OVERINVESTMENT AND UNDERINVESTMENT PROBLEMS: DETERMINING FACTORS, CONSEQUENCES AND SOLUTIONS

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Abstract

The potential conflicts of interest between managers, stockholders and debtholders influence capital structure, corporate governance activities and investment policies, which, in turn, could give rise to inefficient managerial decisions and "suboptimal" investments that generally fall under the categories of problems of underinvestment and overinvestment. This paper intends to discuss these problems by identifying their causes, determining factors and the consequences on the value production processes, as well as to point out possible solutions to them. After after having confronted the effects and their implications on firm governance activities by clarifying the relevance of the phenomenon and showing the main empirical data that emerged in the prevailing researches, we summarize the main financial proposals found in literature that can diminish their impact.

Keywords: Underinvestment, overinvestment, capital structure; corporate governance; financial solutions to under&overinvestment

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1. Introduction

The relationship between capital structure and value is a notoriously controversial topic that is extremely relevant to both the academic and the business communities. Debt leverage generates, along with tax benefits, a series of responsibilities and incentives in business management activities that can cause conflicts of interest between managers, shareholders and debtholders. These conflicts can influence the process of identifying, selecting and choosing investment projects and, as a result, processes of value creation *(see endnote 1)*.

The presence of these conflicts, together with information asymmetries and incomplete contracting, can give rise to suboptimal investment strategies that do not maximise the firm's value but rather benefit only a specific category of subjects.

Especially in regards to capital structure planning, the conflicting relationship between managers, shareholders and debtholders could bring managers to act: 1) *in their own interests*, by choosing suboptimal projects that do not provide an adequate yield level but that are low risk, thus ignoring shareholder preference for riskier projects *(see endnote 2)*; 2) *in the interest of shareholders*, by making investment decisions that maximise equity value and not firm value and, when operating in inefficient markets, could cause them to make suboptimal choices that damage debtholders *(see endnote 3)*. In this latter case, value is destroyed because of the different objective functions of shareholders and debtholders.

The incentive to maximise equity value is not necessarily coherent with the incentive to maximise firm value. As is well known, firm assets value can be broken down into equity value and debt value; thus, strategies that reduce debt value and leave firm value as it was increase equity value by transferring wealth from the debtholders to the shareholders.

To sum up, the potential conflicts of interest between managers, stockholders and debtholders influence capital structure, corporate governance activities and investment policies, which, in turn, could give rise to inefficient managerial decisions and "suboptimal" investments that generally fall under the categories of problems of underinvestment and overinvestment *(see endnote 4)*. In this type of situation, the interaction between financing and investment decisions create costs that can compromise tax benefits of the debt and explain why many companies, despite their high profits, prefer using equity as a source of financing even though it's more expensive (Harris and Raviv 1996).

This paper intends to discuss these problems by identifying their causes, determining factors and the

consequences on the value production processes, as well as to point out possible solutions to them. After having confronted the effects and their implications on firm governance activities by clarifying the relevance of the phenomenon and showing the main empirical data that emerged in the prevailing researches, we summarize the main financial proposals found in literature that can diminish their impact.

2. Overinvestment problems

Problems in overinvestment have to do with the possibility that management can abuse its decision-making power by adopting unprofitable or overly risky projects that could damage the interests of the shareholders as well as those of the debtholders (Jensen and Meckling 1976, Galai and Masulis 1976, Jensen 1986, Stultz 1990).

Problems with managerial "overinvestment", caused by a conflict between managers and shareholders, and with overinvestment in risky projects (risk shifting or asset substitution), caused by a conflict between shareholders and debtholders, can arise when applying resource management policies considered to be optimal.

Managerial overinvestment

When considering the hypothesis where ownership and control are separated, the problem of managerial overinvestment consists of a conflict of interest that primarily influences the relationship between the managers, who have control over the firm, and the stockholders and owners of the firm (Jensen 1986). Instead, in a context where property and control substantially coincide (owner-managed firms), the conflict of interest has to do with the relationship between internal shareholders, the group in control or managers and entrepreneurs, and external shareholders who do not participate in firm management (Jensen and Meckling 1976). Moreover, it is believed that this problem, which involves a reduction of resources and of firm value decided by the governing board, can also influence relations between shareholders and debtholders (Jensen and Meckling 1976, Lyandres and Zhdanov 2003).

The problem of managerial overinvestment is based on the hypothesis that managers emphasize the importance of their role, different from that of the shareholders, which gives rise to a conflict of interest *in nuce* that will produce opportunistic behaviour that can lead to a decrease in the firm's total value when the chance arises (Jensen and Meckling, 1976). Beyond their goal of maximising stock value, managers consider the firm a source of economic profit, of self esteem and, more generally, as a means to increase their own human capital, (Zingales 1998, Jostarndt, 2002); for this reason, managers sometimes end up making inefficient decisions whose only objective lies in increasing their own private profits, with no regard for the eventual consequences that can damage the shareholders.

Overinvestment problems can take on various forms. Jensen (1986) connects overinvestment to how managers use the financial resources that the firm produces. When profitable investment projects and growth opportunities are lacking, managers prefer to use the free cash-flow (available cash flow that is in excess of the resources that are necessary to handle the firm's investments at a positive net present value) for opportunistic purposes, instead of giving it back to the shareholders through dividends *(see endnote 5)*.

As Jensen (1986) and Stulz (1990) point out, firm expansion beyond what may be considered an optimal level and the increase of resources directly under managerial control would create higher salaries and would offer greater power and prestige to those who run the firm (the *empire building* phenomenon) *(see endnote 6)*. However, if the firm has few growth opportunities, an excessive increase in firm size is in direct contrast to shareholder interests. In fact, the propensity towards empire building tends to stimulate managers to invest all available resources (the free cash-flow) in projects that increase the firm's size but not its value. Essentially, managers tend to invest even in negative present value projects so long as they can increase the firm's size and thus their own private benefits (Degryse and De Jong 2001) *(see endnote 7)*.

Managerial overinvestment can also take on other forms. For example, Shleifer and Vishny (1989) assert that managers prefer investing in projects that are even of negative net present value but that increase their own human capital, making firm activity inseparable from their personal skills (*entrenchment*). These authors define managerial entrenchment as a set of self-defence mechanisms that management creates by deciding on firm development strategies so as to emphasize their own competencies and skills, rather than choosing strategies that are in the firm's interest *(see endnote 8)*. In this way a dependent type of relationship is created, that attributes importance to the managers' skills independently of whether or not they are capable of maintaining the firm's competitive edge.

Another source of overinvestment could be generated by *managerial overconfidence*; managers, while acting in good faith and with the goal of maximising value for shareholders well in mind, could nevertheless overestimate available competencies and abilities, or else could be overly optimistic about the potential of the firm's activities by investing in projects that do not really have a positive net present value (Stein 2001). This would be due to a literal "mental error", where the manager thinks he knows more than she really does or else believes he has evaluation skills that are greater than those she really has (Malmendier and Tate 2004). By placing too much confidence in their own abilities, managers can end up perceiving less risk than there really is and thus not evaluate carefully all the uncertainties that characterize an investment project.

For example, the payment of exorbitant prices in buy-outs and fusions can be caused by an overconfidence with regards to the benefits and synergies that can really be obtained; Kaplan, in 1998, observed that the high number of fusions and buy-outs that occurred during the 1980s, and that did not increase value for shareholders, were often the result of this type of overinvestment.

In these types of situations debt, as pointed out by Jensen (1986 and 1989), can help reduce overinvestment problems by limiting managerial discretion in using agency resources. Putting limits on managerial decision-making power can be particularly effective when dealing with the conflict of interest between ownership and management that arises with how free cash-flow is allocated *(see endnote 9)*. In fact, making recourse to debt represents an indirect means of control and discipline of managerial behaviour by limiting their tendency to use agency cash-flow inefficiently, since it must first of all be used for interest reimbursement and loan capital.

