CEO Compensation: Agency Theory is Irrelevant but not the Neoclassical Game-Theoretic Framework

Anne Amar-Sabbah, Pierre Batteau

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Abstract

Often criticized in the civil society for its magnitude, though considered with mixed appreciations by academics, CEO pay has been objects of many contributions. Reviewing key papers that have raised controversies, we discuss divergent viewpoints with simple game theoretic models in the neoclassical spirit. We assert the complete inadequacy of the agency and asymmetry of information models for explaining CEO compensation, but we diverge from those who reject the optimal contracting approach and show how reasoning with the classical tools of utility maximization, rationality, freedom to participate, and price sets on markets, competitive or not, can model a broad range of situations, including those put forward as arguments against the microeconomic approaches of compensation. The CEO-Board relationship should not be studied as a delegation issue within a hierarchical organization with the shareholders sitting at the top, but rather as a market bargain in search of optimal contracting with symmetrical position and information of both parties, but with asymmetrical reservation utility because the distribution of talent to manage is itself highly asymmetrical, expressing the game power of each side.

Key words: CEO compensation, rationality, agency theory, bargaining, optimal contracting, utility maximization, neoclassical economics, CEO power, game theory.

JEL Codes : M12, G34, D82, D86

1. Introduction

In the early 90's, Jensen and Murphy (1990) found that the pay of chief executive officers (CEOs) was too insensitive to performance to infer a link between the two variables (also confirmed by Edmans and Gabaix, 2009). In contrast with many common views that the pay was too high, (Moriarty, 2005), they claimed that high performance is not rewarded enough, and they suspected various political forces at work to restrain CEO pay since the 1930's. Normative agency theory recommends the creation of incentives to align the compensation with the shareholders' interests, which implies that the volatility of shareholder value should be reflected to some extent in the ups and downs of the CEO compensation. Jensen and Murphy denied this was the case. This somewhat provocative result triggered a series of controversies on CEO compensation discussing the pros and cons of agency theory and the optimal contracting paradigm as an appropriate framework for studying the issue. Because of the importance of compensations in large corporations, the subject has spilled over the frontiers of academic circles and became a rather sensitive political issue, (Murphy, 2012), making more difficult sometimes to look at it with the necessary academic serenity. It is still today a matter of political controversies.

A comprehensive review of the stylized facts and the three-decade literature on executive compensation can be found in Edmans et al (2017). We shall not attempt any more complement to that major contribution, except deepening the issue of optimal contracting models and the scope of their validity to approach the issue of compensation. We are essentially here concerned with some theoretical foundations of the dispute that contrasts the vision of compensation either as a rent extraction phenomenon or as an incentive contract supposed to achieve an optimal value left to shareholder in an agency relationship.

We start by briefly reminding the milestones of the disputes, referring to some often quoted pieces of literature. We then proceed by presenting a simple view of what optimal contracting could mean when restricting human behavior to individual rationality such as defined. The first example borrowed from game theory reminds that a confrontation between two players can take very different forms according to the rules for playing the game: in most pieces of literature, the CEO is presented as the *agent* and the shareholders (or the Board) as the *principal*. The example allows to hint the effect of the inverse relationship, discussed later in the paper. The second example, reminds how the mere application of utility maximization provides a variety of solutions ranging from miserable to very high compensations, depending

on the economic context of the game. We discuss how several important pieces of literature miss the objective of putting optimal contracting to death probably by insufficiently precise definitions. However, we claim that agency theory, in the strict form initially given by economists, is probably the least appropriate version of "optimal contracting" to apply to CEO compensation. This is because the relationship between Boards and CEOs are not of hierarchical type but rather of market type, to follow Williamson's distinction, but still is explainable by the classical apparatus of neoclassical economics, upgraded in recent decades by the focus on asymmetry of information and game theoretic epistemic interactions.

2. Controversies on CEO compensation

Hall and Liebman (1998), wondering whether CEOs "are actually paid like bureaucrats", challenged Jensen and Murphy's view by empirically revealing a strong link between performance and compensation of the US executives (mainly due to the effect of stock options). The authors gave a necessary condition (although not a definition) of an "efficient contract" (p. 683):"*One principle of efficient compensation is that managers should be rewarded for outcomes over which they have control, while being insulated from economy wide or industry wide shocks*. This condition (not filled for instance by stock options contracts since the performance is tied up to systematic risk induced by the market) is not sufficient since efficiency requires also some kind of parsimonious use of resources. The condition requires designing contracts that "incentivize" CEOs to act according to shareholders' interests as measured by shareholder value.

However, the existence of an empirical relation between pay and performance can be also interpreted as an inverse causality: CEOs could be "rewarded for luck" as suggested by Bertrand and Mullainathan (2001) who recognize the incentive problem resulting from the separation of ownership and control but do not infer that contracts are done to incentivize CEOs. Rather, they see CEOs "skimmers" of the firm's performance which comes as luck for the person in charge. Blaming luck for pay had already been hinted in the literature. Blanchard *et al.* (1994) study the conditions under which windfall profits can be captured by the managers but they place themselves in an agency model (p.345). Bertrand and Mullainathan (2001) depart from the agency model and introduce the idea of "managerial power" directly resulting from the separation of ownership and control. In their paper there is no longer any clear reference to some kind of "incentive contract" proposed by the shareholders to the CEO. The argument is that shareholders are too passive and distant for

thwarting the temptation of the CEO to unreasonably increase her pay. The Board as representative of the interest of the shareholders seems impotent because it is itself under the control of the CEO. Nonetheless, the authors mitigate their assertion by showing how the relationship pay-for-luck is attenuated by stronger governance. This is a step toward the idea that compensation results not from appropriate incentive contracts, but from a game between the CEO and the Board, housekeeper of good governance. Strategic attitudes by the CEOs, often provided with better information about the firm and its future prospects, could rationally explain these deviations (see Edmans and Gabaix, 2009, p 490, for a short review of pay for luck). A position against agency is also developed by Erturk *et al*. (2007) who defend the "skimming" thesis.

The idea that CEOs do not accept passively the incentive mechanism designed by the Board, but are playing a game against it to control their pay has been often mentioned in the economic literature but without much stress. In the early 2000s, a new stream of literature has emerged advocating managerial power as a phenomena deserving rigorous analysis. Two major authors, Bebchuk and Fried (2003) have thoroughly diverged from the standard route opened by Jensen and Meckling (1976). They expose their vision as follows: (i) *In the optimal contracting approach, Boards are assumed to design compensation schemes to provide managers with efficient incentives to maximize shareholder value.* (ii) *Another approach to studying executive compensation focuses on a different link between the agency problem and executive compensation: Under this approach that we label the "managerial power" approach, the contract is "designed not only as a potential instrument to addressing the agency problems but also as "part" of the problem itself*, the word "*part*" being stressed by them. This formulation is insufficient to determine whether the authors are asserting a necessary or a sufficient condition, or a real definition for "optimal contracting" and "managerial power", but one should retain two important elements: (i) an "optimal contract" to their eyes is designed to maximize shareholders value via incentives (ii) the agency framework is not rejected but is referred to as a general "problem" covering situations where contracts are influenced by managerial power. Their approach can be interpreted as an inversion of the role of the utility functions as determinants of the compensation: in the optimal contracting approach the shareholder utility is the objective function while the CEO utility determines the "incentive" constraint in the maximization program. By contrast, in the managerial power literature the CEO utility becomes the objective function and the shareholders' utility a constraint. We shall treat more formally this inversion. Except for this

inversion, Bebchuk and Fried share with the tenants of the optimal contracting approach the project of exploring the relationship Board-CEO. The power thesis introduced by Bebchuk and Fried is supported by several publications, in particular Henderson *et al* (2010).

