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Résumé de l'article

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Les résultats montrent que l'indépendance et l'expérience des administrateurs sont les deux facteurs qui expliquent la valeur créée aux actionnaires. Toutefois, cette relation change significativement après l'introduction de la loi sur la sécurité financière la « *Sarbanes-Oxley Act* » de 2002.

The Determinants of the Value Created by Stock Repurchase Programs

by Foued Hamouda and Mounira Ben Arab

This paper aims to extend the empirical literature on the determinants of the value created by stock repurchase programs by analyzing the characteristics of the repurchase decision-making groups. Based on a sample of 200 US-listed firms from 1998-2004, the paper examines empirically the relationship between value created by stock repurchase programs and board of directors' characteristics. The analysis depends on panel data analysis to consider unobservable fixed-effects in this relationship.

The results provide evidence of a significant relation between board of directors' characteristics and value created by the stock repurchase programs. The two important determinants are directors' independence and directors' outside experience. However, we find that this relationship changed significantly for some measures after the adoption of the 2002 *Sarbanes-Oxley Act*.

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Introduction

Since the early 1980s, the use of share repurchases by American firms has increased dramatically. In 1984, for example, firms spent \$39.4 billion on stock repurchases and \$255.26 billion in 2000, which represented approximately 26 percent of their total annual earnings (Dittmar and Dittmar, 2002; Chan *et al.*, 2004). For some firms, stock repurchase activity was large, representing a significant part of equity, such as for IBM Company which bought \$772 million between 1995-1998, equal to 46 percent of its total outstanding shares (Roehner, 2005). More recently, as other countries have begun removing tax and regulatory impediments to share repurchases, there has also been a dramatic increase in repurchase activity outside the US.

Since repurchase programs continue to evolve in these countries, prior work has considered the effect of the announcements on firm value (Comment and Jarrell, 1991; Ikenberry *et al.*, 2000; Li and McNally, 2007). Other studies have proposed theoretical models and presented some motivations behind repurchase, like signals or free cash flow theory and the power they have to explain post repurchase performance (Persons, 1997; Isagawa, 2000; Bhattacharya and Dittmar, 2002; Oded, 2005).

On balance, there are five motivations that could explain why firms repurchase their shares, namely: to manage shareholder profitability, to signal price undervaluation, to reduce agency conflicts, to substitute dividends for repurchase and to avoid unwanted takeovers. However, the most common

reasons cited in the academic literature are to reduce agency conflict between managers and equity holders, and to signal an undervaluation in prices.

Indeed, according to cash flow theory, when firms hold excess liquidity, managers can use these resources to distribute dividends, to invest in positive or negative NPV projects or to repurchase their own shares. However, the choice among these three solutions remains, always, in the hands of executives and directors.

In this paper, we will study the characteristics of these decision-maker groups represented by the board of directors, and their impact on the value created for the shareholders. In particular, in the United States, the current rules stipulate that managers first launch repurchase programs and then the board of directors approve this decision. That is to say, a proposal for repurchase could be rejected by the board, with which the final decision rests. This condition is stricter in other countries such as France, Italy or Tunisia which require, further, general shareholder agreement (Varaiya et al., 2005).

Consequently, we argue that firms putting up this strategy should be those where agency costs are the weakest or those in which governance mechanisms are the most efficient for control. Past studies tried to explain repurchase post performance by signaling or free cash flows theory. To our knowledge, no previous work tried to clarify the reasons of performance increase in a governance scheme and no study tried to provide clear measure of value created by stock repurchase programs. Given these ideas, we will first assess whether repurchase decisions create value for shareholders. Interestingly, previous studies found that, on average, repurchasing firms experience positive long-term abnormal returns after repurchases (Comment and Jarrell, 1991; Chan *et al.*, 2004; Zhang, 2005). Therefore, based on Fernández (2001) model, we build a new measure of value created for shareholders by stock repurchase programs.^[1]

Second, we will analyze the main determinants of the value created for shareholders, referring to board of directors' characteristics that could better explain such a decision. This will allow us to understand why stock repurchases add value for shareholders as explained in previous empirical works. Our contribution will be to consider a comprehensive list of board of directors' characteristics considered by governance codes as "best practices." Further, in contrast to previous studies, we have applied a more advanced econometric technique that considers possible fixed-effects on this relationship.