A high level of recourse to debt capital, while assuring a fixed recurring outflow of financial resources that are thus no longer available to managers, stimulates management's commitment to avoid situations of economic distress and bankruptcy, means that company management is more exposed to capital market evaluations (Jensen 1986) *(see endnote 10)* and represents a positive sign for the capital market, which results in share appreciation (Ross 1977) *(see endnote 11)*.

Overinvestment in risky projects: incentives for risk-shifting

Overinvestment in risky projects (called also *risk-shifting* or *asset substitution*) produces a conflict of interest between shareholders and debtholders and increases the possibility that managers, after having contracted a debt and while acting in ownership interest, transfer the value from debtholders to shareholders through another rise in leverage, thus increasing the risk of distress and bankruptcy, or else undertake new investment projects that are riskier than the firm's average ones (Jensen and Meckling 1976) *(see endnote 12)*. Therefore, when firms are indebted, an *ex post* (with respect to debt contracting) risk increase can, *ceteris paribus,* transfer earnings from debtholders to shareholders (Galai and Masulis 1976). In fact, different levels of risk connected to investment decisions made by managers influence the conflict of interest between debtholders and shareholders, since riskier investment and financing policies that increase share value and decrease debt value transfer wealth from debtholders to shareholders.

Jensen and Meckling (1976) show how, due to equity's limited liability, shareholders, and the managers that act in their interests, are encouraged to approve projects that are riskier than the ones initially proposed before the debt was underwritten. In fact, once the financing has been obtained from investors, the manager could use these financial resources for various investments that are riskier; if the debt's price is set on the basis of the risk level of already existing projects, riskier projects would end up causing a devaluation of the debt. In this case the debt's market value would decrease and the debtholders' loss would be the shareholders' gain.

In this case the firm would be stimulated to issue debt to then engage in investment projects that are even riskier (Barnea *et al* 1980); it would then be able to obtain financial resources at a lower interest rate than the one that corresponds to the risk class of the investment that was actually engaged in and would have a lower total debt cost. On the other hand the debtholders would be damaged by such a situation, in that they would receive a lower yield than the one they would have been able to get with other types of investments. Consequently, the debt's market value would decrease, while the shares' market value would increase - as long as the firm's "operational beta" remains the same - due to higher yield possibilities. Value would thus be transferred from the debtholders to the shareholders.

This mechanism is based on the fundamental difference between equity and debt, that can be found in the different type of sensitivity they show with respect to the firm's level of risk; in fact, while equity value grows when there is higher risk, debt value decreases when the volatility of the firm's activities increases (Jostarndt 2002).

When trying to understand why the presence of risky debt can create incentives for risk shifting, the literature often refers to the *Option Pricing Theory* by Black and Scholes (1973). Two analogies with options explain the root of this problem especially well (Brito e John, 2002). First of all, shareholders, when they contract debt, sell the firm to debtholders and they can only buy it back if they pay what is due at the expiry date; in other words, it's as if the shareholders obtain a European-type call option on firm activity when they contract debt, at a price that is equal to the debt's nominal value. Since the call option's (equity) value increases when the underlying activities' volatility grows, risk shifting incentives arise as an attempt to maximise option value and thus equity value. In the second analogy, instead, shareholders of an indebted firm have a put option, or "limited liability", on its activities, at the same price as the debt's nominal value. Incentives for risk shifting arise in this case as well, because the shareholders try to maximise their option's value through an increase in risk.

In both analogies shareholders increase their wealth by increasing the volatility of the firm's activities, that then means they approve projects that are too risky and thus end up distorting investment policy.

Therefore, shareholders of indebted firms can obtain most of the benefits inherent in a risky project when it is successful, and can avoid sharing the costs

of unsuccessful projects with debtholders thanks to their limited liability (Jensen e Meckling 1976). High risk investment projects show a broader distribution of the yields probability than the one usually applied by the firm. The shareholders hope to be able to take advantage of the positive side of probability distribution, since their responsibilities – and thus the sum total of their losses – are limited to the firm's capital, no matter what type of investments have been made (Fluck 1998). At the same time, though, shareholders are residual claimants, or subjects that have the right to receive everything that is left other once the debtholders have been paid. In this sense, once the debt has been taken care of, they have no limits on how they appropriate created value.

3. Underinvestment problems

"Underinvestment" (also called *debt overhang*) problems have to do with the agency relationship between shareholders and debtholders, following the hypothesis that managers act in shareholder interest, or else between new and old shareholders, when managers act in the interests of the old ones. Myers, in his 1977 study, was the first to point out the possibility that high debt relationships can stimulate managers to reject positive net present value projects, which ends up decreasing firm value. The presence of "risky" debt *(see endnote 13)*, that shows a lower market value than the nominal one, has a particularly negative influence on firms' investment choices.

Myers' (1977) analysis is based on the concept that firm value is made up of assets in place and growth opportunities based on the future ability to make profitable investments. Growth opportunities are compared to options, whose present value is a result of not only the expected cash flow, but also the probability that the firm actually takes advantage of them. In other words, the value of growth opportunities depends on investments made at the manager's (decision makers) discretion, who have the power to exercise these options *(see endnote 14)*. The way that the assets in place are financed, and thus the way the firm's capital is structured, influences the ability to create and take advantage of growth opportunities, since in this manner pressure is put on the quality of the firm's decision making.

When trying to maximise firm value, managers should use all investment options that have a positive net present value. Instead, Myers (1977) shows that when there is risky debt managers who act in shareholder interest tend to follow a decision making process that is completely different, that leads them to reject profitable investments that could offer positive net worth to the firm's value. In other words, shareholders of firms who have risky debt are not willing to finance projects, thus taking on the cost, that would exclusively or mostly benefit the firm's debtholders; in these cases, the net present value of the project, while positive, would allow the debt's market value to rise up to the corresponding nominal value, without producing other benefits for the shareholders. In fact, risky debt would act as a sort of "tax" on the profits derived from the new investments, since most of the value created would only serve to allow debtholders to recover their loan (Stein 2001).

In such a situation the investment would be made only when the net present value is positive and higher than the debt's nominal value (Myers 1977, Bekovitch and Kim 1990). In fact managers, as a general rule, would tend to choose investments whose net present value offers a residual payoff to shareholders, while it is also positive and thus can cover the debt value.

The presence of risky debt creates, *ex post*, potential situations where management can serve shareholders' interests only by making suboptimal decisions for all the stakeholders (Myers 1977). Therefore, firms that are indebted could not be able to finance positive net present value investment projects, thus losing growth opportunities, and, in the long run, value *(see endnote 15)*.

Besides the above-mentioned situations of *ex-post* underinvestment, that cause a problem of moral hazard *(see endnote 16)*, underinvestment conditions can also be caused by agency problems and by *ex-ante* information asymmetry, which set off adverse selection (Stiglitz and Weiss 1981). In fact, debtholders prevent the possibility that managers and shareholders can adopt opportunistic behaviour by raising interest rates or by limiting credit. Since it is difficult to ascertain the quality of firm management behaviour in investment choices due to a lack of information, the debt becomes riskier, as does the premium that should be paid to obtain financial resources *(see endnote 17)*. Having thus to turn to external capital, a profitable investment could end up not being undertaken due to the high cost of the debt; as a consequence, it is the shareholder who carries the cost of the conflict of interest *(see endnote 18)*.

In this last case the firm could choose to issue new equity rather than debt; in this way *a conflict of interest between senior and new shareholders* would arise for the same reasons (Myers and Majluf 1984). The new shareholders, in fact, not knowing the actual quality of the proposed firm investments, end up asking for a high premium in exchange for their financial resources so as to protect themselves from eventual opportunistic behaviour; in other words, the firm would be financed by issuing equity at a price that is lower than the market price. Such actions could annul the benefits of a positive net present value investment and thus cause a loss of value, while spurring the decision to not undertake the project.

Therefore, these problems cause an unavailability of those financial resources necessary to allow the firm to take advantage of all investment opportunities that could potentially create value; the only projects that will be undertaken are those that show returns capable of cancelling the difference between market value and nominal debt value and of paying off shareholders.

