Application of the Forgotten Effects Model to the Agency Theory

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Abstract During the financial crisis, interest problems between shareholders (principal) and managers (agent) have raised due to the evidence of the dishonest behaviour of the Chief Executive Officer (CEO). Based on the agency theory, we use the model of forgotten effects in order to identify different solutions for each kind of agency problems. The aim of this study is to reduce agency problems and facilitate the companies' success, providing useful information to improve the decision-making process in management.

Keywords Forgotten effects model · Agency theory · Shareholders · Fuzzy sets · Management

1 Introduction

Principal-agent relationship may be described by any situation in which one or more people transfer authority to others to make decisions. The agency problem is one aspect of this relationship (Jensen and Meckling 1976). In that sense, agency problems exist when (1) the objectives of principal (who transfer authority) and agent (who is in charge of making decisions) are different and (2) asymmetric information exists and makes it difficult for the principal to monitor the agent's actions. Even though this problem can be found in many situations, we are focusing our analysis on the owner-manager relationship (Mitnick 2006; Jensen 1986; Fama and Jensen 1983).

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Agency theory affirms that when the ownership and control are separated and the structure of the firm is not defined in order to safeguard the interests of shareholders, the managers will not act to maximise the benefits of the shareholders and the value of the firm will decline (Boland et al. 2008; Donaldson and Davis 1991; Jensen and Meckling 1976).

It is important to describe the scenario and the characteristics of the participants. In that sense, one of the agent's characteristic is defined by "opportunistic behaviour". The main causes are the asymmetric information, divergence of interests and the attitude towards risk. Opportunism implies to act in favour of your own individual objective and maximise the own personal economic gain, even if it means to divert from shareholders' interests. The second characteristic that must be explained is the aversion to work which implies to invest less effort in tasks which are not important enough for the agent. Thus, the design of efficient incentives will improve performance and will reduce this problem. On the other hand, the characteristics of the principal include being a risk seeker and the desire of maximising the corporation's benefits. Therefore, the main elements in principal-agent relationship are the actors (principal and agent), but also the contract which acts as a mechanism to control and unify the relationship in order to minimise the different interests and potential disagreements (Alvarez 2008).

Not only does the separation of ownership and management suggest different interests, but also different information available for each part. This is what is called asymmetric information and it involves less information for the principal who is not able to know the effort and the decisions made by the agent, neither the factors that are affecting the daily activity of the company. This asymmetric environment benefits the agent who can focus the work on his own interest, and it does lead to reduce profits for the principal (Salas 2002). Information asymmetry deals with two main problems: adverse selection and moral hazard. The former is about immoral behaviour before signing the contract so that the principal does not know if the agent is good enough and the principal finds it difficult to forecast if the agent will do his best. The latter is about immoral behaviour after signing the contract so that the agent makes decisions only taking into consideration his own interests.

These divergence of interests lead to three types of agency costs: monitoring costs, bonding costs and residual losses. Monitoring costs include all actions taken in order to control and monitor the agent (stock options or the board of directors). Instead, bonding costs are incurred by the agent due to contractual obligations that restrict the own agent's activity. Finally, residual losses are those costs incurred due to the divergence of interests (Wang 2010).

The empirical literature focuses on some relationships between agency costs and mechanisms to solve the agency problem using statistical approaches, but few studies have used logic fuzzy. The aim of this article is to take advantage of the model for the detection of forgotten effects so that we may know the relationship between some agency problems and the mechanisms to solve them in order to reduce agency costs. The paper provides useful information to improve the decision-making process in firms where the ownership and management are separated.

2 The Recuperation of Forgotten Effects in the Resolution of the Agency Problem

The forgotten effects theory is broadly detailed by Kaufmann and Gil Aluja (1898). This methodology will let us identify forgotten effects of first and second generation.

This study pretends to be an application of the use of the forgotten effects model to solve some problems of the agency theory. The forgotten effects methodology will allow us to obtain useful and innovative information for the owner (principal) to reduce agency costs caused by the divergence of interests between agent and principal. According to Lozano et al. (2004), we will enumerate some solutions of the agency theory (set of causes) to solve the different sources of manager-owner conflict (set of effects).