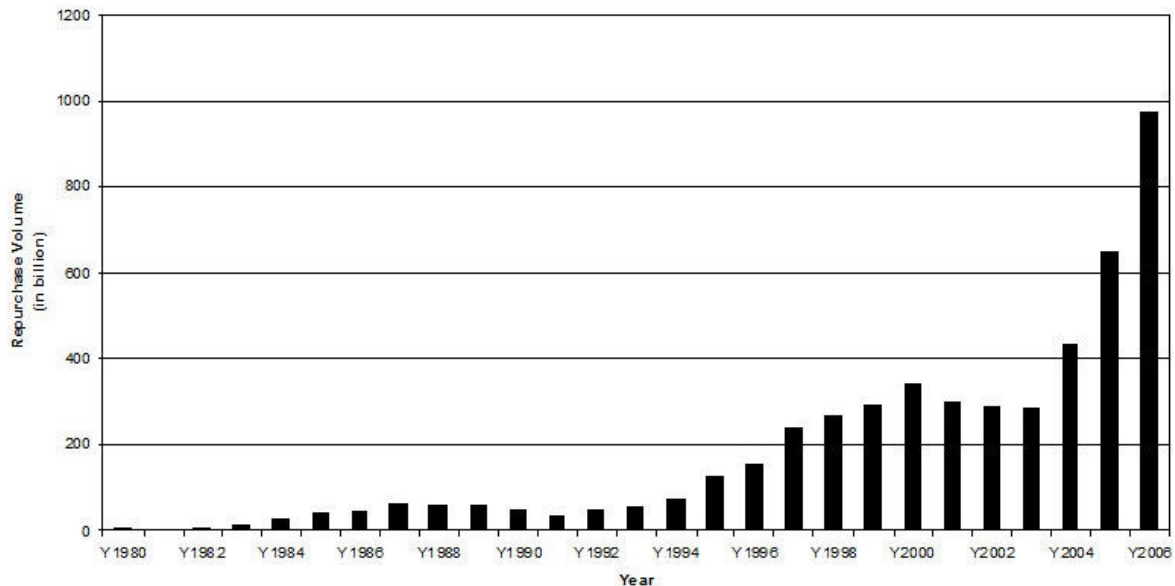
Our results are broadly consistent with previous works and conclude that share repurchase programs add value for shareholders. In addition, we found that most board characteristics explain why repurchase activity adds value for shareholders. That is, governance mechanisms could be the main reason behind the value creation for shareholders.

The remainder of the paper will be organized as follows. In section 2, we will present the recent developments of repurchase programs. In section 3, we will describe sample selection and data design. In section 4 empirical results will be reported. Finally, we conclude in section 5.

Recent developments in stock repurchase programs

One of the most significant trends in corporate finance during the 1990s was the increasing popularity of stock repurchase programs around the world. In 2003, companies that made up the Standard & Poors (S&P) 500 index bought back \$284 billion of their own shares. The total amount repurchased by these firms reached \$973 billion in 2006, representing an increase of 127 percent over the \$429 billion they had repurchased in 2004. These repurchasing decisions showed no signs of abating in 2006 as depicted in Figure 1 which describes the activity for the period 1980-2006.

Fig1. Increase in repurchase activities for S&P 500 Firms



The gradual increase in repurchases in recent years could have been related to financial studies that linked these programs to an increase in firm value (Ikenberry et al., 1995; Zhang, 2005; Ginglinger and L'Her, 2006). Or it could have been the result of the establishment of looser regulatory constraints that prevented firms from repurchasing their shares in many countries (e.g. France, United Kingdom).

Indeed, stock repurchase activity was first regulated in the United-States long-ago with relatively lax rules. The only regulatory guide for carrying out repurchases was the Security Exchange Commission (SEC)'s "safe harbour" Rule 10b-18, which described a code of conduct that, if followed, protected firms against charges of share price manipulation.^[2] As a result, most of the research surveyed in previous work was on firms listed on the NYSE, NASDAQ or AMEX stock exchanges rather than on the other exchanges. The results of these studies showed, generally, an abnormal return of around 1.49-14.1 percent after the repurchase announcement and many reasons to explain this. According to the personal income tax theory, for example, price increases after the announcement of a repurchases are taxed as capital gains, with a lower effective tax rate compared to ordinary income tax that would be applied to the dividend. Signaling theory also stipulates that when stocks are under-priced, firms repurchase their stocks to correct obvious market inefficiencies. The strategic behaviour of some firms in repurchasing their stocks, nowadays, has also showed the efficiency of these programs to create long-term value to shareholders. Ikenberry *et al* (1995), for example, concluded that the market reacts carefully following repurchases. Indeed, market reaction two days before and after an announcement is 3.54 percent, while the average abnormal return four years following an announcement is 12 percent.