However, the rational contracting thesis does not find grace with Lubatkin *et al*. (2004); more precisely, Lubatkin (2007) does not see any salute in the exploration of this "*dyad" relationship between economically rational and motivated actors*"; he opposes an "embedded" theory of corporate governance summarized as follows (Lubatkin, 2007: 59): *"First we reasoned that whether the manager behaves in a self-serving opportunistic manner or as good steward is embedded, or partially determined, by the firm's social context, as is the boundedness of the principal's rationality... Second, we reasoned that the influences on perceptions, attitudes, and behaviours that come from socialization experiences at the workplace are nested or embedded with within the firm national institutional context."*

The reference to the social context, in particular the national environment, for explaining how managers behave is to be noted: could CEO compensation be explained by motives taking their roots in the social context or the citizenship? If a certain variability of behavior between pure stewardship and pure self-serving, explained by the social and cultural context can be envisaged as an hypothesis for the behavior of a broad set of top and middle managers in large corporations, there are less grounds for applying it to the highest levels of the governance system, namely shareholders, directors, and CEOs of large public corporations. Non active shareholders in those companies are just acting via their favorite fund managers and there is no evidence that their revenues exhibit a discount reflecting some kind of stewardship towards the company they own. The active shareholders are motivated by the private benefits derived from control (Dick and Zingalles, 2004). Are there country differences as suggested by Lubatkin? Certainly they do exist but for smaller or intermediate domestic companies. Most large corporations however are international and listed on several stock exchanges and studies, e.g. Gabaix and Landier (2008), show that size is the dominant factor for explaining the high level of compensation in the US as in Europe. Economic and markets forces are certainly more determining in this case than social contexts. This is not to deny that the social relationships among the actors (CEO and directors) are negligible variables. Actually they play an important role in the governance modes (e.g. Nguyen, 2011,

for the French case); if they do play a role it likely to reinforce the role of economic motivations[1] more than the stewardship ones.

The difficulty to discuss those opposing views dwells in the lack of precise identification of the type of agency theory and optimal contracting the tenants of the "social context" are targeting. Properties associated to these concepts are stated but without saying whether they are necessary, sufficient, or both, and some confusion entails. In a comprehensive discussion of the Bebchuk and Fried book, Core, Guay, and Larcker (2003) attempt first a definition of efficient contracting: "*We follow a traditional agency-theory framework and define an efficient contract as one that maximizes the net expected economic value to shareholders after transaction costs (such as contracting costs) and payments to employees"*. Apparently, this definition is equivalent to the usual one of "optimal" contracting. There are four important ideas in it: one is adhesion to the "*traditional agency framework*"; another is "*maximizing*" hinting that the parties "maximize" something some value; the third idea is that the shareholders rank last in the queue of all other stakeholders having contracted with the firm, a founding pillar of capitalism. The fourth idea is the reference to contracting costs, in particular those incurred for monitoring the CEO's action. Without more formalization, the argument of minimizing monitoring cost also can also be confusing. Core *et al*, (2003) also remind the important distinction between *first-best* and *second-best* optimality to come next.

Rigorous developments on optimal contracting can be found in the rich literature on contracts, following the pioneering works of Akerlof (1970) and Stiglitz (1983), Hölmstrom, among others, one finds formal contract models in Salanié (2005), Laffont and Martimort (2001), Bolton and Dewatripoint (2005), Tirole (2006), Gerard-Varet and d'Aspremont (1979). These models have been widely applied to the study of job contracts for employees, services provision, capital venture, insurance etc. They have been less often applied to the CEO-Board relationships; see Gabaix *et al* (2014) for a review. For stating our view of the "agency and optimal contracting" framework, we remind first the dual nature of agency and moral hazard, and we point out the specific distribution of roles usually assigned to the participants in an agency relationship.

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[1] When Louis Gallois became President of Airbus Group in 2006, he asked for a drastic reduction of his compensation in comparison to his predecessor. He was previously CEO of the French Government-owned railroad company (SNCF) where the social context is especially overwhelming. The move was refused by the Airbus Board, wishing to align his compensation on that of his German co-president. Eventually, between 2006 and 2012, Louis Gallois received compensations ranging from 2 to 5 million euros according to the annual reports.

3. Agency and moral hazard and the hypothesis of agent's discretionary power.

Principal-agent models emerged in economics[2] in the early 70s, to formalize delegation within organizations on the hypothesis of the systematic presence of opportunistic behavior of the agents. In this way, it was simply a transformed version of moral hazard models widely used in the field of insurance since more than two centuries. Borch (1962), Arrow (1963), Ross (1971), Spence and Zeckhauser (1971), Mitnick (1975), Williamson (1975), Hölmstrom (1979), Stiglitz (1983), Nalebuff and Stiglitz (1983) are among the pioneers. The concepts share the same strict formal structure and both illustrate imperfect extraction of the benefits of cooperation whenever the players cannot arrange binding contracts on mutually beneficial joint-strategies, i.e. when the game is not played cooperatively[3], leaving decisions to "individual rationality" only. This is classically the case in prisoner's dilemma where the individually rational choice by both players leads to a non-Pareto Nash equilibrium. This is the case also in certain games played *à la Stackelberg*, i.e. one player speaks first and the other selects her strategy after observing the first player's move.

The formal structure of an agency/moral hazard situation is simply a non-cooperative two-person game in extensive form, played *à la Stackelberg*, i.e. the principal speaking first and the agent selecting next her strategy, knowing the principal's choice. The rule is consistent with the assumption that the agent's move is supposed not observable and therefore not contractible. This induces an asymmetry of information because the first player has to decide before knowing the other's choice. This "endogenous" asymmetry of information should not be confused with the "exogenous" one, bearing on the parameters of the game (utilities, types of the players, states of nature, etc.) and leading to another concept of the contract literature: "adverse selection", which is not considered at this point (see Laffont and Martimor (2002) for modelling)

When studying the relationship Board-CEO in an agency framework, authors implicitly assign the principal's role to the Board since they represent the shareholders, the CEO being regarded as the agent. Of course, this is consistent with the Coasian view that the firm is a

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[2] The precision is needed because there is also in institutional analysis the theme of "agency" in a debate to determine whether the "agents" benefits enough individual freedom for shaping social institutions or social institutions shape the agents' action.

[3] A game is cooperative whenever the players can contract on joint-strategies and are able to design a method to enforce them. Rationality is then said "collective".

node of hierarchized contracts, the founding contract between the shareholders (*affectio societatis*) being at the top, so that any decision by the firm, is made on their behalf. This power position is the counterpart of the risk they incur on their residual claim (see Grossman and Hart (1986), and Hart and Moore (1990), for the logic and benefits of this hierarchy). So the Board plays first because they speak in the name of the shareholders and the CEO has to wait until the Board decides before acting herself.

However, why not consider instead an agency situation where the CEO is regarded as the principal? For instance, she is a potential "provider of talent" to the firm: if they accept the deal, the Board is assigned the duty of providing *ex-post* the necessary capital to exert the CEO's talent: promising her talent but not receiving what she expected to deploy it or else changing their mind about investments that the CEO cannot control. When one does so, strongly different results follow. An illustration of this inversion is given in appendix with a simple game representation of the CEO-Board relationship.

To which extent "optimal contracting" is concerned so far? In the verbal literature, agency theory and optimal contracting theory are frequently used as synonyms. Of course, as reminded by Gomez-Meija and Weisman (2007) or Lubatkin *et al* (2005), there are many versions of agency theory, the loosest one being that any confrontation CEO–Board whatever its content is an agency case. Most authors however conceive agency as a *hierarchical delegation* with a preeminent role conferred to the Board for proposing a contract but under the existence of a discretionary space for the CEO, preventing a detailed monitoring. If one drops this assumption and consider other rules for playing the game, other solutions do exist with different outcomes.

So, rather than distinguishing agency and optimal contracting, we shall label all solutions that we consider as particular outputs of the neoclassical game-theoretic paradigm (NGT), characterized as follows:

a) The maximization of utility hypothesis which reflects individual rationality (i.e. methodological individualism assumption). The CEO as well as the Board. are followers of Max U[4], the star actor of the neoclassical theater.

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[4] A tribute to Deirdre Mc Cluskey (1994) who often refers to this fictitious character in her writings.

b) The players are also interactively "rational": In games against other intelligent persons, they reason according to the principles of modal epistemic logic (see Bacharach, *et al, 1997.*). So we disregard here all types of behavior envisaged in the behavioral finance literature which explores the many cognitive biases that encumbers the mind of economic agents and make them drifting away from the Max U's prudence.

c) By definition the solutions are "first best" when they are Pareto optimal (i.e. satisfying "collective rationality").However to set a contract the parties must resort to some mechanism. This can be done by recourse to a mediator or by agreeing on voluntary constraints posed on the individual actions or by devising penalties, side-payments, etc. Whenever several mechanisms are available, the rationality condition supposes that one chooses the one minimizing the amount of resources diverted in the mechanism. If one looks for first best solutions, the mechanism should be "implementable" (in the Hurwiz-Maskin sense) which means that individual rationality will not upset the reached solution. Conditions a and b together do not guarantee Pareto optimality and for this reason "second best" solutions only can be achieved in some cases.

d) Contracts are settled in the context of markets (not necessarily competitive and often strongly non-competitive) and the classical conceptual apparatus of microeconomic theory under uncertainty and informational asymmetries and the recourse to game theory, is used to describe and analyze the context in which compensations are determined.

We show next a wider variety of solutions based on the Max U principle.