Underinvestment in risky projects: incentives for risk avoidance

The traditional contraposition between problems of under and overinvestment is more complex than it seems, in that it points out a much greater variety of deviations from optimal investment policies. Problems regarding risk-shifting, that is particularly favoured by firms that are financially "stressed", are not found in the investment policies of highly indebted firms. Brito and John (2002), referring to John and John (1993), John and Nachman (1985), Rajan (1992), show how the presence of risky debt does not always create risk shifting, but that in some contexts it can generate situations, that are opposite to those, of risk avoidance (or rather underinvestment in risky projects).

Incentives for risk shifting traditionally have been analyzed (Jensen and Meckling 1976, Green 1984) with theoretical models based on finite periods (period 0 and 1), without considering the firm as an entity in continuous evolution and thus not taking into account the presence of growth opportunities that can come up in the future, which are a fundamental component of the firm's value.

On the basis of these considerations Brito and John (2002) re-examine incentives for risk shifting in a model where during the final period the firm still shows growth opportunities that have not yet been realized, and show how these have a very strong impact on agency costs determined by risky debt. In fact, these growth opportunities can eliminate the underinvestment problem described by Myers (1977) and reduce the problem of risk shifting, by sometimes converting it into opposite situations of risk avoidance (underinvestment in risky projects) *(see endnote 19)*.

Although risk shifting problems seem to be particularly relevant, it can be observed in economic realty that often these types of indebted firms adopt a conservative and prudent investment policy, where they try to focus on the core business by selling extra assets and reducing, instead of increasing, the firm's risk (Brito and John 2002).

While incentives for risk shifting are generated by the shareholders' awareness that they are in any case protected by the principle of limited liability (put options on firm activity), risk avoidance attitudes are produced by the fear that growth opportunities may be lost if the firm were to be put up for sale.

The impact of risky debt on firm decision making depends on whether or not there are future opportunities for investment of value; excessively risky investment policies could damage the firm's possibility to survive at least up until the time when such growth opportunities can be taken advantage of. Entrepreneurs can obviously take advantage of such growth opportunities only if they manage to keep control of the firm, i.e. keep it from going bankrupt; in fact, distress and eventual bankruptcy would make give debtholders firm ownership. The entrepreneurs' commitment is thus towards saving the firm's future ability to obtain those financial resources necessary to be able to take advantage of growth opportunities.

The main conclusion reached by Brito and John (2002) is that the presence of growth opportunities that have not yet been taken advantage of has a notable impact on agency costs of risky debt: firms with low growth prospects that operate in mature sectors and with high leverage are stimulated to over-invest in risky projects (risk shifting), whereas to the contrary, firms with good economic prospects are stimulated to under-invest and to avoid overly risky investments (risk avoidance).

Incentives for risk avoidance, that are generally the result of information asymmetries, allow us to understand why firms with high levels of risky debt and growth opportunities not yet taken advantage of adopt quite conservative investment policies. Let's take for example firms that are the result of a LBO: after the operation the shareholders avoid making highly risky investments because they are afraid of losing control of the firm before they have taken advantage of those growth opportunities that in many cases spurred them towards a buy-out operation. Risk avoidance incentives also help understand why young firms with high growth potential show, *ceteris paribus,* a debt level that is much lower than in firms whose growth opportunities are limited or null. These second types of firms would benefit from innovative strategies, but when they are financed through debt they would end up having to face a trade-off between conservative investment policies, that could compromise growth opportunities, and a more aggressive policy that could cause bankruptcy. Brito and John (2002) thus observe that these types of firms avoid going into debt since debt creates risk avoidance incentives, i.e. the managers, being worried about losing control of the firm, could decide to not undertake riskier projects that would in reality be necessary for the firm's development.

4. Determining factors, consequences and empirical evidence

When a firm has risky debt and scarce growth opportunities, managers, acting in shareholder interests, could reject positive net present value investment projects (Myers' underinvestment, 1977), because the value created would be advantageous only for the firm's debtholders and would not avoid distress. They could also decide to promote high risk investment policies (risk shifting) that takes away value from debtholders and maximises equity value. On the other hand, if growth opportunities are high, managers can end up choosing conservative investment policies so as to avoid risking their control over the firm. The main source of these types of distortions thus lies in the presence of risky debt, i.e. in high levels of debt whose market value is lower than the nominal one and therefore difficult for the firm to handle (crisis situations or financial distress) *(see endnote 20).*

On the other hand, where firms with low debt levels, high liquidity but low prospects for growth opportunities are concerned, and especially in the case of mature firms, managers could undertake negative net present value investment projects for purely opportunistic reasons (empire building). The origins of managerial overinvestment can be found in the type of decision-making power that management has, that allows it to engage in investments for its own benefit. In this case, as noted by Jensen (1986) and Stulz (1990), an increase in leverage disciplines management's behaviour; in fact, the presence of debt obliges managers to always be able to pay interest rates and meet deadlines and thus increases their commitment towards more efficient company management. Table 1 synthesizes and confronts the main characteristics of such problems.

Table 1

The benefits of debt can be found in how they allow problems of managerial overinvestment to be foreseen and prevented when there is a lack of future growth opportunities, while the its costs lie in the risk of not being able to undertake positive net present value investment projects because of overinvestment problems (debt overhang) or in incentives to make other types of inefficient investment decisions (risk shifting). The existence of a trade-off between the costs and benefits of debt thus becomes evident (Stultz 1990). The benefits of debt would become obvious in how management exercises its control over firm activity. On the other hand, high debt could increase the risk that positive net present value investment projects are rejected or that excessively risky projects are accepted.

Capital structure make up can condition investment policy, firm management and, in general, the ability to create value. Distortions in the process of investment project selection determine agency costs, that are measurable both in terms of *ex ante* and *ex post* reduction of firm value and in terms of how the distribution of this value among the various stakeholders is altered.

Problems of incomplete contracts, information asymmetries and conflicts of interest between managers, shareholders and debtholders can give rise to inefficient investment choices both when there is a high and a low level of debt.

As observed by Brito and John (2002), deviations from optimal investment policies, whether or not their determining factors are different, can be classified under two dimensions (table 2): on the basis of the quantity of the resources invested in firm activity and according to the level of risk that the various investment choices can produce.

The first dimension takes into consideration the type of influence the conflict of interest between managers, shareholders and debtholders has on *the level of the investments made by the firm*, or rather on the tendency to engage in investment projects that are of different economic sizes, thus countering managerial underinvestment (Myers 1977) problems with overinvestment ones (Jensen 1986). In Myers' model, the sum total of resources destined to new investments is inferior to what would be desirable and thus negatively influences the firm's ability to take advantage of growth opportunities. In this case, a lower number of projects are undertaken with respect to an "optimal" investment level, which blocks positive processes of creation of economic value. To the contrary, managerial overinvestment always is connected to the firm's investment level, but in this case managers' preference for empire building may bring them to invest more resources than would be considered "optimal", and to engage even in negative net present value projects if they increase the firm's size and allow the managers to enjoy higher private benefits.

The second dimension has to do with the *risk profile of financed projects* rather than influencing the amount of resources that will be used for investments, which mostly causes problems of risk shifting (Jensen and Meckling 1976). In this case the risk/return profile will be the one that will change, by stimulating investment projects that show a risk level that is different from the firm's average one and that is, above all, different from the one that was *ex-ante* appreciated by the firm's investors. In fact, risk shifting problems have to do precisely with the transference of value from debtholders to shareholders through an added increase in leverage that increases the risk of distress and bankruptcy, or through the acceptance of new investment projects that are riskier than the firm's average ones. To the contrary, Brito and John (2002) show that situations of risk avoidance are more common where managers tend to engage in secure investments or in ones that are less risky than the firm's average ones, so as to protect their control over the company and avoid that others can eventually benefit from future growth opportunities.

Table 2

It is interesting to observe how each deviation from the optimal investment level has a different motivation. For example, in underinvestment problems the shareholders/managers "under-invest", since most of the benefits would go to the debtholders, and thus prefer to issue dividends before they lose all control of the firm. Where the risk avoidance problem is involved, the shareholders/managers avoid risky projects for the opposite reason: they don't want to lose control of the firm.