Repurchase programs were also developed in several countries outside the US. Some of them adopted new legislative rules to introduce these programs for the first time, like Japan in 1995 or Finland in 1997. Other countries approved some legislative changes to encourage firms to be more familiar with these programs like the United Kingdom in 2003 (Hirtle, 2001).

Like American research, abnormal returns were positive after the announcements for all studies. These works were performed in France (Ginglinger and L'Her, 2006), in Canada (Ikenberry *et al*, 2000; Li and McNally, 2007), in the United Kingdom (Rau and Vermaelen, 2002; Oswald and

Young, 2004), in Australia (Lamba and Ramsay, 2005), in Germany (Seifert and Stehle, 2003; Hackethal and Zdantchouk, 2006), in Norway (Skjeltorp, 2004), in Korea (Lee *et al.*, 2005) or in Hong Kong (Zhang, 2005).

Sample selection and research design

Data source and sample description

Our sample includes all American firms listed in *Forbes 800* and *Forbes 200* magazine and covers 1998-2004 period.^[3] We selected data according to “proxy statements” available in **edgar** database. We then matched this sample to *Thomson Financial* database, *Worldscope* and *Compustat* files with annual financial data available. To get more rigorous results and to conform with previous studies (Porter *et al.*, 2000; Hirtle, 2001; Lamba and Ramsay, 2005), we withdrew all firms that had reported negative equity capital and firms involved in significant mergers during the sample period. The final selection allowed us to get relevant information for 200 firms.

Table I gives firms distribution according to business activity and stock exchange listing. We used the general industrial classification (GIC) provided by *Thomson Financial* where, 01 means industrial, 02 utility, 03 transportation, 04 banks and funds investment, 05 insurance and 06 financial services.

For a set of 200 firms, we noticed that the greatest number of firms involved in repurchasing activity was in the industrial sector. The others remained more limited with respect to their repurchase decisions. In addition, we noticed that many firms were listed on NYSE stock exchange rather than other exchanges.

Table I :
Firms' distribution according to firm activity and stock listing

Activity	Number of firms	Stock exchange	Number of firms
Industrial	165	NYSE	139
Service	12	NASNM (NASDAQ National Market Large Cap -United States)	50
Transportation	3	ASE (Alberta Stock Exchange-Canada)	2
Banks	4	Others	9
Utility	12		
Other financial services	4		
Total	200		200

Research design and development of hypothesis

Because past studies had underlined that corporate governance improved firm performance, we used some measures that had been considered in previous research studies as “best practice” indicators. Indeed, we used the size of the board (SOB), the independence of the board (BOD_IND) and the board directorship (CUM) to proxy for board structure. In particular, many papers recommended that firms have a small number of directors on the board (Jensen, 1993; Bhagat and Black, 1999; Mak and Kusnadi, 2005; Dahya and McConnell, 2005). They argued that large boards make the efficient exchange of information difficult, leading to less effective coordination and decision making. Besides, with ineffective communications, larger boards become easier to control by the chief executive officer than small boards. In contrast, some researchers reported that a larger number of directors could encourage better discussion for significant board decisions (Cheng, 2008; Coles *et al.*, 2008). This contrast of views in previous research studies is the reason why we proposed a double relationship between board size and value created by stock repurchases.

Furthermore, researchers on corporate governance have always supposed that independent directors practice more control on chief executive officer than internal directors. Fama (1980) and Fama and

Jensen (1983), for example, argued that the success of the board as an internal mechanism is reinforced by including outside members. These directors were motivated to develop an expert's reputation since the market valued them according to their performance as outside directors. According to this observation, we proposed a strong relationship between board independence and value created by stock repurchases programs.

In addition, Jensen (1993) considered that the cumulative role between the chairman and CEO appears as a hindrance to the separation between management and control. This is because combining these two roles creates a new setting in which it is easier for the chief executive officer to dominate the board and therefore to influence strategic decisions like stock repurchases. One might therefore argue for a negative relationship between the cumulative role and the value created by stock repurchase programs.