2.1 The Main Agency Problems (Effects)

The objective of this section is to describe some sources of the agency problem that will be used as effects in the following analysis.

b1. Shirking: This problem is based on the asymmetric information and the agents' opportunistic behaviour. Shirking is about not putting the best effort to help to increase shareholders' benefits. Managers may spend time in activities which they enjoy more and it creates opportunity costs, costly for the principal and difficult to detect. This is a moral hazard problem caused by the lack of control by owners (Mascareñas 2007).

b2. Free cash flow (FCF): Free cash flow is cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital (Jensen 1986). Earnings retained in disposition of the manager. Free cash flow can be seen as financial resources at the executive's discretion to allocate and can be a result of waste of the corporate resources (Wang 2010).

b3. Managerial myopia: The time horizon can be another principal-agent conflict. In that case, owners' aim is to maximise profits in a long term. However, managers' decisions are more related to the short term. Thus, the executives would prefer projects at a low cost and benefits that can be gain in a short term as to enhance their reputation quickly. Then, managers tend to invest in projects with negative net present value (NPV) but with cash flows in a short term, instead of investing in profitable long-term projects (Álvarez 1999).

b4. Attitude towards risk: Principal and agent have different attitudes towards risk so that the two parts may prefer different strategies due to the different risk preferences. The manager assumes a higher risk than the principal because all decisions he makes are affecting his job. Managers may prefer less risky investments and lower leverage in order to reduce the probability of bankruptcy

(Salas 2004). Instead, shareholders are supposed to assume risky projects because they can diversify their portfolio.

b5. Job security: The security job may also be an agency problem. If the manager acts in an inefficient manner, his job is at risk. However, the agent knows that any change in management is quite expensive, so that the manager attempts to know the threshold, letting him manage the job with some tranquillity. Despite that fact, the most common behaviour in management is known as herd behaviour, which means that managers tend to make similar decisions to their competitors. Moreover, the job security also leads to maximise the size of the firm in order to reduce the likelihood of being taken over. Lastly, managers also search for diversification at the expense of the shareholders (who can diversify their individual portfolios more easily).

b6. Self-interests: The separation of ownership and control gives CEO an opportunity to work in his own self-interest. The manager may take advantage of perks such as use of the company jet, expense accounts or company cars. It represents a real cost to shareholders (Salas 2004).

2.2 Mechanisms to Solve the Agency Problems (Causes)

The goal of this section is to identify and describe the mechanisms to deal with the agency theory problems (Cuervo 1999; Jensen 1994). These are going to be the causes of the model.

a1. The board of directors: The board of directors is the most powerful mechanism inside the corporations. The board carries out the direction, administration and control. It also monitors opportunistic behaviours to improve the efficiency of the company. Moreover, the board guarantees shareholders' interest and makes the last decision to CEO's strategies. Therefore, it has an important paper in terms of control, supervision and evaluation in order to protect shareholders' interests. The efficiency depends on the size and composition of the board. First, the size is negatively related to the value of the firm. Second, the major proportion of external members on the board will lead to better results for the company (Fama and Jensen 1983; Baysinger and Hoskisson 1990).

a2. Dividend taxation: Dividend retention is one of the problems of the agency theory we have seen with the free cash flow. A decision to retain earnings instead of paying dividends would encourage executives to not maximize the shareholders' value. Thus, dividend taxation is a valuable tool to reduce managers' discretion. Also, it is a signal for the capital market which acts as a monitor. In short, large dividend taxation should influence negatively to agency costs (López and Saona 2007).

a3. The debt: The debt helps to mitigate agency problems. An increase in debt also increases the risk of bankruptcy; therefore it limits the executives' consumptions. Besides, debt forces the managers to pay cash out, reducing the free cash flow managers can waste. It also increases the control of the capital markets.

Therefore, there is a negative relationship between agency costs and the level of debt (López and Saona 2007).

a4. Executive compensation: To solve the agency problems shareholders also may use executive compensation. These incentives for managers can reward them financially for maximizing shareholders' interests. For instance, plans in which managers obtain shares, thus aligning financial interests with shareholders. Also, incentives related to future maximization of the firm in order to omit short-term executive actions.

a5. Stock options: Related to executive compensation, it is important that the executive owns part of the corporation in order to align interests with shareholders. However, it is important to take into account that if the managers' ownership increases too much, it can produce the executive retrenchment: the positive influence it may create at first might be cancelled as the participation of the executive in the ownership increases. However, once this threshold is achieved, exists again a convergence effect between interests (López and Saona 2007).