Table 3 shows the contexts in which inefficient investment choices are made. In firms that are having financial problems (close to bankruptcy) but that still have high growth opportunities, incentives for risk avoidance are the main determining factor behind sub-optimal investment choices; to the contrary, in firms with low economic prospects incentives for

managerial overinvestment, risk shifting and underinvestment become dominant, depending on whether the firm is in optimal financial shape (with lots of available cash) or is, rather, in financial difficulty (close to bankruptcy).

Table 3

As we can see, firms' reactions to situations of financial distress strongly depend on economic prospects. In a situation of risky debt where there are few possibilities for growth, incentives for risk shifting and underinvestment become paramount, since the firm could end up not being able to take over the value created by the investments (in that they would benefit only the debtholders). Otherwise it would engage in investments with high yields prospects but that at the same time are much more volatile than the average risk level of the firm's activities. To the contrary, if growth opportunities are good, management will prefer to protect their control over the firm and avoid that others can take advantage of the future benefits of growth opportunities. If financial conditions are positive, i.e. if the firm has a good cash flow that can be used freely once the debt has been covered, the absence of valuable investment prospects could stimulate management to waste cash in organizational inefficiencies instead of returning it the shareholders, or use it for investments that do not recover the cost of the capital.

Most of literature has tried to empirically quantify this phenomenon's influence and to measure its effects on firm value. From an empirical standpoint it seems to be relatively much more difficult to analyze underinvestment situations than overinvestment problems *(see endnote 21)*; however, in both cases more research is necessary *(see endnote 22)*.

With regards to under and overinvestment problems, the effect of debt on firm value does not seem to always be the same: on one hand, since it helps reduce management's tendency towards empire building it is positively connected to assets in place (Jensen, 1986); on the other, since it exasperates the costs of underinvestment, it is negatively correlated to growth opportunities (Myers, 1977) *(see endnote 23)*.

Some authors (Mello and Parsons 1992) assert that the agency costs of debt are higher than those discussed in theory. Others (Parrino and Weisbach 1999) confirm that debt worsens the underinvestment phenomenon even though its effect is not enough to counterbalance the value of the tax shield created by the debt. Yet others (Leland 1998) have found that the effects of underinvestment and risk shifting are not incisive enough to explain low debt levels and that agency costs of risky debt that give rise to the risk shifting phenomenon are actually much lower than the tax benefits offered by the debt capital. To the contrary, Child *et al* (2000) show that the costs of risk shifting and underinvestment have a significant impact on both capital structure decisions and firm value.

In 1990 Stultz observed that mature firms with few positive net present value investment opportunities lean towards higher debt levels, while firms that are growing and that have good investment possibilities show more moderate debt levels; this implies the existence of an inverted relationship between growth opportunities and firm leverage. Of among the many empirical studies done that examine this type of relationship, Smith and Watts (1992) confirm the theory by not making any distinction between firms that have a high or low level of growth. Instead McConnell and Servaes (1995) and Lang *et al* (1996) reach interesting results by separating the analysis sample into two sub-groups: high growth firms (Tobin's high Q) and low growth ones (Tobin's low Q). McConnell and Servaes (1995) observe a negative relationship between value and leverage in firms with high growth potential (high growth firms) and a positive one in firms with low growth potential (low growth firms). These results point out a positive or a negative effect of leverage on firm value according to whether or not relevant growth opportunities are present. Lang *et al* (1996) do not notice any relationship between the two variables for the sub-group of high growth firms, while they observe a strong negative correlation between value and leverage for low growth firms *(see endnote 24)*, therefore the hypothesis of Jensen (1986) that debt can enhance control and discipline is confirmed. In other words, firms with high growth opportunities show low levels of leverage (Bradley *et al* 1984, Titman and Wessel 1988, Smith and Watts 1992) and prefer short term debt over long term loans (Barclay and Smith 1995).

Miguel and Pindado (2001) have empirically demonstrated the presence of a trade-off between under and overinvestment problems, in their observations of how they tend to alternately show up on the basis of debt level, cash flow and the presence of growth opportunities. For this reason, Morgando and Pindado (2003) affirm that it is necessary to verify whether or not there is a quadratic relationship between firm value and investment levels. When underinvestment problems arise, additional investments could give rise to an increase in the firm's market value. To the contrary, additional investments could cause a reduction in the firm's market value when there are overinvestment problems. Consequently, the firm's market value will rise until it reaches an optimal investment level, after which it will decrease (Wu and Wang 2004). Therefore, it could be interesting to dedicate future research on verifying what an "optimal" level of investment could be; firms that go above this optimal level would be vulnerable to overinvestment problems and to a negative relationship between value and investments; to the contrary, firms that do not reach this level would show underinvestment problems and a positive relationship between value and investments.

Furthermore, firms with high leverage tend to invest less due to the fact that debt inhibits the possibility to make investments (Lang *et al* 1996). In this light, the ability of debt to limit investment possibilities, especially in firms with low quality investment projects, underlines the relevance of overinvestment problems *(see endnote 25)*. Harvey, Lins and Roper (2003) point out the high probability that firms with a large available cash flow, high levels of assets in place and limited growth opportunities will over-invest. Richardson (2002) empirically measures the phenomenon of managerial overinvestment and the effectiveness of governance mechanisms as means of prevention. For every additional free cash flow dollar, the average firm tends to over-invest $0.44, to keep $0.40 in financial assets and, on the average, only $0.22 are returned to shareholders *(see endnote 26)*.

Therefore, problems of suboptimal investments seem to arise on the basis of the types characteristics that individual firms show, i.e. according to the level of debt, to the presence or not of growth opportunities or to the availability of cash-flow *(see endnote 27)*.

5. Potential mechanisms of intervention

The literature on possible mechanisms for mitigating the negative effects on firm ability to create value commented in the previous section is variegated and interesting (Myers 1977, Smith and Warner 1979, Green 1984, Diamond 1989, Berkovitch and Kim 1990). As amply illustrated, deviations from optimal investment policies create, *in primis*, agency costs that are absorbed entirely by shareholders (or by entrepreneurs) through an *ex ante* increase in the cost of capital. These subjects are thus particularly interested in trying to contain potential distortions when selecting investment projects, so they can have access to financial resources at better conditions.

Since the solutions to these problems are imperfect, often firms prefer to avoid debt and thus deprive themselves of an important source of financing. In fact, many firms that have low debt and high unused economic potential seem to end up leaving money on the table (i.e. Coca-Cola, IBM, Intel and Microsoft, or Ferrero in Italy). An efficient system of corporate governance, both in terms of optimal ownership organization and governance and in terms of optimal organization of external resources, would minimize problems regarding sub-optimal investment decisions. For example, greater efficiency in the financial market (Allen and Gale 2001) or in the managerial job market (Fama 1980) would mean a definite reduction of these problems, due to the fact that they are external types of corporate governance. In theory, if the capital market were efficient, fast and transparent circulation of information in the financial system would reduce risk shifting and underinvestment problems, as opportunistic types of behaviours would not be allowed (Allen and Gale 2001) *(see endnote 28)*. Therefore, it is hoped that mechanisms that can increase capital market efficiency, i.e. the introduction of the "Testo Unico delle disposizioni in materia di intermediazione finanziaria" - Legislative Decree n.58/1998 - (Consolidated Act on Financial Intermediation), is a kind of Act, reforming the law on financial services, stock exchange and listed companies, that reduce incentives for both underinvestment and overinvestment.

However, aside from the unconvincing possibility that most of these problems can be avoided through an exclusive use of equity, other financial solutions can be found to avoid that agency costs evolve to a higher cost of capital and to a reduction in the firm's economic value. These are prevalently *ex-ante* solutions that can be agreed upon by contract, or have to do with the way in which the ownership of the financial obligations issued by the firm are organized.

Table 4 synthesizes the financial solutions proposed in literature to solve or at least mitigate problems of under and overinvestment and shows their differing ability to increase efficiency in management activity.