Besides these measures, we added other variables depicting the existence of committees into the board. They represented the independence of the nominating committee (NC_IND) and the independence of the audit committee (AUD_IND). Indeed, the use of stock repurchase as a strategic decision relied mainly on the ability of directors to identify the reasons behind such decision. This condition could be achieved by the ability of the nominating committee to select effective and competent directors who work for shareholders interest. This means, the nominating committee must be independent. In these regards, *Cadbury Report* (1992) recommended to all firms to have a nomination committee with independent directors. In the same way, the Securities and Exchange Commission approved in 2003 several reforms proposed by the American Stock Exchange (AMEX), the New York Stock Exchange (NYSE) and the Nasdaq Stock Market (NASDAQ) to set up a nomination committee with a majority of independent directors. In that light, we could expect better influence of this nominating committee composed by independent directors for one period and the value created by stock repurchase programs for the following periods.

Based on previous work (DeZoort *et al.*, 2002; Jean *et al.*, 2004) interested in reviewing the role of the audit committee and its influence on the financial performance and earning management, we expected a positive relationship between the audit committee's independence and value created by stock repurchase programs. Indeed, repurchase decisions approved by board of directors were influenced by financial statements where inspection was one of the audit committee roles. Thus, top managers relying on these financial statements might decide which repurchase is harmful to investors. Louis and White (2007) analyzed the same idea and showed that a firm's financial reporting behaviour varied according to the managers' desire to signal good news by repurchase programs. Today, American security law, the *Sarbanes-Oxley Act* of 2002 (SOX), imposes on all the listed firms in the United States a requirement to include independent directors within this committee.

More importantly, we argued that there were other measures related to expertise, competence and alignment of directors' interest with those of shareholders that could better explain value created to shareholders. In this regard, we have chosen directors ownership (OID_OWN), the number of years serving the firm (BOD_TEN) and director outside experience (BOD_EXP).

Indeed, according to agency theory, the board of directors is responsible for setting up some mechanism to align director's interests with those of shareholders. Morck *et al.* (1988) found, for example, that outside directors who owned shares were more apt to exercise their control than other directors. It followed that repurchase decisions taken within the board had an important impact on their personal wealth as well as on other shareholders. Thus, we expected that when directors' ownership is high, they are ready to contest decisions made by management that do not maximize shareholders wealth.

Regarding directors' internal experience, like past studies (Park and Shin, 2004; Fich and White, 2005) we used tenure, as our proxy. Indeed, during the years of service, the average director develops certain intelligence or controls certain expertise while being more and more familiar with the firm's environment. This argues in favour of more control and better behaviour. That's why we proposed a positive relationship between this measure and the value created by stock repurchases programs.

In addition, Fama (1980), Fama and Jensen (1983), Fich and White (2005) affirmed that labour markets motivated directors to exercise their control over management. Even though some authors (Morck *et al.*, 1988) assumed that, beyond a certain number of mandates, the board would be limited by profit loss relative to the time and effort absorbed by other boards, we included a positive relationship between independent director's experience and the value created by stock repurchase.

Finally, because the role of the audit committee was well studied in previous works (Spira, 1999; Gendron and Bedard, 2006; Jean *et al.*, 2004; Deli and Gillan, 2000; Petra, 2007), we added AUD_OPT and AUD_MEET. Indeed, most of the stock options were held by audit members. That's why we think that the more the outside members of the audit committee are remunerated by stock options, the higher the chances that they are ready to exercise their control. Moreover, the higher is the audit committee meetings, the better will be the efficiency of financial statement and therefore a bigger duty for the manager to take better decisions (Deli and Gillan, 2000; Gendron and Bedard, 2006).

Lastly, we used five control variables that could change the relationship between the board of director's characteristics and shareholders' value. We noted profitability ratio (ROA), financial leverage (LEV), dividend yield (YDIV), research and developments (R&D) and firm size (SIZE). Table II describes each of these variables.