a6. Ownership concentration: The concentration of the ownership is also an important aspect in order to reduce agency costs. A larger concentration of shareholders might result in greater monitoring of CEO. It suggests a stronger monitoring power from investors over the managerial decisions because the incentives are greater. Instead, a low level of ownership concentration (diffuse ownership) might lead to an increase of the managers' power. However, if the concentration is too high it can produce a negative impact to the minority shareholders. Then, a new conflict will arise between large shareholders and minority shareholders. Also the composition of the ownership may be important. For instance, financial intermediaries are able to reduce agency problems because it creates an important relationship between the corporation and the financial providers.

a7. Goods and services market and the executive job market: Finally, the goods and services market is a competitive market and the CEO has to increase the efficiency of the company in order to guarantee the survival of the corporation (Alvarez 2008). In that sense, the goods and services market acts as a mechanisms to monitor the executives and penalize all members of the firm. Then, the competitiveness of the executive job market leads the manager to act properly because their strategies might be compared to the others. This market also influences positively to the agency problem and increases the value of the firm (Cuervo 1999).

2.3 Process Work Out for the Detection of Possible Forgotten Effects

To make this study possible we relied on four experts from the agency theory: one academic professor, one executive, one executive-owner and one owner. This number may result too little to pretend a result that could serve as a sufficient base

to obtain valuations completely certain but it will serve to show the application of forgotten effects methodology in the field of agency theory. We asked each of the four experts, independent between them, to fill three matrixes of qualitative effects on incidence, one of cause-effect, another of cause-cause and finally one of effect-effect, giving them the freedom of expressing their valuations on each incidence from the confidence intervals comprised in the segment [0,1]. The question that each expert had to consider was: to what extent each solution of the principal-agent conflict (causes) has an impact to the sources of the agency problem (effects)? Also the semantic correspondence for the chosen values was given to them:

0:	no incidence	0.6:	significant effect
0.1:	virtually no effect	0.7:	very significant effect
0.2:	almost no effect	0.8:	strong effect
0.3:	very low effect	0.9:	very strong effect
0.4:	low effect	1:	the highest effect
0.5:	medium effect		

We present below the matrixes of the direct qualitative cause-effect incidences:

$\widehat{M}^{(1)}$

	$\mathbf{b_1}$	$\mathbf{b_2}$	$\mathbf{b_3}$	$\mathbf{b_4}$	$\mathbf{b_5}$	$\mathbf{b_6}$
$\mathbf{a_1}$	[0.1,0.3]	[0.8,0.9]	[0.8,0.9]	[0.8,0.9]	[0.8,0.9]	[0.8,0.9]
$\mathbf{a_2}$	[0.3,0.5]	[0.8,0.9]	[0.2,0.3]	[0.7,0.8]	[0.5,0.6]	[0.3,0.4]
$\mathbf{a_3}$	0.8	[0.7,0.8]	[0.5,0.6]	[0.7,0.8]	[0.5,0.6]	[0.3,0.4]
$\mathbf{a_4}$	0.9	[0.1,0.3]	0.8	[0.2,0.3]	[0.7,0.8]	[0.7,0.8]
$\mathbf{a_5}$	0.8	0.4	0.8	[0.5,0.6]	[0.7,0.8]	[0.7,0.8]
$\mathbf{a_6}$	0.7	[0.6,0.7]	[0.3,0.4]	[0.6,0.7]	[0.4,0.5]	[0.3,0.4]
$\mathbf{a_7}$	0.5	0.4	[0.5,0.6]	0.5	[0.2,0.3]	[0.1,0.2]

$\widehat{M}^{(2)}$

	$\mathbf{b_1}$	$\mathbf{b_2}$	$\mathbf{b_3}$	$\mathbf{b_4}$	$\mathbf{b_5}$	$\mathbf{b_6}$
$\mathbf{a_1}$	[0.6,0.8]	0.8	0.7	[0.6,0.7]	0.8	0.8
$\mathbf{a_2}$	0.4	0.8	0.4	0.6	0.4	0.8
$\mathbf{a_3}$	0.1	0.1	0.1	0.5	0.2	0.8
$\mathbf{a_4}$	[0.8,0.9]	[0.6,0.7]	0.8	0.8	0.6	[0.5,0.6]
$\mathbf{a_5}$	0.7	0.4	0.7	0.3	0.7	0.5
$\mathbf{a_6}$	[0.6,0.8]	0.2	0.6	0.2	0.5	0.7
$\mathbf{a_7}$	[0.8,0.9]	0.1	0.4	0.3	0.8	0.6