4. A simple model showing a variety of bargaining outcomes under rationality assumptions.

4.1. The game form for sharing the residual monetary output of the firm

The players are the Board and the CEO and possibly a mediator. The framework is a static two-person game model. Multi-period models are common in the mathematical literature but here they would blur the central message that this paper is addressing.
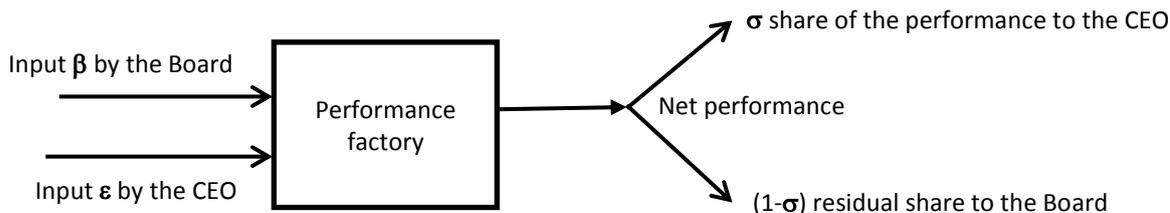
Figure II: The performance factory

The net performance (whatever its measure) after settling all other contracts of the firm, is a function of two inputs which are the Board and CEO contributions respectively denoted β and ε. The Board contribution may include a set of elements (for instance providing network relationships) not detailed here. Figure II summarizes the model. [5]

The CEO contribution describes the devolution of her talent (skills, networks, charism, personal resources, efforts etc.) to the success of the firm. So we denote the level of deployment of her talent (usually called "effort" in the contract literature) by ε. For the sake of graphical interpretations, we measure ε as a real number in the interval **[0,1]** representing the proportion of the maximum contribution of the CEO. In this simple model, we set β as 0 or 1 and embed it in the participation constraint. The share of the performance accruing to the CEO is denoted by σ in **[0,1],** the Board getting the complementary share **(1-σ)**. This allows describing all possible outcomes of the game as the points of the unit square **[0,1]x[0,1],** with three decision variables ε, and σ.

4.2. Utilities

Next, the players assign to each possible duplet **(ε, σ)** a personal utility which may depend on two sets of factors (i) uncertainty and (ii) cost of contributing.

(i) Uncertainty: the net performance as a function of contributions β**,** ε, could be regarded as dependent on the future state of the world. We just suppose here that the performance is affected by some noise producing respectively specific (company risk) and systematic (market risk). The specific risk is disregarded by the shareholders since they can diversify it away,

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[5] Espousing arguments from Holstrom and Milgrom (1987) and Edmans and Gabaix (2008) we look only at « linear » contracts on performance**.**

whereas the CEO will consider both to assess her utility. The achieved performance depends also on other variables that are components of the prevailing state of nature, not necessarily symmetrically known by the CEO and the Board because their information structure can be different. So the relevant noise surrounding the performance is different for the CEO and the Board. Moreover, different risk aversion attitudes may prevail. We do not detail all these elements and we simply capture all those factors within an expected utility function for each party, on the basis of a probability measure supported by their information set. For the sake of brevity we just mention "utility" and we ignore the state contingent issue.

(ii) The contribution is costly for CEO (the Board has just to decide on participation)

In summary the game is summarized as follows: there are two utility functions defined on the unit square. For all the reasons said, they are not transferable (their sum has no meaning and the game is not about money sharing: it is about utility bargaining). Their complete specification may also depend on the method for reaching a decision, since transaction costs will exist. This is the object of the next paragraph.

4.3. Bargaining methods

At this stage nothing has been said about how the parties reach a solution, i.e. a particular duplet (ε, σ). To encompass a broader range of methods, one may introduce also a third player, the "mediator", who is in charge of designing the contract in certain cases (he may propose binding contracts with penalties in case of deviation and he charges fees for his services). The characteristic of the mediator is that his utility function is irrelevant since he is supposed to reason only by considering the utilities of both the CEO and the Board. In the sequel, the mediator is "he", whenever we use his services.

The solution to the trade will be attained by some *bargaining* which can be described as a sequence of not binding messages circulating among the players, sometimes in face-to-face relationships (common knowledge) and sometimes transiting via the mediator, (informational asymmetry). A formal development of this process is not in our purpose here. This is the object of another literature developed by authors like Hurwicz (1973), Maskin (1999), Hurwicz and Reiter (2008), or,sometimes referred to as the literature on "implementation". The formal developments extremely complex and we want to keep the model simple.

Invoking if necessary the revelation principle, we just assume here processes in which messages are values of the three variables β, ε, and σ.

Each message is a sequence of triplets (β, ε, σ), which evolve during the bargain. In the standard agency literature, bargaining method are rarely envisaged and it is simply assumed that the Board after deciding on their own contribution β proposes a share σ, supposed incentivizing, and CEO chooses freely ε afterwards. Alternatively the Board can hold for sure that the CEO will comply with the assigned role because it has the power to force her to do so (e.g. huge penalty in case of noncompliance), then the Board just chooses a pair (σ, ε) and the CEO just complies. Agency theory rejects this contract because of the postulated non-observability of the agent's action. Another alternative is to imagine a CEO deciding *both* on her talent ε and the share σ she predates by playing on dividend policy, debt, transfer process, share repurchase programs, etc. The Board members are somewhat passive and only free to choose their participation level β in the business. Another way of playing the game is to have the Board naming an expected level of talent from the CEO and the CEO naming the share (1-ε) of performance she will retain. The mediator could also propose the triplet and dictate the contract (the two others agree in advance to comply with the mediator's decision) or he can re-launch a new proposal if one the two players express a veto and, through successive approximations, converge to the final contract. So, there are so many ways to achieve the bargain and no one should be surprised of the variety of possible outcomes.

The upshot of any bargaining can be interpreted in terms of relative power of the players. Of course, it is important to explain where the power comes from: It could result from the bargaining method itself, i.e. be endogenous to it. It is known for instance in formal voting theory that giving a determining vote to the chairman in an assembly may weaken rather than strengthen his power (because there are more chances to raise a coalition against him). Also, smart negotiators can upset a weak position into a strong one because of errors by some player (the "trembling hand" hypothesis in game theory). Most of the time however, power is determined by exogenous factors. So, in addition to structural variables that determine the Board power, specific CEO's characteristics contribute to CEO power. In particular talent (Cremers and Grinstein, 2008), diploma (Bebchuk and Fried, 2004; Bebchuk and Grinstein, 2005; Jensen *et al.*, 2004), experience (Hall and Liebman, 1998; Hill and Phan, 1991; Finkelstein and Hambrick, 1996; Shen and Cannella, 2002), networks (Bertrand *et al.*, 2004).

5. Graphical interpretations of eight Max U solutions of the CEO-Board game

To illustrate the existence of various solutions to the game we restrict ourselves to the unit square **[0,1]x[0,1]**, with β taking only two values 0 or 1, interpreted as participation or non-participation. In other words, there is a utility reservation for the Board, also called a *participation constraint* in the contracting literature. Figure III depicts the game.
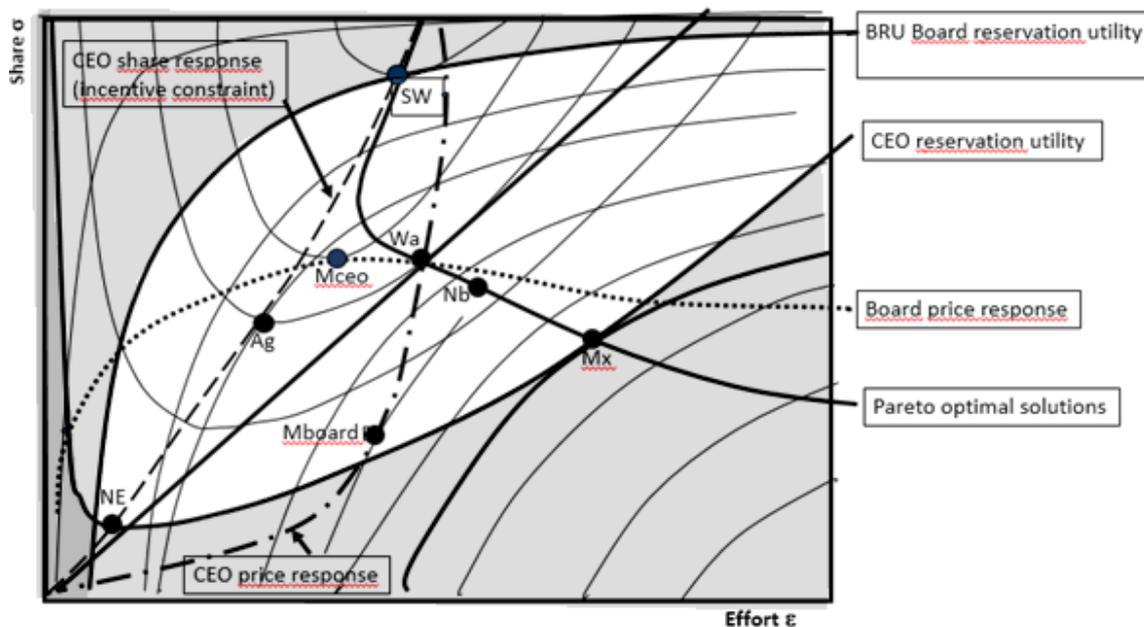
Figure III: Eight "Utility-maximizing solutions" for the CEO-Board contracts