Table II :
Definition of variables used in the paper

<u>Dependant variable</u>		
VC_REP	Natural log of the value created to shareholders by stock repurchase programs	
<u>Governance variables</u>		Expected sign
SOB	Number of directors composing the board of directors.	+-
CUM	A dummy variable that takes 1 when the chairman is also the CEO and 0 otherwise.	-
CN_IND	A dummy variable that takes 1 if there is a nomination committee composed in majority of independent directors and 0 otherwise.	+
BOD_IND	The proportion of independent directors sitting in the Board.	+
BOD_EXP	The average number of external directorship that independent directors hold in other firms.	+
OID_OWN	The accumulated proportion of ordinary stocks held by independent directors.	+
BOD_TEN	The average number of years each independent director has served on the board.	+
AUD_IND	The percentage of independent directors in the audit committee.	+
AUD_OPT	The ratio of "in the money" stock options held by independent directors sitting in the audit committee on the sum of the options and ordinary stock held by these directors.	+
AUD_MEET	The number of the audit committee meeting	+
<u>Control variables</u>		
Lev	total Debt/ book value of equity	+-
YDIV	Dividends paid/ Total value of equity	+-
R&D	dummy variable that takes 1 if firm is considered intensive in research and development and 0 otherwise (if it reveals the amount of R&D separately in its annual report)	+-
ROA	Net result/ total assets	+-
Size	Natural logarithm of volume sales as they are mentioned in the annual reports	+-

Multivariate analysis and empirical results

Methodology

We estimated the association between shareholders' value created by stock repurchase programs and corporate governance by the following model. All governance variables are defined in Table III.

$$\begin{aligned}
 \text{Log}(VC_REP_{n,t}) = & \mathbf{b}_0 + \mathbf{b}_1(SOB_{n,t}) + \mathbf{b}_2(CUM_{n,t}) + \mathbf{b}_3(CN_IND_{n,t-1}) + \mathbf{b}_4(BOD_IND_{n,t}) + \\
 & \mathbf{b}_5(OID_OWN_{n,t}) + \mathbf{b}_6(BOD_TEN_{n,t}) + \mathbf{b}_7(BOD_EXP_{n,t}) + \mathbf{b}_8(AUD_IND_{n,t-1}) + \\
 & \mathbf{b}_9(AUD_OPT_{n,t-1}) + \mathbf{b}_{10}(AUD_MEET_{n,t-1}) + \text{controls variables}_{n,t} + \text{Industry Dummies} + \mathbf{e}_{n,t}
 \end{aligned} \quad (1)$$

As a starting point, we carried out the Pearson test to detect multicollinearity between the independent variables. Table III shows the result of this correlation.

Table III :
Pearson correlation matrix

	SOB	CLM	BOD IND	BOD TEN	BOD EXP	CN IND	ALD IND	ALD MEET	OID OWN	ALD OPT	LEV	RD	ROA	SIZE	YDIV
SOB	1.000														
CLM	0.112** (0.000)	1.000													
BOD IND	0.239** (0.000)	0.221** (0.000)	1.000												
BOD TEN	0.111** (0.000)	0.020 (0.443)	-0.005 (0.943)	1.000											
BOD EXP	0.234** (0.000)	0.159** (0.000)	0.307** (0.000)	0.044 (0.104)	1.000										
CN IND	0.274** (0.000)	0.035 (0.192)	0.469** (0.000)	4.007* (0.000)	0.136** (0.000)	1.000									
ALD IND	0.124** (0.000)	0.116** (0.000)	0.469** (0.000)	3.025 (0.000)	0.146** (0.000)	0.229** (0.000)	1.000								
ALD MEET	0.118** (0.000)	0.001 (0.979)	0.189** (0.000)	-0.007** (0.000)	-0.015 (0.55)	0.240** (0.000)	0.059 (0.029)	1.000							
OID OWN	-0.076** (0.004)	0.003 (0.922)	-0.03 (0.922)	0.039 (0.140)	-0.059** (0.027)	-0.025 (0.343)	-0.01 (0.694)	0.011 (0.673)	1.000						
ALD OPT	-0.202** (0.000)	-0.000** (0.000)	-0.033** (0.001)	-0.174** (0.000)	0.173** (0.000)	-0.065* (0.016)	-0.777** (0.004)	0.118** (0.000)	-0.136** (0.000)	1.000					
LEV	0.133** (0.000)	-0.020 (0.231)	0.106** (0.000)	-0.009** (0.000)	0.08** (0.021)	0.037** (0.000)	0.047 (0.267)	0.025 (0.01)	-0.065 (0.18)	0.035 (0.41)	1.000				
RD	-0.024** (0.000)	-0.030** (0.000)	0.011 (0.643)	4.037 (0.000)	-0.026* (0.027)	-0.036 (0.113)	-0.077** (0.004)	-0.035** (0.000)	-0.036** (0.000)	0.040* (0.024)	0.087** (0.000)	1.000			
ROA	-0.052** (0.000)	-0.040 (0.13)	-0.040 (0.000)	0.029 (0.48)	-0.046* (0.024)	-0.025 (0.344)	0.002 (0.921)	-0.051* (0.01)	0.021 (0.39)	0.035 (0.00)	0.133** (0.000)	0.237** (0.000)	1.000		
SIZE	0.691** (0.000)	0.217** (0.000)	0.499** (0.000)	0.027 (0.21)	0.044** (0.000)	0.335** (0.000)	0.233** (0.000)	0.221** (0.000)	-0.146** (0.000)	0.112** (0.000)	0.134** (0.000)	0.110** (0.000)	-0.070** (0.000)	1.000	
YDIV	0.173** (0.000)	0.030** (0.000)	0.165** (0.000)	0.049 (0.13)	0.021** (0.01)	0.118** (0.000)	0.076** (0.004)	-0.022 (0.053)	0.034 (0.203)	0.112** (0.000)	0.126** (0.000)	0.026** (0.000)	0.053** (0.000)	0.031** (0.000)	1.000