$\widehat{M}^{(3)}$

	$\mathbf{b_1}$	$\mathbf{b_2}$	$\mathbf{b_3}$	$\mathbf{b_4}$	$\mathbf{b_5}$	$\mathbf{b_6}$
$\mathbf{a_1}$	0.5	0.6	0.6	0.7	0.6	0.4
$\mathbf{a_2}$	0.7	0.9	0.6	0.8	0.7	0.6
$\mathbf{a_3}$	0.8	0.9	0.8	0.7	0.8	0.7
$\mathbf{a_4}$	0.9	0.6	0.8	0.5	0.7	0.6
$\mathbf{a_5}$	0.9	0.7	0.7	0.4	0.8	0.5
$\mathbf{a_6}$	0.8	0.6	0.6	0.8	0.5	0.5
$\mathbf{a_7}$	0.6	0.5	0.4	0.3	0.6	0.3

$\widehat{M}^{(4)}$

	$\mathbf{b_1}$	$\mathbf{b_2}$	$\mathbf{b_3}$	$\mathbf{b_4}$	$\mathbf{b_5}$	$\mathbf{b_6}$
$\mathbf{a_1}$	0.4	0.5	0.6	0.7	0.5	0.7
$\mathbf{a_2}$	0.1	0.7	0.1	0.1	0.1	0.1
$\mathbf{a_3}$	0.1	0.1	0.3	0.7	0.2	0
$\mathbf{a_4}$	0.8	0	0.7	0.7	0.3	0.8
$\mathbf{a_5}$	0.6	0.8	0.7	0.5	0.3	0.3
$\mathbf{a_6}$	0.8	0.8	0.8	0.8	0.4	0.8
$\mathbf{a_7}$	0.1	0.1	0.1	0.1	0.3	0.5

Next, we present the matrixes of direct qualitative cause-cause incidences resulting from each one of the four experts:

$\widehat{A}^{(1)}$

	$\mathbf{a_1}$	$\mathbf{a_2}$	$\mathbf{a_3}$	$\mathbf{a_4}$	$\mathbf{a_5}$	$\mathbf{a_6}$	$\mathbf{a_7}$
$\mathbf{a_1}$	1	0.9	[0.7,0.8]	[0.8,0.9]	0.8	0.9	[0.5,0.6]
$\mathbf{a_2}$	0.9	1	[0.4,0.5]	[0.8,0.9]	[0.8,0.9]	[0.8,0.9]	[0.2,0.3]
$\mathbf{a_3}$	[0.7,0.8]	[0.7,0.8]	1	[0.5,0.6]	[0.5,0.6]	[0.4,0.5]	[0.7,0.8]
$\mathbf{a_4}$	[0.8,0.9]		[0.2,0.3]	1	[0.6,0.7]	[0.4,0.5]	[0.2,0.3]
$\mathbf{a_5}$	[0.8,0.9]	[0.5,0.6]	[0.3,0.4]	[0.8,0.9]	1	[0.8,0.9]	[0.4,0.5]
$\mathbf{a_6}$	[0.8,0.9]	[0.7,0.8]	[0.4,0.5]	[0.7,0.8]	[0.8,0.9]	1	[0.2,0.3]
$\mathbf{a_7}$	[0.5,0.6]	[0.4,0.5]	[0.6,0.7]	[0.2,0.3]	[0.4,0.5]	[0.2,0.3]	1

$\widehat{A}^{(2)}$

	$\mathbf{a_1}$	$\mathbf{a_2}$	$\mathbf{a_3}$	$\mathbf{a_4}$	$\mathbf{a_5}$	$\mathbf{a_6}$	$\mathbf{a_7}$
$\mathbf{a_1}$	1	[0.9,1]	0.9	[0.7,0.9]	0.8	1	[0.6,0.7]
$\mathbf{a_2}$	1	1	0.9	0.8	0.5	1	0.5
$\mathbf{a_3}$	[0.8,0.9]	[0.9,1]	1	[0.5,0.6]	0.3	[0.7,0.9]	0.5
$\mathbf{a_4}$	[0.8,0.9]	0.8	[0.7,0.8]	1	0.3	[0.6,0.7]	[0.8,0.9]
$\mathbf{a_5}$	1	[0.5,0.6]	0.5	[0.9,1]	1	[0.9,1]	[0.8,0.9]
$\mathbf{a_6}$	1	1	0.9	[0.5,0.6]	0.3	1	0.3
$\mathbf{a_7}$	0.2	0.4	0.2	[0.8,0.9]	0.8	[0.5,0.6]	1