The CEO's contribution ε is horizontal and her received share σ is vertical. Some utility isocurves are drawn on the picture for the CEO and the Board respectively. Their shape can vary but the depicted ones reflect some classical assumptions found in the formal contract literature: for the principal, the direction of increasing utility is clearly South-East, i.e. more contribution by the CEO and smaller share abandoned to her is preferable for the Board. The curves are drawn with a typical convexity which may reflect some risk aversion for instance. Another innocuous assumption is that more talent deployed always increases the "expected" output. The shape of the CEO's utility isocurves is due to the cost of talent deployment characterized by increasing marginal cost, a standard condition. For the CEO, one may also identify a utility reservation or "participation constraint". Since the players refuse the game if the solution leads them below their reservation utility, they get this utility for all points located in their no participation area. We are not looking here for closed-end solutions we

only want to characterize qualitatively different types of "optimal contract" and their conditions of occurrence. For this reason, we do not need a formal specification of the utility functions. Of course, the analytical approach could be refined using similar assumptions as those set by Holmström and Milgrom (1987). The graphical arguments borrow from the old Edgeworth Box in which a contract can be seen as a trade of two goods: share against talent. One adds also that the model excludes asymmetry of information of the "adverse selection" type: Figure III is supposed common knowledge of the players. This is not usual in the modern contracting literature as for instance in models treated in a recent paper by Gil and Zanarone (2016), but we shall discuss later the extent of informational asymmetry between the board and the CEO to justify this simple framework.

Provided with this framework, one may identify *eight* outcomes that Max U would endorse as his preferred habitats. They can be first-best or second-best, each resulting from a particular way to play the game. Note that the picture is topological in the sense that the utility functions can be deformed provided some basic properties are preserved. However, the different solutions cannot be rigorously compared in terms of utilities because the utility curves have to be redrawn in each case to take into account the cost of the particular mechanism adopted for bargaining. The purpose here is only descriptive to stress the difference among solutions.

5.1. Nash contract

- A "Nash equilibrium" is such that whenever any player sticks to it, there is no incentive for the other to deviate. There is a single Nash point $(\sigma_N, \varepsilon_N)$ situated at the lowest point of the CEO's response curve on her reservation utility lines (point *Na* on figure III). Clearly the point is a maximum in ε for the CEO if the Board sets $\sigma = \sigma_N$ since it is on her best response curve. It is also a maximum in σ since when σ increases the Board's share decreases when the CEO's talent stays at ε_N, and decreasing σ leads the CEO to quit, the Board getting just their reservation line. The solution can be interpreted as a prisoner's dilemma. A condition is that both ε and σ are announced in advance as a commitment. This solution could arise with a Board not trusting a new CEO in its ability to increase the firm's performance by her talent, but forced to deal with her. The Board sets a share that is just compatible with the CEO minimal expectation: the commitment to accomplish talent ε_n is a declaration "a minima" of the CEO's strategic intention. From the informational

standpoint, this point just requires the common knowledge of the CEO's reservation utility and its minimum point. Another interpretation is to call the solution "bureaucratic": the Board, betting on a lazy or uninterested CEO, maximizes their own share without caring about the level of output. Doing so, they lead the CEO to adopt a minimalist attitude: adjusting her talent to the small share she receives. There is no incentive scheme implemented.

5.2. Agency contract

The game is now played à la Stackelberg with the Board as first mover setting the share σ and the CEO adapting her talent ε next. As a disciple of Max U, the CEO will select a talent deployment ε for each possible σ, placing herself on a response curve, usually called the "incentive constraint" in the contract literature. Anticipating this constraint, the Board chooses σ that maximizes their own utility and the solution is at the tangency of the Board iso-utility line with the CEO's response curve (point **Ag** on figure III). It is clear that the solution-is second best optimal in any configuration of the pair of (non-degenerated) preferences, because the Board as first player does not maximize against the CEO's utility function but against her response curve. This is exactly the same situation as a monopolist who maximizes against the customers' demand curve and not the price line. Both the monopoly and the agency are resulting from Stackelberg equilibria producing inefficient outcome.

However, the implementation of this solution requires common knowledge of the response curve. A weaker assumption is that the Board is able to "estimate" the CEO's response curve and sets the share σ_A accordingly. One may also interpret this solution in a way that will be useful for comparing with the next cases: there are two traded goods; "share", initially endowed to the Board, and "performance" to the CEO. The Board, as a monopolist, sells one unit of share against one unit of performance (rather than talent deployment which is supposed not observable).

Observe that the area imprisoned in the lens-shaped area formed by the utility lines passing through the solution point **Ag** represents a collective loss of utility suffered by the players and can be viewed as *an opportunity cost* of agency. This loss could be reduce by improving the monitoring of the CEO but at a cost.

5.3. Marxian contract

Suppose that the CEO speaks first and is ready to supply an observable talent for a share of the performance. Whatever the talent announced, a utility maximizing Board will rationally select the granted share that pushes the CEO to her reservation level (her participation constraint). Since any point on this frontier curve is equivalent for the CEO, she is ready to accept any point leaving her better off. Then the interest of the Board is to maximize their own utility against the CEO's participation constraint. Another way to reach the solution is to suppose that the Board selects the share σ and requires the CEO's talent ε. The CEO is completely passive in this case and has nothing to say about her contract. For obvious reasons, we call this point (**Mx** on figure III) the "Marxian" solution since the Board keeps most of the fruits of the performance and pays a minimal participation salary to the CEO for her talent, which is imposed to maximize the Board's utility. One doubts that this solution is of interest for blue chip corporations, but they are likely to fit with the situation of some small-sized companies in which the owner family collects the fruits by exploiting at low price the competencies of managers who remains better off facing the crowd of competitors willing to take the seat.

5.4. The strong-woman contract

This case stages an omnipotent CEO. The contract (point **SW** on figure III) is obtained at the tangency of the CEO utility iso-line with the participation constraint of the Board. The CEO decides on both her talent and her share by maximizing her utility. Monitoring the talent is not an issue here. The shareholders have no power and the CEO grants them only the smallest share of the performance that deters them from voting with their feet by selling their shares. Indeed, it may happen that some CEOs exert a sort of dictatorship over their Board because the very existence of the company is completely in her hands. She just serves the shareholders with the return on investment offered by the market for not having them left. There is no surplus of EVA^{TM}, no abnormal returns, no extra-performance for the shareholders, and windfall profits fall into the CEO's pocket.

5.5. Talent for share contracts with a price mechanism and types of competition

The three next solutions rely on an implicit or explicit price **p** for share, taking the talent ε as *numéraire.* Initially, the "expected performance" is regarded as an asset totally in the hands of the Board who owns the property rights over the company assets. The talent ε is another asset in the hands of the CEO. The Board is ready to sell a share of its right to the CEO

against a share of her talent, and the solution is provided through a price mechanism. Figure I is analogous to a classical Edgeworth Box with however a disutility of the CEO when she supplies too much talent (in an Edgeworth exchange economy, this would involve saturation and cost of disposal for the good endowed to the CEO).

It is important to note that those solutions suppose that the talent is (directly or indirectly) contractible and therefore observable. Under the price mechanism, there are three cases to consider according to how the price is set: (a) by the CEO acting as a monopolist supplying talent, (b) by the Board acting like a monopolist supplying performance rights, and (c) by a competitive market.

5.5.1. The Board as a monopolist

A price **p** for share in terms of talent taken as *numéraire* is depicted by a straight line going through the origin and for each talent ε offered the CEO can buy at most **p** units of σ. When the price **p** is set by the Board, the CEO takes it for granted and, in the shoes of Max U, sets her response ε according to p and this define a CEO price response on figure III. The next step is to assume that the Board, itself a Max U follower, sets **p** so that its utility is maximized. The point reached is **Mboard**. One sees that the demand curve lies on the right of the curve obtained in the agency case, and the optimal contract lies South East of the agency point **Ag**. The Board derives a greater utility by setting a *price for talent* rather than a *price for performance* (i.e. performance as *numéraire*).