Table 4

A first tool useful in limiting such problems is based on the possibility to *add clauses (covenants) to the debt contracts* (Smith and Warner 1979, Hart 1995). Debt contracts notoriously contain clauses that can *ex-ante* reduce problems of opportunism by explicitly limiting firm and management decision-making power with regards to investment policy, financing and dividends (Smith and Warner 1979) *(see endnote 29)*. However, many agency problems are hard to control in this manner, due to the fact that it would be difficult to make up the contractual clauses in such a way that they could include all possible circumstances, and also due to the fact that they are often impossible to check up on (the incomplete contract problem) *(see endnote 30)*.

If on one hand such clauses help limit problems of asset substitution, on the other it becomes difficult or too costly to guarantee debt holder protection due to incomplete contracts. Problems of underinvestment, when referred to managers' refusal to undertake positive net present value investment projects, are difficult to ascertain by subjects external to management and for this reason they are hard to solve through the introduction of covenants; there would be no objective means to judge whether the clauses have been respected.

Another mechanism that can limit investment policy inefficiencies is the *use of "senior" debt*, i.e. with pre-emptive payoff with respect to existing debt so that new investment projects can be financed (Myers 1977, Stultz and Johnson 1985). The seniority of a debt refers to its privilege in terms of priority of interest and capital payoffs in the case of bankruptcy. This reduces the underinvestment problem by not allowing old debtholders to appropriate the value

created by the new project (Stultz and Johnson 1985, Bekovitch and Kim 1990).

This solution, however, can not be used when contracts contain clauses that limit the possibility to issue debt with different seniority. In fact, Smith and Warner (1979) point out how debtholders protect themselves from the possibility of new issuances by including explicit restrictive clauses in the debt contract; their empirical evidence shows that in 90% of the cases studied there were limitations made on the issue of more debt with different seniority. Furthermore, the two authors note that the restrictions are not only limited to debt with higher priority, but that generally have to do with the issue of debt with any type of priority, even when subordinated to the earlier one *(see endnote 31)*.

On the other hand, the issue of new debt, with seniority over the earlier one, amplifies problems of risk shifting (Berkovitch and Kim, 1990); in this case it would be possible to make new investments that are more innovative and riskier, transferring the risk over to the old debtholders by reducing their obligations' value.

Therefore, the solution offered through the financing of new investments through new senior debts creates a trade-off between the possibility to reduce problems of underinvestment, on one hand, and the risk of increasing problems of overinvestment on the other (Berkovitch and Kim, 1990).

Another mechanism that can help reduce these problems can be found in the *use of convertible debt or debt with warrant* (Green 1984, Brennan and Schwartz 1987, Gibson and Singh 2001). Convertible debt, which is structurally very similar to debt with warrant *(see endnote 32),* offers the possibility to convert debt capital into equity. Many authors (Jensen and Meckiling 1976, Smith and Warner 1979, Harris and Raviv 1985, Stein 1992, Nachman and Noe 1994, Cornelli and Yosha 2003) have emphasized how useful this type of investment is in containing incentives for asset substitution. As formulated by Black and Scholes (1973), when there is convertible debt, investments with growing risk would increase the value of the conversion option and thus reduce the possibility that shareholders can gain at the expense of the debtholders (the dilution effect Chakrabort and Yilmaz 2003). Green (1984) shows how that if the debt is structured in such a way that it can be converted into shares when the investment portfolio is modified, problems of risk shifting can be completely eliminated. Mikkelson (1981) confirms this by observing that firms with lots of debt and a high growth rate issue a larger quantity of convertible debt so they can obtain financial resources necessary for new investments. Venture capital activities particularly make wide use of these instruments exactly because they protect firm activity from opportunistic behaviours (Repullo and Suarez 1998). In this case it can be seen how by activating a sort of "patient debt" this mechanism also reduces problems of risk avoidance. Unfortunately this solution does not apply to underinvestment problems; to the contrary, it could very well increase managerial opportunistic behaviour in that direction.

Another mechanism that can solve problems of conflicts of interest between debtholders and shareholders can be found in *debt renegotiation* (Myers 1977). Due to incomplete contracting, a solution to underinvestment and overinvestment problems could be found by allowing management to continually renegotiate loan conditions. For example, in the case of underinvestment, if debtholders and shareholders are in a situation where the project's NPV is positive, but less than the gap between the debt's nominal and market value, it is in both party's interest to renegotiate the debt. Renegotiation can help reach an agreement where debtholders give up part of their demands in exchange for shareholder commitment to supply new capital so the investment can be made (Myers 1977, Bergman and Callen 1991, Mauer and Ott 1999). Renegotiation also allows for problems of risk shifting to be controlled (Hart and Moore 1989), since more favourable loan conditions decrease the value of the shareholder's "limited liability" option. In other words, the possibility to update and renegotiate the technical characteristics of the debt on the basis of the firm's present situation, puts a limit on management's decision making power and on its ability to undertake risky investments.

Debt renegotiation is, however, a costly mechanism (Myers 1977). First of all, there are direct transaction costs that arise when there is only the suspicion of financial distress; it is, in fact, necessary that debtholders know the "true" value of both the investment project and of the firm so that the renegotiation can be carried out properly (value estimated by management that will most certainly be either over or underestimated according to necessity). Also, renegotiation becomes complicated when there are many debtholders (the free riding problem). Whereas it may seem possible to reach an agreement with one subject, when there are several debtholders problems of hold-up can arise *(see endnote 33)* (especially when the debtholders have different seniority). Therefore, if in theory the possibility to renegotiate the debt represents an opportunity to avoid under and overinvestment problems, in reality the situation seems much more problematic due to the difficulties that arise when the various debtholders and the firm try to reach an agreement.

As pointed out earlier, also an *increase in the debt's level of concentration* can produce positive effects on investment policy efficiency. This strategy increases the attention of the single debtholders toward the firm's managerial activity, problems of free-riding are reduced, and direct, more easily managed relations are established between managers and debtholders. In fact, when a situation of insolvency occurs, it is easier to find an agreement when there are fewer debtholders than when there is a large number of them, each with different rights and demands (Bolton and Scharfstein 1996). In the case of

financial restructuring, the cost of debt renegotiation would be reduced, even though informational asymmetries could cause debtholders to be sceptical about the real validity of the investment project. Examples of concentrated debt are *bank debts* and *private placements* through insurance policies and pension funds. Bank debt offers, in particular, numerous advantages (Fama 1985). First of all, it reduces the problem of free riding, that tends to reinforce incentives toward underinvestment. In fact, this problem does not exist if the firm has a single debt holder, for example the bank, that can correctly evaluate the influence of the new loan on the value of the previous debt. Bank debt and private placements also have an additional advantage over public placements when incentives toward risk shifting are particularly high. Banks, in fact, have a greater ability to monitor the firm's investment decisions, due to their specific competence, their structure that is directly geared toward such business and the imposition of definite contract clauses. In other words, a close and enduring relationship with a bank has positive aspects that can mitigate potential distortions in the process of investment project selection. On the other hand, bank financing has high intermediary costs and gives rise to hold-up problems. In this case the hold-up occurs when the firm depends too heavily on just one bank, that then takes advantage of such dependence by imposing exceedingly severe loan conditions or by refusing to concede further credit. It could be very difficult to find less costly financial resources in such a situation, since the firm's inability to obtain credit from its own bank could be interpreted by the market as an unfavourable indicator of its financial situation (Rajan 1992).

The *use of short term debt* represents another instrument that can solve underinvestment problems (Myers 1977) *(see endnote 34)*. In fact, if the debt expires and is repaid before the growth option can be used, or rather before the investment decision is made, the firm will be able to undertake a new project without distortions and problems of opportunism since it is no longer indebted. If the firm is unable to repay the debt, the debtholders will decide whether or not to sell out the firm or whether to instead carry out the investment and, since they now have control, benefit from it as the new owners *(see endnote 35)*.

As observed by Myers (1977), short term debt can solve underinvestment because "it offers the basis of a continual renegotiation, where the firm can theoretically move to all-equity financing at any time or to another source of debt capital".