$\widehat{A}^{(3)}$

	$\mathbf{a_1}$	$\mathbf{a_2}$	$\mathbf{a_3}$	$\mathbf{a_4}$	$\mathbf{a_5}$	$\mathbf{a_6}$	$\mathbf{a_7}$
$\mathbf{a_1}$	1	0.9	0.8	0.9	0.9	0.8	0.5
$\mathbf{a_2}$	0.9	1	0.9	0.8	0.8	0.8	0.7
$\mathbf{a_3}$	0.8	0.9	1	0.8	0.2	0.7	0.3
$\mathbf{a_4}$	0.9	0.8	0.8	1	0.9	0.3	0.7
$\mathbf{a_5}$	0.9	0.8	0.2	0.9	1	0.1	0.6
$\mathbf{a_6}$	0.8	0.8	0.7	0.3	0.1	1	0.3
$\mathbf{a_7}$	0.5	0.7	0.3	0.7	0.6	0.3	1

$\widehat{A}^{(4)}$

	$\mathbf{a_1}$	$\mathbf{a_2}$	$\mathbf{a_3}$	$\mathbf{a_4}$	$\mathbf{a_5}$	$\mathbf{a_6}$	$\mathbf{a_7}$
$\mathbf{a_1}$	1	0.8	0.8	0.8	0	0	0
$\mathbf{a_2}$	0	1	0.9	0	0	0	0
$\mathbf{a_3}$	0	0.8	1	0.7	0	0	0
$\mathbf{a_4}$	0	0.2	0.2	1	0.1	0	0
$\mathbf{a_5}$	0.8	0.9	0.5	0.6	1	0	0
$\mathbf{a_6}$	1	1	1	1	0.2	1	0
$\mathbf{a_7}$	0	0	0	0	0	0	1

Finally, we show the matrixes of direct qualitative effect-effect resulting from each one of the four experts:

$\widehat{B}^{(1)}$

	$\mathbf{b_1}$	$\mathbf{b_2}$	$\mathbf{b_3}$	$\mathbf{b_4}$	$\mathbf{b_5}$	$\mathbf{b_6}$
$\mathbf{b_1}$	1	[0.2,0.3]	[0.7,0.8]	[0.4,0.5]	[0.2,0.3]	[0.4,0.5]
$\mathbf{b_2}$	[0.3,0.4]	1	[0.8,0.9]	[0.7,0.8]	[0.7,0.8]	[0.7,0.8]
$\mathbf{b_3}$	[0.5,0.6]	[0.7,0.8]	1	[0.6,0.7]	[0.8,0.9]	[0.7,0.8]
$\mathbf{b_4}$	[0.2,0.3]	[0.7,0.8]	[0.8,0.9]	1	[0.8,0.9]	[0.7,0.8]
$\mathbf{b_5}$	[0.2,0.3]	[0.8,0.9]	[0.8,0.9]	[0.8,0.9]	1	[0.7,0.8]
$\mathbf{b_6}$	[0.4,0.5]	[0.3,0.4]	[0.7,0.8]	[0.5,0.6]	[0.8,0.9]	1

$\widehat{B}^{(2)}$

	$\mathbf{b_1}$	$\mathbf{b_2}$	$\mathbf{b_3}$	$\mathbf{b_4}$	$\mathbf{b_5}$	$\mathbf{b_6}$
$\mathbf{b_1}$	1	0.1	0.8	0.8	0.8	0.8
$\mathbf{b_2}$	0.3	1	[0.4,0.5]	[0.7,0.8]	0.5	0.6
$\mathbf{b_3}$	0.8	0.5	1	[0.7,0.8]	[0.7,0.8]	0.6
$\mathbf{b_4}$	[0.7,0.8]	[0.8,0.9]	0.5	1	0.6	0.5
$\mathbf{b_5}$	0.8	0.5	0.5	[0.6,0.7]	1	0.7
$\mathbf{b_6}$	0.9	[0.7,0.8]	0.6	[0.7,0.8]	[0.7,0.8]	1