A nice interpretation of the difference between the agency contract **Ag** and the monopolistic Board contract **Mboard** is as follows: in both cases, the Board acts as a monopoly but gets more in setting the price in terms of talent rather than in terms or performance as it is implicitly the case in the agency solution. This invites to consider performance as a *luxury good* while talent is an *inferior good* because it is marred by its cost of extraction. In the agency model the CEO is viewed as a *supplier* of performance -the luxury good- who delivers an amount of it to the Board at a price set by the Board. The advantage of speaking first and naming the share σ is counterbalanced by the CEO's endowment in luxury goods. By contrast, in the share-for-talent price mechanism, the CEO can be viewed as a *supplier* of talent -the inferior good- at a price also set by the Board who buys it against a share of performance. In this case, the luxury good is initially in the hands of

the Board who, thanks to their monopoly position, expropriates the CEO from most of the fruits of the performance achieved through her talent.

5.5.2. The CEO as a monopolist

With a similar method, one can draw the supply curve (Board price response on figure III) in terms of the share σ sold by the Board when **p** is set by the CEO. This solution reached is at point **Mceo** on figure III where her isocurve is tangent to the supply curve. One sees that the solution is more in favor of the CEO who, exactly like a natural monopolist, rations the supply (less talent deployed) to obtain a more favorable price together with a higher profit. Here the CEO pays in talent (the "weak" currency) but compensates with a much higher price thanks to her monopoly position, allowing her to restrict the supply of her talent. If the CEO cost curve is convex enough, the Board response curve seen as a function $\sigma(\varepsilon)$ is itself convex and this solution is more favorable to the CEO than the Agency point **Ag.** In other words, a strong CEO prefers to define the contract of her own, at the expense of accepting either a monitoring of her talent or an enforceable commitment to comply with the terms of the contract.

5.5.3. Competitively priced contract

If both the CEO and the Board take for granted a price set by some market where the CEO talents are traded against shares of performance of companies, they will end up on the utility maximizing contract(s) that equalize supply and demand. This solution is of course at the intersection of the demand and supply curve and classically such a contract lies on the Pareto line (point **Wa** on figure III). In reality, this type of market is likely to be affected by imperfections and cannot be considered as fully competitive, but a nice interpretation would be that there are conventions in the world of Boards and CEOs that are taken for granted by both sides when they maximize their utility, and allow a quasi-price system to operate. One convention could be to align the compensation on that of CEOs of similar companies: the demand comes from CEOs that think that they can be recruited at this price because they have the reputation for and the supply comes from companies that know that they have to pay the market price as their neighbors. The implementation of this bargain can be led by the third player, the mediator, acting as a descendant of the Walras's *commissaire-priseur*. This suggests questioning the informational efficiency of this market: it is well known that imitation can be a cheap way to achieve efficiency provided the imitated agents are the

informed ones. It is also well known that in the absence of clear criterion to identify the informed ones, the market could produce bubbles. One interpretation is therefore that the high market values of CEOs may reflect possible bubbles, but it may also reflect a clearing market price, balancing supply and demand for CEO positions in each class of companies.

5.5.4. Nash bargaining contracts

One may turn anew to John Nash to look at the bargaining situation for which he proposed a first solution in 1950. The idea has been explored in the framework of non-binding contracts (Grout, 1984). Variants of the solution have been proposed also (Kalai and Smorodinsky, 1975).

In the Nash solution the respective reservation utility (participation constraints) of the CEO and the Board, namely U^0_{CEO} and U^0_{Board}, act as a deterrent: they represent what each gets in case of no-agreement. The Nash bargaining point is $(\sigma^*, \varepsilon^*)$ on the Pareto line such that the following product of gradients of utility is maximized (equation 1) :

$$[U_{CEO}(\sigma^*,\varepsilon^*) - U^\circ_{CEO}] \mathbf{x} [U_{Board}(\sigma^*,\varepsilon^*) - U^\circ_{Board}] \quad (1)$$

Since figure III is drawn in terms of the pair (σ,ε) and not in terms of the pair (U_{CEO}, U_{Board}) and since the relationship between utilities and decisions is not specified here, it is not possible to position precisely this solution on figure III, except that it lies on the Pareto line. Arbitrarily, we have put it at point **Nb** somewhere on the Pareto-line. The interest of it is to mention that the level of reservation utility plays a key role in the bargaining. So, if the CEO has a strong power and she threats to leave the company with a high reservation utility, the Nash bargaining point will be displaced higher, implying a lesser talent for a bigger share. In this case the Nash point **Nb** is likely to dominate the agency point **Ag,** and/or the price monopoly **Mceo**. By pushing high enough the CEO's reservation utility, it is also likely to dominate the agency point. So, a first best optimal contract is perfectly feasible as a result of a bargaining process in which the CEO stands in a strong position in front of the Board. So why do Bebchuk and Fried (2004) claim that optimal contracting and CEO power are opposing theories? We are still in the Max U framework for both parties but the optimal solution shifts in favor of the CEO.

6. Agency theory, optimal contracting, game theory, and the neoclassical paradigm.

The so-called "optimal contracting" framework is clearly in the realm of the neoclassical game-theoretic paradigm. However, it not very clear what the critics of the optimal contracting framework targets since the meaning seems to differ among authors. For instance, Bebchuk and Fried (2003, p72) call optimal contracting "*an approach where Board are assumed to design compensation schemes to provide managers with efficient incentives to maximize shareholder values*". Clearly, since ex-post incentives are expected, this looks similar to what we call the "agency contract" (**Ag** on the figure III) but does optimal contracting in their eyes cover *only* that approach? Does it cover for instance the search for Pareto optimal contracts reached through a price mechanism? Moreover, the designation "optimal contracting" is awkward (as noted also by Core *et al*., 2003) since precisely the solution in the agency case is not optimal but only second best. But Core *et al* oppose optimal contracting to managerial power: "*Another approach to studying executive compensation focuses on a different link between the agency problem and executive compensation. Under this approach, which we label the "managerial power approach*...". However they see their theory itself as an agency issue. When criticizing optimal contracting Lubatkin (2007) mainly targets the Jensen-Meckling's framework but also marks his rejection of any economic models, like those presented here, founded on interactive rationality between CEOs and Boards. The reason given by Lubatkin is that this ignores the institutional context that "embeds" the relationship. This is a way to express the old Polanyi's criticism of the narrow vision of economists, heirs of Adam Smith, who see individualistic agents exempt of any societal influence. Of course, there is no harm to explore sociological visions of the firm and part of the truth is likely to emerge from it. But rejecting the ability of an economical approach to explain delegation within organization by observing the failure of the agency model is an erroneous conclusion. Agency is just one form of the delegation game when it is played with a player speaking first and the other passively accepting the deal and adjusting her action to it. Agency in Board-CEO relationships is even of a more restricted case since the role of principal, the first central character of an agency, is systematically assigned to the Board (or to the shareholders). So, we use "neoclassical game theoretic" paradigm", NGT, in short, rather than optimal contracting. This paradigm allows many models of Board-CEO relationships, very distinctive from the usual incentive contract of agency theory. The virtue of the previous simple model is to exhibit examples of contracts with a high share of the performance accruing to the CEO, i.e. showing a high CEO power, without departing from the standard microeconomic models of trade of two goods that are clearly situated in the neoclassical line. The neoclassical tools of analysis are not yet doomed.

Gabaix and Landier (2007) try to explain in an equilibrium model why CEOs' pay has increased so much in top companies, while not sticking to the assumptions of incentive agency models. Such a piece of research is undoubtedly belonging to the "NGT" paradigm. In another paper Edmans and Gabaix (2009) review several models to explain some apparent "anomalies" mentioned by various authors as a contradiction with efficient contracts. All these models rely on the basic assumptions and methods of the neoclassical contracting paradigm.

The capital venture literature faces the similar question of whether the power is in the hands of the capital-venture or in those of the entrepreneur (see for instance Casamatta, 2003, for a model of double moral hazard). In this case, asymmetry of information is a significant issue leading to double adverse selection and double moral hazard, requiring complex mathematical models. However, one may claim that asymmetry of information becomes a less significant issue in CEO-Board relationship when, year after year, the Board is revising the compensation of a CEO they know well. Adverse selection is not either so sensitive when hiring a new CEO for large public corporations, for they are generally highly visible and their records are well known to the Board. For smaller corporations, the issue remains open; see Palomino and Peyrache (2012) for a model of the effect of adverse selection on CEO pay, together with some empirical discussion. Note that modelling adverse selection is typically within the realm of the neo-classical paradigm.