Furthermore, problems of overinvestment can also be solved in this way. It is well noted, in fact, that while share value grows with an increase in volatility, to the contrary long term debt is inversely related to such volatility, given the greater risks the debtholders run. Therefore, short term debt, being less sensitive than long term debt to variations in the level of cash flow volatility and in activity risk (Leland and Toft 1996), allows for greater control over managerial behaviour and avoids that risky investment policies penalize debtholders (Barnea *et al* 1980) *(see endnote 36)*. Barclay and Smith (1995) show empirically how for this reason firms with high growth opportunities make greater use of short term debt *(see endnote 37)*.

Furthermore, Bodie and Taggart (1978) and Barnea *et al* (1980) assert that the issue of callable debt, i.e. debt with a call clause that allows it to be recalled at an established price, has a function similar to short term debt in how it can solve underinvestment and risk shifting problems. On the other hand, we must not forget that short term debt also has higher costs of transaction due to the fact that they are continually renegotiated and renewed, as well as of control and its economic conditions regarding the loan are less favourable.

Another beneficial form of investment policy can be found in *the issue of secured debt* (Titman 1984, Titman and Wessels 1988, Friend and Lang 1988). Secured debt offers debtholders the possibility to make up for their losses by claiming rights over certain firm activities when the firm can not meet its obligations. The value of secured debt is thus closely connected to the value of the activities offered as a guarantee. Smith and Warner (1979) assert that the issue of secured debt can alleviate the problem of risk shifting by containing the firm's power of decision making with respect to the guaranteed activities. Stultz and Johnson (1985) suggest that the opportunity to issue secured debt can also help contain the problem of underinvestment. In fact, secured debt is nothing more than a debt with a higher priority than existing debt and thus can take the cash flow from new investments away from the old debtholders. Jensen and Smith (2000) observe that considerations regarding secured debt can equally apply to leasing activities.

A particularly interesting solution to these problems can be found in the use of *project financing* (Cariola 2001), together with the possibility to create *dedicated worth* (Flannery *et al* 1993). *Project financing* is a technique used to finance a specific investment project as a separate entity from the firm, that generally supplies the necessary risk capital. In operations of this sort, the financer (debt holder) relies only on the cash flow generated by the project as a source of funding for the loan's payoff and on the project's worth as collateral; in other words, the firm itself is not responsible for the project's obligations (Cariola 2001). In theory, the use of project financing should eliminate incentives for underinvestment; in fact, the debt used to finance the project has exclusive priority on its cash flow, which avoids that value be transferred between new and old debtholders. However, in reality it is not so easy to separate and verify the quality of the project's cash flow in a context that is separate from the firm, especially if the spin-off means that synergies with other firm activity are compromised (Grinblatt and Titman 2001). On the other hand, *project financing* operations do not solve

overinvestment problems. To the contrary, since they allow for spin-off operations, the risk arises that problems of opportunism can increase and be consolidated through the transfer of activities that create cash flow outside the firm and thus out of reach of the debt holder's demands (a good example of this can be seen in the "Marriott" case *(see endnote 38*).

Among the various changes being made in Italy that are aimed at increasing negotiation autonomy, Italian managers are currently offered a solution that is quite similar to *project financing* thanks to the recent Vietti reform in corporate law. This reform allows that worth be created for a specific deal that is distinct from the main firm's worth, when it is well defined and has a time limit on it (Lamandini 2003).

The use of *financial engineering* mechanisms is also a particularly interesting and innovative way of dealing with conflicts of interest, as is the adoption of financial instruments placement techniques. Gay and Ivan (1998) observe how an increase in growth opportunities means also an increase in the use of the firm's derivatives and assert that the use of such instruments can, at least partially, be caused by the need to reduce underinvestment and risk-shifting problems. In other words, the goal of financial engineering is to create new instruments that can increase investor well-being and facilitate firm financing at the same time. Innovation in debt obligations can create value, as it transfers some types of risk from the firm or from the investors over to other subjects that are better capable of dealing with them. Thus the debt becomes more liquid and the agency costs resulting from conflicts of interest between management, shareholders and debtholders are reduced.

Finally, it is interesting to note how under and overinvestment problems can be reduced by using the *reputation* mechanism (John and Nachman 1985). In 1977, Myers states that "*honesty is the best policy",* in the sense that good behaviour shown by management and the firm itself that has been consolidated through time by constantly honouring commitments on time, makes sure that a positive reputation is built and, as a consequence, solid financial credibility is also assured. This facilitates economic relations and safeguards them from opportunism *(see endnote 39)*.

When a good reputation is established, the cost of capital and situations of credit rationing – often consequences of under and overinvestment - are reduced. This increases investor willingness to entrust the firm with their financial resources *(see endnote 40)*. In fact, a good reputation reduces information costs and agency problems while increasing the firm's reliability and trustworthiness. This means that the availability of financing resources, debt capacity and support of investments increases, while the cost of money is reduced.

In conclusion, in this paper we have indicated the main financial mechanisms that can be used to resolve problems of under and overinvestment. Instruments of corporate governance must also be taken into consideration, in that they can alleviate these problems while they protect the interests of all the stakeholders. As Zingales (1998) points out, the interaction between capital structure and corporate governance instruments can protect value creation efficiency and how it is eventually distributed.

Corporate governance contributes to value creation through the use of managerial mechanisms, that influence firm management from the inside, and institutional ones found in the competitive and transactional context, that from the outside influence how efficiently firm resources are allocated (Shleifer and Vishny 1997, Denis 2001). The expression *corporate governance* can imply two things (Lazzari 2001), depending on whether there is more emphasis put on the mechanisms and instruments regarding the allocation and management of power within the firm and are thus endogenous to the organization's structure, or on the role of institutions and external mechanisms that control the efficiency of firm activity from the outside.

However, as Zingales *(see endnote 41)* points out, all of these mechanisms become totally inefficient when conflicts of interest are based on "abuses carried out by those who are willing to falsify documents, to lie and to deceive, out of desperation or of a lack of scruples", as in the recent Enron and Parmalat cases.

6. Conclusions

The interaction between financing and investment policies creates a situation where high or low debt can compromise a firm's ability to take advantage of growth opportunities that may arise. The need to study in greater depth the interaction between investment decisions and financing on the part of both academics and the business community was already noticed in 1993, in a special issue of Financial Management entirely dedicated to such topics, and by Michael Jensen, keynote speaker at the annual convention of the American Finance Association during the same year.

This paper contributes to a systematization of the literature that discusses these problems in finance; it points out causes, determining factors and consequences that derive from problems that arise in the interaction between investment and financing choices while attempting to illustrate some of the many mechanisms that, when applied to capital structure, can reduce negative effects on firm value. Myers, in his 1977 article, had already pointed out these problems and had discussed some possible remedies for them; since then, the financial community has tried to identify some possible instruments that can eliminate, or at least reduce, their negative impact on firm value. In particular, within the present complex and continually evolving financial context, the greater importance placed on managerial and relational competence and skill, as well as on human capital, amplifies problems of incomplete contracting and information asymmetry,

increasing the probability of opportunistic behaviours. According to Zingales (1998) and Rajan and Zingales (2000), the most worrisome consequence of an excessive level of debt is precisely how difficult it becomes to manage human capital. In fact, to understand the connection between underinvestment problems and the role of human capital in the present context, it is enough to observe how, for example, a financial crisis temporarily provoked by a lack of liquid funds can have irreversibly effects on firm value, on growth opportunities and on the firm's competitive edge (by reducing growth opportunities or by simply reducing the probability that they can be taken advantage of). Managers or employees could lose the incentive to specialize their competencies and skills with regards to the firm's assets in place (due to the risk that should the firm go bankrupt their firm-specific investment, being idiosyncratic to the firm's activities, would lose market value), and thus could provoke the loss of a fundamental competitive factor. Therefore, further research could analyze such aspects within the present knowledge-based competitive contexts by studying the interaction between the various aspects of corporate governance - which capital structure is a part of - in greater depth,.