$\overset{\frown}{B}^{(3)}$							$\overset{\frown}{B}^{(4)}$						
	$\mathbf{b_1}$	$\mathbf{b_2}$	$\mathbf{b_3}$	$\mathbf{b_4}$	$\mathbf{b_5}$	$\mathbf{b_6}$		$\mathbf{b_1}$	$\mathbf{b_2}$	$\mathbf{b_3}$	$\mathbf{b_4}$	$\mathbf{b_5}$	$\mathbf{b_6}$
$\mathbf{b_1}$	1	0.9	0.9	0.9	0.5	0.6	$\mathbf{b_1}$	1	0.1	0.1	0.6	0	0
$\mathbf{b_2}$	0.9	1	0.8	0.7	0.8	0.4	$\mathbf{b_2}$	0	1	0.5	0.7	0.5	0
$\mathbf{b_3}$	0.9	0.8	1	0.9	0.7	0.8	$\mathbf{b_3}$	0.3	0.7	1	0.8	0.7	0
$\mathbf{b_4}$	0.9	0.7	0.9	1	0.9	0.9	$\mathbf{b_4}$	0	0.8	0.9	1	0	0
$\mathbf{b_5}$	0.5	0.8	0.7	0.9	1	0.8	$\mathbf{b_5}$	0	0	0	0	1	0
$\mathbf{b_6}$	0.6	0.4	0.8	0.9	0.8	1	$\mathbf{b_6}$	0	0.8	0.8	0.8	0.8	1

From $\underset{\frown j}{M}$, $\underset{\frown j}{A}$ and $\underset{\frown j}{B}$, we can build three frequency tables for each one where it will be gathered, for each relation of incidence, the number of times the experts have assigned the same valuation as for the inferior extreme as well as for the superior extreme. Then, it could be considered that these statistical tables are the compilation of the four experts' opinions in each incidence relationship. It will be operated through the averages obtained from the statistical tables multiplying them by its correspondent level of confidence. Once calculated we will be able to build up three new matrixes $M(\underset{\cdot}{\widehat{M}})$, $M(\underset{\cdot}{\widehat{A}})$, $M(\underset{\cdot}{\widehat{B}})$ which will constitute the aggregate opinion of all four experts and, consequently, we will be able to operate as if it were an only expert.

We make the maximin convolution to obtain the matrix $M(\underset{\cdot}{\widehat{M}}^*)$ that gathers the accumulated effects from first and second generation. It is necessary to compare it with the matrix of direct cause-effect incidence which will give us the possibility of revealing the forgotten effects. First, we must reduce the confidence intervals to ordinal numbers. This restriction is necessary since not always exists a strict order between two or more confidence intervals due to that the usual order relationship between confidence intervals is not a relationship of total order.

To make this comparison we will need to obtain the median value of each interval from matrixes $M(\underset{\cdot}{\widehat{M}})$ and $M(\underset{\cdot}{\widehat{M}}^*)$. Thus,

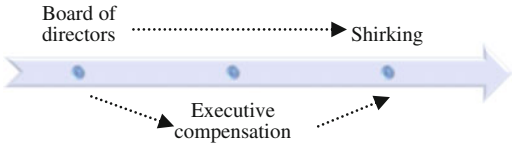
$\overline{M}(\underset{\cdot}{\widehat{M}}^*) - \overline{M}(\underset{\cdot}{\widehat{M}})$						
	$\mathbf{b_1}$	$\mathbf{b_2}$	$\mathbf{b_3}$	$\mathbf{b_4}$	$\mathbf{b_5}$	$\mathbf{b_6}$
$\mathbf{a_1}$	0.**4**	0.1	0.1	0.2	0	0
$\mathbf{a_2}$	0.3	0	0.**4**	0.1	0.3	0.2
$\mathbf{a_3}$	0.2	0.3	0.3	0	0.2	0.1
$\mathbf{a_4}$	0	0.3	0	0.2	0.1	0
$\mathbf{a_5}$	0.1	0.1	0.1	0.**4**	0.1	0.2
$\mathbf{a_6}$	0	0.2	0.1	0.1	0.2	0.1
$\mathbf{a_7}$	0	0.2	0.1	0.2	0	0.1

The last table only shows forgotten effects. Even though the current study does not seem to have very high level of forgotten effects, we must highlight the following ones (shown in bold):

$a_1 \rightarrow b_1$: Incidence of the board of directors on shirking
$a_2 \rightarrow b_3$: Incidence of the dividend taxation on managerial myopia
$a_5 \rightarrow b_4$: Incidence of the stock options on the attitude towards risk

Previously to the analysis of the results, we will explain the methodology in one example in order to analyse the next cases.