7. Is observability relevant to the CEO-Board bargaining?

In the strict agency relationship, the Board decides on the share of performance that the CEO will receive once they have anticipated the incentive constraint reflecting CEO's preferences. A possible pre-contract action by the CEO would be to manipulate her preferences using guile, for instance pretending that their interest is elsewhere than in money. One has already mentioned the importance of hiding one's true reservation utility in the Nash bargaining game (solution 6 above): certain cunning CEOs, willing to enhance their compensation, could incessantly brandish the threat to leave if their expectations are not satisfied. This is credible if the asymmetry or information is deep. However a Board who knows the incumbent well and is kept informed of the conditions of the market for leaders will not swallow the trick. Actually, asymmetry of information cannot be tackled by an incentive contract offered to the CEO. Of course, contracts at the CEO level can never be complete since one cannot prescribe an action contingent to the many unforeseeable future

situations and the discretionary power of the CEO in large corporations may seem large and opaque for the passive shareholders. Does this imply that the contract should necessarily be incentive-driven to prevent the CEO from manipulating the firm at her guise and diverting the firm's wealth instead of serving shareholder value? Actually the different ways open to the CEO to extract private benefits have been described since long in the literature (Williamson, 1984; Jensen 1976, 1984; Shleifer and Vishny, 1997; Dyck and Zingales, 2004) and they are well known to the directors, who are able to anticipate them when bargaining on compensation. The directors are aware of the ways the CEO can generate perks: by retaining profits rather than disgorge the cash when growth opportunities are gloomy, by sometimes rigging her stock-option contract, by reducing her exposition to specific risk and that of her collaborators (Amihud and Lev, 1981), by attempting to influence the stock price through timely communication when her option maturity is nearing, by gently manipulating transfer prices to allow profit transiting towards entities in which she has higher stakes etc. In corporation with proper governance, all those deviations are not only anticipated but continuously monitored and observed by the Board members of private companies or by the analysts of public ones. Because the CEOs know that the directors know, they are prevented from indulging too far into wrong practices that could hit their own reputation. This does not mean that all kind of wrong-doing is prevented and, indeed, it may affect shareholders wealth. But significant wrong doing is generally reflected in the movements of the stock price as shown by lots of event studies. Nonetheless, observe that all these undesirable actions are not mentioned in the CEO contract as facts leading to formal penalties. In case of excess, the shareholders can bring the case to the court. Otherwise, the rest is implicitly part of the compensation. There is for instance often a tacit understanding between Boards and CEOs that non-taxable revenues are preferable to taxable ones, therefore justifying perks.

What is actually expected by the mass of shareholders is the conduct of a strategy in accordance with their expectations of portfolio holders (e.g. stability of the beta of the firm, no asset shareholder, should not be seen as essential to understand compensation. If the shareholders are to thwart the CEO's temptations to skim shareholders' wealth, the best solution is to design a contract providing severe penalties if at some point in time, short or distant, it is becomes clear (by investigation or pure serendipity) that the CEO has improperly acted. No further monitoring and no cost are involved by just adapting the size of the penalty to the probability of improper action being unveiled, and the CEO is deterred departing from the iron law of the shareholder value or performance achievement. Actually most CEO

contracts are of this type since they can be dismissed "*ad nutum*": a CEO who miss delivering according to expectations is fired, as shown in many examples.

So, it looks like a wrong idea that because of the incompleteness of the CEO contract, incentive mechanisms are the leading thread to understanding compensation. Other mechanisms are at work and this is why in our model we have considered solutions for which the monitoring of talent is irrelevant. Of course combining the three concepts related to asymmetry of information, namely: moral hazard, agency, and adverse selection, has given rise to a very elegant theory with some profound results. Considering the overwhelming recourse to agency incentive theory in the early CEO compensation literature, it is sometimes difficult to say whether this was because of the CEO's unobservable action or because the research tended to force reality to be in accordance with elegant models.

The fact that a tie exists between compensation and company performance, particular when stock options are included in the compensation, should not be seen as evidence that contracts are designed to thwart moral hazard. It is true that stock-options have been initially designed for sealing the agreements of entrepreneurs and risk-venture financiers to seize the opportunity of innovation with a fair sharing of its profits. For CEOs of large companies, the agency literature tend to extend this idea that stock options are an incentive mechanism to boost performance, but one could see them as well as rent extraction reflecting a power on the allocation of the fruits of the performance. CEO compensations, including stock-options, are re-examined and determined every year in a confrontation with the Board (through compensation committees when they exist), and the outcome can result in larger or more modest compensations depending on the anticipated performance and not the reverse. If this invalidates the incentive explanation, it does not invalidate the Neoclassical Contracting Paradigm.

While the agency model assumes the threat of managerial opportunism fundamental, we have envisaged here other scenarios, where the issue of monitoring is secondary: At every period of renewal, the CEO proposes a package including her intentions and the compensation scheme she wants, possibly including stock options; the board accepts or rejects (i.e. renews, or dismisses), and provides the needed support afterwards (inverse agency model discussed in appendix). The CEO has a broad discretion to act, but for CEOs, discretion is more of an asset than an evil since they always are facing the dilemma of releasing information to the shareholders while holding secret one's strategic intentions and assets in hands, which is a

necessary condition for success when competition is tough (see for instance Von Lilienfeld-Toal and Ruenzi, 2014).

Rejecting the non-observability in the CEO-Board relationship just means here that fear of opportunism is not a dominant factor explaining the contract. Truly, each time one is facing prisoners' dilemma, desiring to escape the "doomed" outcome and vowing to achieve the virtuous one, though not Nash-stabilized, the parties accept entering cooperation provided the ghost of opportunism is kept at bay. However, the probability of opportunism is in direct relationship with the distance between the players: the insurer is far from the insured and most often they don't even know each other, whereas the CEO is quite close to the Board members and, as usual in business relationships, giving one's word is sufficient to secure an efficient path towards the output, essentially because business games are continuously repeated and that the best asset not to be damaged is reputation for both sides.

In summary, here, we reject strongly the idea that asymmetry of information, whatever its form, plays any role in the design of CEO compensation.

8. Criticism of the critics of agency theory

Lubatkin (2007) launches a hard attack against agency theory, claiming it is not applicable to most real companies, firms, and organizations, and reminding that Jensen and Meckling (1976) had only in mind a small set of listed corporations in which shareholders are widely dispersed, whereas most businesses in the world are of family type (La Porta *et al.*, 1999). He concludes: *In short, if the only context that the Jensen-Meckling model is suited to explain is a small subset of all firms, then the model lacks generalizability and this represents a serious shortcoming. Indeed, I am puzzled why this 28 year old model continues to receive so much positive attention from scholars from all over the world, and why alternative governance explanation have not also attained similar legitimacy in the academic press* (2007: 64). Note first that we disagree with Michael Lubatkin's enumeration (p.64) of the "*constitutive factors of agency theory: self-interest, bounded rationality, risk aversion*". The first one only enters our definition of agency theory and can be opposed to stewardship theory. The two others are neither necessary nor sufficient to found agency theory (as a Stackelber game). In particular, "bounded rationality" is out of our view of agency. Truly, a framework relying on Herbert Simon's ideas and the abundant literature on bounded rationality, procedural rationality, etc. would certainly be useful to understand how CEOS make their decisions once in office, and a

lot has been done in this direction. Bounded rationality can explain some "errors" (the "trembling hand" again) accounting for the noise observed in the dispersion of compensation levels but it is not likely to be the central factor when the bargaining bears on millions of dollars examined among decision makers of the highest educational statuses and broad experience of the top level.

In spite of these divergences, however, we converge with Michael Lubatkin to the radical standpoint that agency theory, seen as a theory of incentives in delegation, is not able to explain the compensations, especially those of CEOs. Surprisingly, Michael Lubatkin quotes Gomez-Meija and Wiseman (2007) to hint that agency theory was established by Jensen and Meckling *"for large for-profit organizations operating in developed markets with widely diversified shareholdings"*. The essence of our paper is exactly the reverse: agency theory is inadequate for such companies!