One last consideration seems to be of note: decision-making regarding capital structure is not simply a matter of deterministic, prescriptive principles, due to the complex number of forces that influence firm relations and managerial activity. It is, rather, an art, that, despite all the innovations in financial engineering and technology and the changes in the competitive context that are part of today's financial world, cannot be separated from the intellectual skill of "good" financial managers.

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Appendices

Table 1. Problems of *under* and *overinvestment*: characteristics, determining factors and consequences

	Underinvestment or *debt overhang* (Myers 1977)	*Risk avoidance* or *underinvestment in risky projects* (Brito and John 2002)	*Empire building* or managerial *overinvestment* (Jensen 1986, Stulz 1990)	*Risk shifting* or *overinvestment* in risky projects (Jensen and Meckling 1976)
Subjects in agency relations	Managers with shareholders against debtholders; present shareholders against new shareholders	Managers against shareholders (and also debtholders)	Managers against shareholders (and also debtholders)	Managers with shareholders against debtholders
Determining factors	Leverage: high *Growth Opportunities*: low Cash-flow availability: low	Leverage: high *Growth Opportunities:* high Cash-flow availability: low	Leverage: low *Growth Opportunities*: low Cash-flow availability: high	Leverage: high *Growth Opportunities*: low (high risk but unprofitable growth opportunities) Cash-flow availability: low
Type of firm	Firms that make quite a bit of recourse to debt, especially when in financial difficulty, and that operate in sectors with good economic potential	Both young firms with high growth potential (high tech) and mature ones (resulting from LBO)	Firms that rarely make recourse to debt and that operate in sectors that have scarce growth prospects	Firms that make quite a bit of recourse to debt, especially when in financial difficulty, and that operate in high risk sectors
Influence on value	Refusal towards positive net present value investment projects	Refusal towards risky investment projects but with positive net present value	Choice of projects with negative net present value	Choice of high risk projects, with low probabilities of being successful or even with negative net present value
Role of debt	Exasperates such problems	Exasperates the problem	Reduces such problems due to is ability to discipline management	Exasperates such problems

Table 2. Classification of deviant investment behaviours on the basis of investment stock and risk

Deviations from optimal levels in firm investment policy regarding:			
the firm's level of investments undertaken	⇨	Managerial *overinvestment* (Jensen, 1986; Stulz, 1990)	*Underinvestment* (Myers, 1977)
the firm's risk profile:	⇨	*Risk-shifting* (Jensen and Meckling, 1976; Green, 1984)	*Risk avoidance* (Brito and John, 2002)

Source: Brito and John (2002)

Table 3. Relationship between growth prospects, financial condition and investment choices

Impact of growth opportunities and financial distress on firm investment policy		Growth opportunities	
		High	Low
Financial conditions	Positive	Optimal investment policy	Managerial overinvestment
	Negative	Risk-avoidance	Risk shifting and underinvestment(Myers)

Source: Brito and John (2002)

Table 4. Main financial solutions for problems of under and overinvestment

	Underinvestment (Myers 1977)	*Risk avoidance* or *underinvestment risky projects (Brito and John 2002)*	*Empire building* or *managerial overinvestment* (Jensen 1986, Stulz 1990)	*Risk shifting* or *overinvestment in risky projects* (Jensen and Meckling 1976)
Introduce contractual clauses (*covenants*)	Difficult solution	Neutral	Neutral	Low
Use of senior debt	Solved	Neutral	Neutral	Amplified
Use of convertible debt and warrants	Neutral	Low	Neutral	Risolto
Allow for debt renegotiation	Solved (although difficult when there are many debtholders)	Low	Neutral	Low (although difficult when there are many debtholders)
Increase in debt concentration	Low	Low	Low	Low
Use of short term debt	Solved (although the cost is too high)	Amplified	Neutral	Solved (although the cost is too high)
Issue guaranteed debt (or leasing)	Solved	Amplified	Neutral	Solved
Use of project financing and dedicated worth	Solved (although difficult to structure)	Low	Low (although difficult to structure)	Amplified
Financial tools and placement techniques	Solved (but difficult to carry through)	Neutral	Neutral	Solved (but difficult to carry through)
Financial reputation	Low	Low	Low	Low

Endnotes:

[1] When a firm is defined as a "*nexus* of contracts" (Jensen and Meckling, 1976) all those who have an interest in the firm's activities are part of the whole of explicit and implicit contracts that a firm is made up of. In this sense, managers are different from all the other stakeholders, since they hold a central position of coordination and execution of all the firm's contracts. Managers have direct control over business activity (even though the stockholders, or suppliers of risk capital, have indirect control); thus it is their specific task to make strategic decisions regarding firm development and to plan resource allocation. This does not always happen, due to the fact that often opportunistic interests bring them to use firm resources inappropriately, by allocating them poorly and by making suboptimal investment decisions that diminish firm value.

[2] As is well known, managers are economic subjects that are more "adverse to risk" than shareholders, in that it is impossible for them to diversify company risk through investment differentiation. In this case, when having to choose between two projects they will tend to prefer low risk investments that are most likely to be successful, due to the fact that most of the managers' personal earnings depend on the firm's fate.

[3] In particular, managers could choose to not support safe projects with positive present net value if that would mean causing an increase in debt value with respect to an insignificant (in terms of absolute value) increase in equity value. In other cases, managers, by acting in the interests of shareholders, could accept risky projects with negative net present value that could significantly damage debt value and transfer earnings from the debtholders to the shareholders.
[4] For numerical examples that analytically illustrate the problems of under and overinvestment see the appendix.
[5] For example, the resources mentioned could be used towards making the main offices more elegant, buying expensive automobiles, increasing the number of employees that will be under their direct control, using company jets for private purposes, etc.
[6] Firm expansion is particularly associated to increases in management salaries; Murphy (1985) shows empirical evidence to show that managers' salaries are directly related to growth rates in sales.
[7] There is also the risk that the firm destroys value by diversifying its activities in an uncontrolled manner, something that happened with Parmalat, which lost considerable sums of money by investing in media (Odeon), in soccer (Parma AC) and in tourism (Parma Tour).
[8] For example, managers that have a high number of shares can defend themselves from or completely avoid any sort of hostile climb to power by maintaining their job even when they are operating inefficiently; the fact they can avoid this mechanism makes room for opportunistic behaviour.
[9] While the manager has discretional power in dividend policy and in excess cash flow returns to shareholders, he is obliged to pay interest on debt according to the periods and the amounts previously established. In this way debt reduces the cash flow the manager has on hand and, as a consequence, his discretional power when making strategic decisions. The promise of a permanent increase in future dividends causes the same effect as a debt issue but is much less bonding for the manager than debt, in that an eventual future cut in dividends would at most be punished by the market through a reduction in the stock value quotation, while not honouring debt service would mean the firm's bankruptcy (Jensen 1986).
[10] As long as the firm keeps its debt level low, inefficient managerial behaviour does not necessarily have a negative influence on managers' wellbeing, even though the investment value of external shareholders is reduced. To the contrary, when there is a high level of debt, suboptimal managerial behaviour that reduces firm value can mean that the market negatively evaluates managerial behaviour and can also, in some cases, bring the firm to bankruptcy.
[11] In this case the debt sends signals to the market, reassuring it that managers are not operating in an opportunistic way and thus preventing that the firm's shares become undervalued. Firm financing through new equity (underwritten by shareholders different from the present ones), as observed by Ross (1977), dilutes the old shareholders participation and reduces managerial incentives to be efficient (the effect of dilution reduces shareholder control).
[12] "*…with that financial structure (firms financed almost entirely with debt type claims) the owner-manager will have a strong incentive to engage in activities (investments) which promise very high payoffs if successful even if they have a very low probability of success. If they turn out well, he captures most of the gains, if they turn out badly, the debtholders bear most of the costs…*" (Jensen-Meckling 1976, pag. 334).
[13] As Myers points out (1977), there are no underinvestment problems if the debt's market value corresponds to its nominal value, i.e. in the presence of a safe debt. Eventual transfers of wealth from debtholders to shareholders could come about only when there is risky debt, for example when the yield value is at 90 with respect to a market value of 50; in these cases, managers could adopt inefficient investment strategies that favour shareholders.
[14] Therefore Myers asserts that firm value depends on activities that can be considered call options (growth opportunities), in the sense that their value is at least partially derived from the firm's investment decisions.
[15] Bodie and Taggart (1978) observed that incentives towards underinvestment increase where there is a high level of indebtedness and a risk of financial distress. In fact, the mere suspicion of a financial crisis can make the relations between the various categories of investors difficult and thus encourage opportunistic behaviour.
[16] In the sense that after capital structure decisions are made investment selection criteria change, which in turn generates suboptimal behaviour (Myers 1977).
[17] Debtholders ask for a higher premium to finance the firm and thus protect themselves from the lack of information they would need to be able to evaluate the quality and value of many of the proposed investment projects (Stiglitz and Weiss 1981). The financers, by asking a higher rate to protect themselves from eventual insolvency, only make insolvency more probable. Every increase in interest rates set by a financer has a two consequences. On one hand, it induces a "positive incentive effect", in the sense that it raises the unit profits obtained by the debt holder in the case of debtor solvency. On the other hand, it has an "adverse incentive effect" because it negatively influences the quality of the investment projects financed (indistinguishable ex ante), in the sense that it can push debtors who are more favourable towards risk to choose more innovative projects than the ones available, or else can persuade debtors less inclined to risk to give up their credit request ("adverse selection effect"). Stiglitz and Weiss show that above certain levels of interest rates the effects of "adverse selection" or "negative incentive" dominate the "positive incentive" effects in such a way that both the earnings expected by the debt holder and his relative credit offer have no monotonic increase function with respect to the interest rate.
[18] Firms have good reason to try to convince their stakeholders that they will not adopt opportunistic behaviour, but problems of credibility make it difficult to eliminate the problem.
[19] The concept of risk avoidance, recently brought to light thanks to the contributions of Brito and John (2002), represents an interesting topic for future research, in that it needs more in depth study on both a theoretical and an empirical level.
[20] "It is important (…) to underline that from an economic standpoint there is no such thing as high or low debt, but only sustainable or unsustainable debt" (Montesi G., comment found on www.lavoce.info).
[21] Taking into account that both phenomenas are tough to observe, verifying the role of underinvestment problems is much more difficult than studying overinvestment problems; for an external analyst it is practically impossible to tell if a manager has decided to not take advantage of growth opportunities and not undertake positive net present value investments (narrow information not observable); to the contrary, to the contrary, negative net present value investments (not profitable investments) are activities whose consequences are tangible and observable. It is also important to note that at the moment

