk taking problem. At best, they can only mitigate the problem. The intuition for this result is as follows. If excessive risk taking is driven by implicit incentives (career concern) of managers, then regulations concentrated on contractual schemes are misleading and will not fix the problem. Career concern literature (e.g. Hermalin, 1993; Citci and Inci, 2016) suggests that even though executives are compensated with only fixed wage or stock ownership, career concerns of managers still provide strong incentives them to take excessive risk. Therefore, prohibiting the use of convex compensation schemes in executive pay or increasing power of shareholders in managerial compensation decisions will not be sufficient to wipe out excessive risk from the market, if these motivations are driven by career concerns.

One can argue that the limitations on contractual structures and the rise of shareholders’ power in executive pay will be effective policies in preventing excessive risk taking, if they are primarily (or additionally to the career concern channel) driven by the excess use of stock options

and analogous bonus plans in executive pay. The explosion of the use of stock options in executive pay after 1990s suggests that there may be excess use of these convex compensation schemes before the crises, and so putting limitations on them will decrease managers' risk appetite. However, existing evidence indicates that institutional investors are the ones having the power to pressure managers and contract schemes such as stock options are only the carrots provided by institutional investors. Thus, if excessive risk taking is driven from contractual incentives, this implies that institutional investors, shareholders are the ones who prefer this level of risk and they might provide these contractual incentives in order to incentivize managers to choose excessive risk. Therefore, restricting the set of carrots does not guarantee the solution of the problem, as long as the shareholders prefer excessive risk taking and as long as they have other carrots and sticks (such as turnover decisions). As a result, the solution of the problem may lie behind the carrots, and should target the hands of the ones holding those.

Many factors have triggered the economic and financial crisis of 2008-09, the worst financial disruption since the Great Depression. In this paper, we focused on the potential role of excessive risk taking and tried to identify implicit and explicit incentives that may lead managers to take excessive risk. Our review and existing evidence suggest that both implicit and explicit incentives became effective in managerial excessive risk taking. Current policies centered on the fixing contractual schemes will not guarantee the solution of these incentive problems and we can't solely rely on these policies for prevention of possible future crises.

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