The restriction we make of the scope of agency does not allow us either to adhere to the effort of Gomez-Meija and Wiseman (2007) to reinstate it as a universal framework for organization theories. Replying Lubatkin and his co-authors (2004) who have cast an anathema on agency theory, Gomez-Meija and Wiseman enunciate the "three factors constitutive of agency: *"informational asymmetry", "bounded rationality"*, similar to Michael Lubatkin (2007: 64), and *"potential for goal conflicts"*. They precise that these factors make consensus among agency writers, which means, if true, that we disagree in this paper with the bulk of the agency writers. As mentioned previously, the only type of informational asymmetry in pure agency theory is the "endogenous" one resulting from the Stackelberg rule. The exogenous asymmetry of information on all the other parameters of the exchange are not specific to agency. We have already rejected bounded rationality in Lubatkin's definition. The last item of Gomez-Meija and Wiseman that they call "*potential goal for conflicts*", is a universal trait of every relationship among human beings when it comes to share scarce resources and is, by the way, what makes economics exist as a discipline since Xenophon. Gomez-Meija and Wiseman make a good plea for a theory of delegation founded on these three factors but, to our eyes, it cannot deserve the label of agency unless one totally forgets the origin of this concept.

Lubatkin mentions also the possible alternative of a "*stewardship theory*", supposed to be sometimes more in line with the real behavior of actors of the firm, managers, employees, and owners. Stewardship theory assumes each agent within the organization is acting to serve a

common goal. The effect of the heterogeneity of individual interests on decisions is strongly reduced if not erased. The need for exploring stewardship theory is legitimate as a research topics and it has brought valuable contribution to organization theory, for the idea that every decision of the stakeholders within the firm could be uniquely driven by guile is conspicuously wrong. Let us say however that the adhesion of the actors of the firm to a common goal is not new and has been already explored in the early seventies, for instance by Marschak and Radner (1972) in their "theory of teams" where individual discretion is allowed, but with a unique *utility function*, common to all agents. The essence of their theory is the assumption of asymmetry of information over the parameters affecting the performance of the team, together with the existence of costs of communication that prevents spreading all relevant information across the organization and thus creates dilemmas of action resulting in sub-optimal outcomes. Aside from the uniqueness of the utility function, the rest of team theory is fully embedded in the neoclassical contracting paradigm, with utility maximizing, rationality and the search for optimal decisions. If one wants to introduce concerns for collective welfare, there are two classical ways to do it in the standard neoclassical models: either incorporating it directly as a parameter within the utility function of each agent or putting constraint on the maximization of utility. Henry Ford had placed a constraint on the maximum ratio of the CEO remuneration and that of the workers. In the modern era, public disapprobation[6] or new legislation could as well place capping rules on compensation.

9. The Board-CEO relationship: market more than hierarchy?

Delegation is a universal phenomenon in institutions that Williamson has called "hierarchies", where people sitting at the nth story of the company headquarters receives instructions from people sitting at the $n+1^{th}$ floor, though with some discretion to implement these. The implicit assumption in the corporate governance literature stems from that hierarchy: the Board, as representative of the owners of the property rights over the firm, sits at the top and *delegates* to the CEO, who in turn *delegates* to her deputy CEO, who in turn *delegates* to various managers etc. A common statement in the agency literature is that an agency contract "*aligns the interest of the managers on that of the shareholders*" (never the reverse!), meaning that the managers' utility is second to that of the shareholders when a decision ought to be made. So, in a hierarchical organization founded on delegation,

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[6] On June 2018, the leaving CEO of Carrefour has renounced to 4 millions euros of additional compensation after a mediatized campaign against it.

whenever an agent is using her discretionary power to pursue some kind of self-interest, she is taxed of "opportunism", one of the most frequent words in the agency literature. Gomez-Meija and Wiseman, reserve a special section of their paper to opportunism, its scope and its determinants. They reinforce (unwillingly) the negative connotation of the concept by discussing the issue of bribes and the variability of moral behavior within each society, and finally they seem to excuse the opportunists because they are the dominant species over the planet, which is not a surprise for the students of positive economics, the "doom science".

The fact that the word itself relishes of some tint of temptation for shirking whenever one is not under the eyes of the boss, suggests that the agency issue concerns mainly organizations where some coercion is necessary for imposing people an effort whose fruits they will not directly harvest. Organizations of this type follow Mac Gregor's "model X" of man (1960). By contrast, agency theory should be rejected whenever people are clearly aware of the value of their contribution and receive an equitable reward for it. This is the case when the common organizational goal is internalized by the whole staff. A stewardship atmosphere then prevails. But it is also the case, when the relationship *is not* hierarchical and when systems of preferences underlying the decisions are independent and not submitted to some pre-order. This is the case of what Williamson called "market" relationships. In market relationships, each agent is presumed to follow his/her own interest, not being tied up by a commitment to align her interest on that of another person. Two actors involved in an exchange are symmetrical in their freedom to keep on or discontinue the trade (which does not means that they have equal power to impose the terms of the trade!). We never think of aligning our interest on that of a bond trader when she is trying to sell us a CDO and reciprocally. Market processes do not place the utility of one trader above that of the other party as in delegation. Of course informational asymmetry can happen, with its classical forms of moral hazard (isomorphic to agency as recalled above) and adverse selection, but the solutions to treat them emerge from the dynamic of the markets, not from mechanisms designed within hierarchical organizations. Outsourcing a task to a service provider for instance may indeed create the risk he sabotages it, but the competition among providers will throw him soon out of the market. Markets generate a wide variety of signaling devices, commercial conventions, or reputation quests that tend to thwart moral hazard and adverse selection, because the fruits of cooperation in very large markets are not perceived as clearly by the participants as in small teams. By contrast, internal delegation is much more coded and competition much lessened within hierarchical organizations, because these are established by definition on the ideal of

mutual cooperation. So, in hierarchical institutions agency theory acquires a greater appeal than in markets institutions, and contracts are necessarily quite different. These differences have been explored in the early 90s, staying within the Neoclassical Contracting Paradigm.

Having mentioned this fundamental distinction between the two Williamson's institutional frameworks, the question is to decide whether the relationship between CEOs and Boards falls on the side of markets or on that of hierarchies. We contend the CEO compensation has to be studied as a phenomenon resulting from market forces and not from the needs of optimal delegation and incentives. The case is similar to the huge compensations of top soccer players. The literature on the economics of soccer neither envisage the players as receiving delegation from club owner, nor envisage their salary (most often fixed) as an incentive scheme to align their interest on his. Agency theory would be totally impotent to explain the content and the size of soccer contracts[7]. Self-interest of both sides and market forces only explains the compensations granted, and when a soccer player forgets to think according to his own interest his agent, who knows the brevity of the careers, swiftly brings him back on the right track. Outstanding players allow their club winning finals and championships and they ask the price for their outstanding talent. Observe there is no asymmetry of information, for their action is visible every day by their club owner, and regularly by billions of people. Whenever they "shirk", thousands of TV replays and medias all over the world will report it soon. They simply use their monopolistic power (*à la* Chamberlain) in a market relationship for extracting a high rent for their well-known talent and when they disagree or when they are not pleased with the contract they swiftly find another club. Agency theory has no power to explain their compensation. The "winner takes all society" (Frank and Cook, 1996) rather is at work and it is probably the same type of evolution, to a lesser extent, that has boosted the CEOs' compensations with the sheer effect of size of the corporations which reduces the number of candidates and increases their monopoly power on their own talent, (Gabaix and Landier (2007) and more recently in Gabaix *et al*. (2014).

So, adverse selection and moral hazard within the organization have to be excluded of the key factors explaining the relationships between the Board and the CEO. The risk of adverse selection may be present when recruiting an engineer, a researcher or a middle manager; it is

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[7] If they were designed for incentive purposes, the top players' compensation should be much more sensitive to the results, to follow Jensen and Murphy's argument. Moreover, the range of salaries itself within the same team would vary a great deal along the year reflecting victories and defeats.

certainly not a dominant issue for selecting CEOs, because precise information is available about the records and the past experience of the candidates. Moral hazard may be looming around when recruiting an unknown salesman whose efforts have to be directed to increase the sales. Then, an incentive contract submitting her compensation to her performance is the standard solution. Is moral hazard important when a CEO takes over the power in a blue chip company and conducts a policy that is day after day, under the scrutiny of financial analysts and the media? Can she deviate by opportunism, from the expected policy in the initial contract without incurring the risk to be fired *ad nutum* or to demolish her reputation? We do not think so and, in short, we completely disagree with Abowd and Kaplan (1999, p.7) claiming that "*Agency theory remains the only viable candidate for the answer to the question of how well does executive compensation work*".