there are no empirical studies that support the recent observations made by Briton and John (2002) on the problems of risk avoidance.

[22] A study carried out by Graham and Harvey (2001) has pointed out how American financial directors make great efforts to maintain financial elasticity to protect the possibility to take advantage of growth opportunities. One of the main determining factors in financial policy is, in fact, represented by the need to not jeopardize future possibilities to engage in economically convenient projects and to be able to cover unexpected expenses without excessive sacrifices. This means that financial elasticity has value, exactly because its loss can damage firm value and can block future optimal investment policies.

[23] *"firms should use relatively more debt to finance assets in place and relatively more equity to finance growth opportunities"* (Hovakimian *et al* 2001)

[24] An increase in growth opportunities reduces the benefits of debt as it diminishes the possibility to control and discipline managerial behaviour; firm indebtedness is reduced as a result. Therefore, this negative relationship exists precisely so as to reduce the possibility that managers can choose investments when growth opportunities are scarce and without value.

[25] De Jong (2002) shows how in Holland managers try to avoid using debt so that their decision making power is not limited. Zweibel (1996) also shows how debt can help prevent overinvestment problems, but he also points out that managers do not voluntarily accept the type of "discipline" that debt represents. Jensen (1986) has noted that decisions to increase firm indebtedness are voluntarily made by management only when the intent is to "reassure" the stakeholders that management activities are "right".

[26] This study analyzes the importance of governance mechanisms in the reduction of agency costs when there is free cash flow and in particular when there are independent advisors: firms with FCF where outsider participation is less than half tend to under-invest approx. $0.53, while when outsider presence reaches two thirds of the board only $0.18 is shown to be under-invested.

[27] Empirical evidence regarding these problems can be found in Fazzari et al (1988), despite criticism regarding the methods used (Kaplan and Zingales 1997) where investment sensitivity to cash-flow availability is examined; in observing how there is a positive relationship between the two variables a preference towards the use of internal resources to finance investments is found, that then increase as the available cash-flow rises. The possibility to use free cash-flow allows managers to choose inefficient investment projects (and at negative net present value). This study stimulated theoretical and empirical literature on the relationship between investments, cash-flow availability, value and leverage.

[28] In reality, if informational efficiency eliminates these problems *ex-ante*, the presence of contract incompleteness allows for opportunistic behaviours to arise after the fact (Hart 1995).

[29] Covenants can be both positive (for example, the ones that force the firm to keep specific budget indexes) and negative (for example, those that prohibit the issue of additional debt with a higher priority than already existing debt). Firms that violate these clauses are said to be in "technical bankruptcy", i.e. debtholders can request payment of the debt whether or not interest has always been paid out regularly.

[30] As noted, only the stipulation of complete contracts could eliminate conflicts of interest between principal actors and agents (Hart 1995).

[31] Ho and Singer (1982) and Gibson and Singh (2001) explain this phenomenon by affirming that a subordinated debt has, in reality, higher priorità, at least until the firm goes bankrupt.

[32] It must be observed, however, that Spatt and Sterbenz (1993) show how the issue of convertible debt and debt with warrant are not exactly the same.

[33] The hold-up problem is a consequence of a combination of incomplete contracting and of resource specificity. This type of situation can arise when the contract leaves the agent a high margin of decision making power with respect to the defined activity. For further information see Williamson (1992).

[34] Barnea *et al* (1980) show how short term debt tends to reduces incentives for risk shifting. Barclay and Smith (1995) observe that the deadline tends to increase the larger the firm is, while it decreases with growth opportunities; Stohs and Mauer (1996) also note that long term debt is issued above all by large firms that have a low risk profile and few growth opportunities.

[35] Following this hypothesis, however, it must be considered that while on one hand it is true that the debtholders obtain control in situations of distress, on the other also the positive growth opportunities offered by new investments could be lost due to the change in control and the situation of distress.

[36] Firms with long term debts have higher agency costs, since managerial decisions can have a greater impact on the present value of the existing debt. Reducing the debt's deadline would thus help contain such costs, in that it would mean that the firm would acquire greater elasticity in determining its capital structure, being able to decide whether to use equity for financing or to use third party capital.

[37] Ericsson (2000) and Stohs and Mauer (1996) empirically show how risk shifting problems reduce debt maturity by 20%.

[38] On October 5th 1992 Marriott announced its division into two separate entities: one dealing with Hotels and the other dedicated to real estate. Marriott's debt would be entirely absorbed by the real estate firm. Since 81% of the cash flow was generated by the chain of hotels, the debt holder's risk increased (due to the fact that the real estate firm generated less cash flow) and, as a consequence, the debt's value decreased. The debt value decrease exactly corresponded to an increase in equity value. This example shows a real case of the transference of wealth from debtholders to shareholders.

[39] According to *Webster's Third New International Dictionary*, a good reputation means that an organization is highly esteemed, is valuable and is trustworthy. It is a multidimensional concept that can be related to the quality of the product or service offered on the market, to the types of good behaviours demonstrated, to management's charisma and competence as well as to the firm's economic-financial reliability.

[40] The financial literature (Diamond 1989, Hirshleifer and Thakor 1992) demonstrates through theoretical models how a good reputation of the firm or of the managers can mitigate overinvestment incentives. John and Nachman (1985) assert that reputation can also reduce underinvestment incentives. Therefore, reputation represents an important instrument that can resolve underinvestment and asset substitution problems, while preserving investment policy efficiency.

[41] Comment on www.lavoce.info on 30-12-2003.