For example, in the first case ($a_1 \rightarrow b_1$) exists a forgotten effect of degree of 0.4 in the incidence of the board of directors on the shirking. In a previous analysis, this relationship cannot be seen but the model allows us to describe this relationship through intermediary elements. Thus, the aim is to find intermediary elements that have provoked this forgotten relationship, searching the minimum between each element of the row 1 of the matrix $\overline{M}(\underset{\frown}{A})$, and the minimum of each column of the matrix $\overline{M}(\underset{\frown}{M})$. Then, the maximum of these minimums is chosen. Once the maximum values are taken, we proceed the maxmin composition again, but now with the column b_1 of the $\overline{M}(\underset{\frown}{B})$.

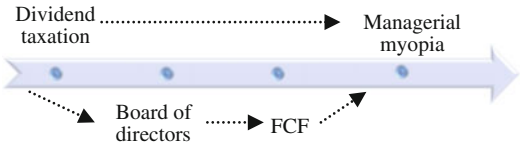


One can observe that the maximum of the minimum is 0.8, which corresponds to a_4, 'executive compensation' and this is the intermediary element.

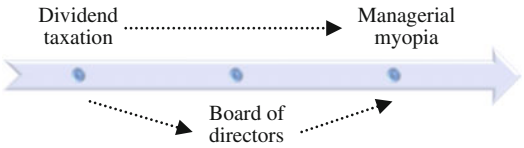
To conclude, the board of directors has an incidence on shirking through the executive compensation scheme. The same analysis has been done for all significant incidences.

In the second case, $a_2 \rightarrow b_3$, with a degree of 0.4 there is a forgotten effect in the incident of dividend taxation to managerial myopia. In order to discover the intermediary elements, we will follow the same process we have done above. Thus, it appears to have 5 intermediary elements:

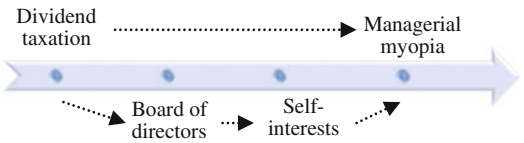
In this case 2A, there is an intermediary element with a degree level of 0.7. It is important to know that dividend taxation affects in the managerial myopia through the board of directors and this has an incidence on the free cash flow of the firm, which has an implication to the managerial myopia.



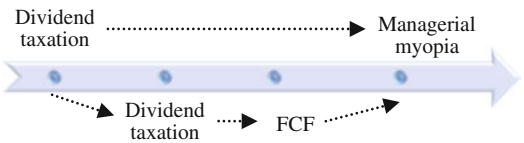
In that case 2B, the dividend taxation has an incidence on the managerial myopia through the board of directors.



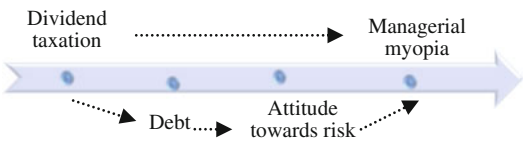
In the case 2C, the path shows that the dividend taxation affects the managerial myopia because the board of directors has an impact on self-interests which incidence on the managerial myopia.



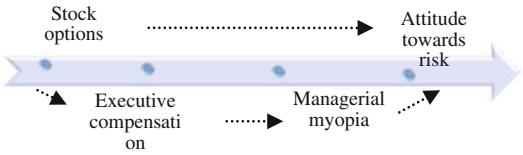
The case 2D also shows that the dividend taxation has an incidence on the free cash flow of the corporation itself which indirectly creates and affect to the managerial myopia.



Finally (2E), the dividend taxation has an incidence on the managerial myopia because it has an effect to the debt and this has an incidence on the attitude towards risk, which acts against the managerial myopia.



The last case, $a_5 \rightarrow b_4$, has a impact degree about 0.4. Again, the same analysis is done in order to obtain the second generation effects. As it can be seen from the graph, the stock options have an impact to the attitude towards risk through the executive compensation and the managerial myopia.