If the CEO-Board relationship is not a story of delegation, it should be looked at as a mere market relationship. In competitive markets, each player is an atom playing against the huge crowd of competitors and her power is just determined by her initial endowment, including experience, talent etc. If there is a large imbalance in the initial endowments and some players own much more than the crowd, they can acquire a quasi-monopoly power, which means naming their conditions as take-it or leave-it. This is why studying the CEOs' sources of power is a major agenda for understanding their compensation. For explaining the large CEO compensations Bebchuk and Fried invoke the power exerted on the directors: the imbalance stems from the directors being weakened by their own self-interest through the links they have with the CEO and which affect their own financial performance and they conclude that CEOs therefore gain a greater power on the elements of their compensation (salaries, pensions, stock options etc.). Let us add that the imbalance holds also to the fact that the Board members are many, offering to the CEO a set of strategic combinations to obtain their acquiescence: Sometimes, voting theory and cooperative games would be helpful to explain some compensations. Bebchuk and Fried note also that the directors are often recruited by the CEO herself (as we mentioned earlier, this can be analyzed as a case of inversion of the agency relationship, with the CEO becoming principal). Challenged by Jensen and Murphy's criticism saying that the pay of CEOs has increased during a period of reduction of their power, they invoke other explanations that they claim not incompatible with managerial power. They also note the same authors had set in evidence the low level of CEO pay if it were to be in line with performance for the shareholders, and they therefore reject "optimal contracting theory" that they assimilate, wrongly to our eyes, to agency theory. This is rather

curious in particular in the following sentence: "*Finally market forces are not sufficient and fine-tuned to assure optimal contracting outcomes. Markets….impose some constraints on what directors will agree and what managers ask them to approve. An analysis of these markets, however, indicates the constraint they impose are far from tight and permit substantial deviation from optimal contracting"* (Bebchuk *et al*., 2002*)*. In some sort, "optimal contracting" should be rejected whenever it implicitly assumes that CEO markets are *perfectively competitive* and that Conly in purely competitive markets? The theory of monopoly and oligopoly are old enough not to be ignored and game theory allows embedding in the same framework bargaining processes arising in a wide variety of market situations and power of the player, be it by their initial endowments (talent, experience, reputation…) or by their small number. The oil market is not very competitive on the side of the suppliers and truly the power of the cartels has declined on average in the last decade, but this has not prevented some Gulf States to become immensely rich by their market position in a world of increasing demand for energy. Of course, we do not pay oil at its marginal cost and second best solutions only are feasible, like in most "optimal contracts" studied in the literature

10. Another game: are the directors playing with or against the shareholders?

An analysis of the factors qualifying governance mechanisms and the functioning of the Boards has been provided by numerous authors, in a debate initiated by Jensen (1993). The structural variables of the Board have been studied in different pieces of literature: Board size (Maati, 1999; Singh and Davidson, 2003), number of specialized committees (Klein, 1998), shareholders structure (McConnel and Servaes, 1990); Gomez-Meija *et al*., 2003), independent directors and their selection mode (Fama, 1980; Fama and Jensen, 1983; Mishra and Nielsen, 2000; Zajac, 1990), directors' participation in other Boards (Geletkanycz and al., 2001), separation of executive and surveillance functions (Daily and Johnson,1997; Hambrick and Finkelstein,1987; Westphal and Zajac, 1995), effect of asymmetry of information on independent directors performance control (Krishnaswami and Subramaniam, 1999), see also Tirole (2006, chap 1) for a survey. A comprehensive and very rich discussion of the Board's role and Board-shareholders relationship is found in Williamson (2007). Our purpose here was focused on Board-CEO relationship and we shall not enter this discussion. Of course there exist several types of Board and in practice they do not do what they are ideally supposed to do, as deplored by Jensen (1993) and it is hard to conclude from this literature that the Board necessarily stands for the shareholders' interests. Actually, another game is

played between them and the Board members, also to be analyzed as a game of power rather than a game of delegation with incentives. The US battle in spring 2015 which opposed the activist shareholders to some giant funds like Fidelity or Vanguard, is an illustration of this game: the big funds aspire to the stability of the large company management and, as said before, just expect them to conduct a proper management or to speak short, to maintain the "stock beta" because it is the only relevant parameter for managing the small slice of their portfolio returns that the company represents. They are reluctant to see minority shareholders, who are not necessarily diversifiers, entering the boardrooms and therefore they do not leave their proxies in their hands transferring them rather to the established boards. It should be mentioned also the possible collusion of Boards and CEOs. This should be however the topics of another discussion.

Conclusion

The Neoclassical Contracting Paradigm invoked in this paper is the mere continuation of the standard program of microeconomic theory exploring the consequences of freedom of action within a world of pursuit of self-interest in economic relationships. Until the early sixties, from Smith to Debreu, Arrow and Hahn, and many others, without forgetting the Hayekian stream, the literature had produced models setting in evidence the properties of free transactions driven by self-interest and the value of market systems, sometimes to celebrate their achievements and sometimes just to state the general conditions under which the nice features (efficiency of the allocation) do occur, or to point out when they are bound to fail. Akerlof (1970) kicked the anthill by showing how a market system, under asymmetry of information about the quality of the good exchanged, can end up in inefficient equilibrium with the worst quality of product, a sort of Gresham's law applied to quality. The consideration of asymmetry of information and its consequences, moral hazard and adverse selection, has allowed micro-economic theory making a big step in the last forty years, and has shown why efficiency is never guaranteed when actors are pursuing their self-interest, except may be in in a pure Arrow-Debreu world.

We have contended here is that, in spite of its formal elegance, asymmetry of information models are not essential and even counter-productive for explaining CEO compensation. We have rather put forward that a standard neoclassical approach combined with game theoretic concepts (like the old Nash Bargaining model and its variants) is enough to provide a rational for it. Rather the key feature is the relative freedom of action of the Board and the CEO in the

conduct of the bargain leading to the contract[8]. So, Bebchuk and Fried are quite right to call for attention on "power" rather than resorting to the classical agency framework so often put forward in the literature. However, exerting power over individuals provided with free-judgement and latitude of action is a serious game and the convenient way to express is resorting to game theory. We have just shown that some standard arguments drawn from a neoclassical-game theoretic approach can serve for explaining how CEO compensation reflects the price of rarity of talents for this type of jobs. We of course do not ignore that this quite complex issue requires more research from different perspectives, sharing the conclusion of Edmans and Gabaix (2009, p 494): "*… not to claim that compensation is definitely efficient, but to highlight the two-sided nature of the issue and the need for further research to draw clearer conclusions. As with all interesting debates, we expect this one will continue for some time.*"

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[8] We need more cases studies of the formation of the compensation contract, although the secret of this type of bargaining is a limit to this approach.

APPENDIX : inverse principal-agent relationship

The players are the Board (they) and the CEO (she). The first number in each cell is the Board's utility and the second the CEO's and are not transferable. They can always be rationalized by manipulating rewards, cost of action, gain or loss in reputation, perks, and probabilities of the states of nature, not necessarily identical for each player. Nevertheless, we assume that figure I is *common knowledge*, which means that there is no *ex-ante* asymmetry of information about the description and the parameters of the game.

This game can be played in many ways. If each party declares an *ex-ante* non-binding commitment, cell [1,1] is the only (pure strategy) Nash equilibrium, though not Pareto optimal. This solution is the celebrated prisoner's dilemma.

	CEO plays strategy A	CEO plays strategy B
Board pays low	12 \ 5	15 \ 4
Board pays high	10 \ 9	17 \ 7

Figure I: Game in normal game with non-transferable utilities

Consider two ways to play the game, *à la Stackelberg*: in the first one the Board acting as principal plays first and the CEO follows at her guise. This corresponds to the common "agency" situation wherein the Board proposes an "incentive" contract and the CEO's action is adjusted to it. In this case the Board will pay low, since they anticipate that the CEO will implement A, whatever they pay (the solution coincides here with the Nash equilibrium) and individual rationality prevents reaching the Pareto-optimal cell [2,2]. This cell could be implemented only via a cooperative agreement, i.e. by collective rationality. The "incentive constraint" generates a non-optimal output.

Suppose now the inverse scenario: the CEO, now principal, commits herself on strategic program and makes. The Board proposes the pay after learning the CEO's program. Now the CEO is herself facing an incentive constraint because she seeks to "incentivize" the Board to

pay in the direction of her own interest. In this second Stackelberg game, the parties reach a Pareto-optimal contract [2,2] which dominates the previous one.

Since the parties are aware of the Nash inferior output of the sequence "Board first-CEO second", they will try to escape it and look for other types of mutually profitable arrangements. They will bargain and each could use the inferior Nash outcome as a threat if no agreement is reached. One could for instance imagine that potential CEOs have read Richard Thaler and endeavor to speak first for placing "nudges" to induce the Board to pay them well!

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