3 Results

The results show that the main intermediary elements are executive compensation, the board of directors and the free cash flow. As a first conclusion, we must suggest the owners that these are the three most important mechanisms. Thanks to their interactions, they have a high impact to reduce the agency costs. Now, the most important conclusions will be described for each case.

As for case 1, at first there is not a direct relationship between the board of directors and shirking. Even though the board of directors reduces the opportunism, they cannot monitor if the CEO is doing the properly effort. But, through an executive compensation they can have an incidence on shirking. In that way, the board of directors cannot directly detect the CEO effort but if they design an efficient executive compensation they are having an incidence on reducing shirking.

Regarding case 2, we cannot detect a causality relationship between dividend taxation and managerial myopia. But this relationship can be explained through the debt, the free cash flow and the board of directors, as follows:

As for case 2A, the dividend taxation policy reduces the CEO power. Hence, it implies a direct modification of the free cash flow of the corporation, which is an element very sensitive for the agent. From this point of view, a better dividend scheme might reduce the free cash flow, it reduces the discretionary, minimise the future overinvestment behaviour and forces the manager to improve the efficiency of the resources (López and Saona 2007). If the free cash flow is reduced, then the board of directors may look for external founds, which probably would not like to the executive because his monitoring is increasing. On the other hand, provided the executive has more monetary resources, he will make more expansionary decisions and he will take more growing strategies, this is to say more long-term decision-making.

Concerning case 2B, the dividend taxation affects in an indirect way the managerial myopia through the board of directors because they are who approve the dividend policies and make decisions about the funding, which might have an impact to the managerial myopia. Besides, the dividend refund gives the capital market reliable information about the future of the organization.

As for case 2C, the dividends have an impact on the managerial myopia through the board of directors which has an incidence on the self-interests of the CEO. Besides, CEO can assign tasks as the monitoring of the free cash flow and the salaries. Therefore, the executive is more monitored and the interests would converge with owners.

Regarding case 2D, the same discussion made in the case 2A can be used in order to analyse both dividend taxation and free cash flow as intermediate elements.

Case 2E shows that dividend taxation itself has also an indirect interaction with the managerial myopia. The dividends refund contributes to better control the executives because the capital market also monitors the strategies. As the dividends refund increases, the corporation has to look for external funding in order to finance profitable investment projects. In that sense, as the debt increases, the position of the corporation is more risky so that the CEO would not take some projects as to avoid the capital market control (due to the averse attitude towards risk).

Finally, referring to case 3, a forgotten effect exists between the stock options and the attitude towards risk. Provided the executives diversify their value participating in the ownership, the interests between executives and owners will converge. As a result, the managerial myopia will decrease and it will involve accepting long-term projects in spite of being more risky. Thus, the executive compensation will be the same as the owners (stock options).

4 Conclusions

This paper highlights some important aspects that will be summarized as follows:

1. The separation of the ownership and management may lead to agency problems due to the self-interest of managers. The agency theory is concerned with resolving the conflict between principals (shareholders) and agents (companies' executives).
2. Owners are interested in monitoring agency problems due to the agency costs. The agency costs include monitoring costs, bonding costs and residual loss.
3. The expertise concept of Kaufmann and Gil Aluja is presented as a suitable tool for the analysis and mathematical treatment under uncertainty of the experts' opinion.
4. Research into forgotten effects is a sort of mechanism to put on the alert and to allow bringing light to severe problem of the oblivion. For the owner it is important to know the external factors that may affect the sources of the agency problems in order to keep them present in the decision-making process.
5. On one hand, the effects considered in the study were the different sources of the agency problem: shirking, managerial myopia, free cash flow, different attitudes towards risk, the job security and the executives' self-interests. On the other hand, the solutions of the agency problem were taken as causes of the model: the board of directors, the debt, the dividend taxation, the executive compensation, the stock options, the ownership concentration and goods and services market and the executive job market. In order to assess the mechanisms to monitor the executives, four experts were asked for their interpretation of the effect of each mechanism on each source of the problem. It allows us to detect the forgotten effects.

6. From the forgotten effects model, we can conclude that the owner must be aware of the board of directors, dividend taxation and the stock options since they have an indirect effect upon the shirking, the managerial myopia and the attitude towards risk. We also have seen some forgotten effects such as the free cash flow, the board of directors and the executive compensation.
7. Finally, we must point out the contribution of this study to the agency theory since we provide some useful tools to reduce agency problems. It may facilitate the companies' success, providing useful information to improve the decision-making process in management.

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