This table provide Pearson correlation matrix between all variables of the model.
p-values are in parentheses.
* significant at 5% level
** significant at 1% level

From these results, we observed that there are four significant correlations between these variables.^[4] This allows us to estimate three regressions, Reg.1, Reg.2 and Reg.3. These results are depicted in table IV.

Table IV :

The determinants of the value created by stock repurchase programs (Model with Fixed-Effects)

The table reports results from regressing value created by repurchase programs on various board characteristics with panel data analysis. Dependent variable is the log of value created by stock repurchase, $\log(VC_REP)$. BOD_IND is the proportion of independent directors sitting in the Board. BOD_EXP is the average number of external directorship that independent directors hold in other firms. SOB is the number of directors composing the board of directors. AUD_IND is the percentage of independent directors in the audit committee. NC_IND is a dummy variable that takes 1 if there is a nomination committee composed in majority of independent directors and 0 otherwise. AUD_OPT is the ratio of "in the money" stock options held by independent directors sitting in the audit committee on the sum of the options and ordinary stock held by these directors. AUD_MEET is the number of the audit committee meeting. OID_OWN is the accumulated proportion of ordinary stocks held by outside directors. BOD_TEN is the average number of years each independent director has served on the board. CUM is a dummy variable that takes 1 when the chairman is also the CEO and 0 otherwise. $SIZE$ is the natural logarithm of volume sales as they are mentioned in the annual reports. ROA is net result / total assets. $R\&D$ is dummy variable that takes 1 if firm is considered intensive in research and development and 0 otherwise. LEV is total debt / book value of equity. $YDIV$ is dividends paid / total value of equity. For all regression we included industry dummies to control for industry effect. The numbers in parentheses are t-Statistics.

Dependent variable : VC_REP			
Independent Variables	Regression 1	Regression 2	Regression 3
Intercept	2.468120*** (3.210202)	-3.349638*** (-5.863350)	2.198160*** (3.196055)
BOD_IND			3.149188*** (6.776388)
BOD_EXP	0.299885*** (4.992658)		
SOB	0.598863*** (5.120064)		0.630041*** (5.603518)
SOB ²	-0.015346*** (-3.100760)		-0.016023*** (-3.345989)
AUD_IND(-1)	1.208631*** (2.911626)	0.535949 (1.527677)	
NC_IND(-1)	0.425062*** (2.734131)		
SIZE		1.883967*** (25.37740)	
AUD_OPT(-1)	0.353151** (1.706929)	0.413997** (2.390555)	0.232730 (1.134437)
AUD_MEET(-1)	0.207624*** (6.515816)	0.120616*** (4.342870)	0.207046*** (6.498918)
OID_OWEN	-4.168786*** (-2.868596)	-2.064714** (-1.657761)	-5.142507*** (-3.539345)
BOD_TEN	0.026856 (1.318848)	0.027967 (1.630179)	0.028335 (1.397756)
CUM	0.693108*** (4.484435)	0.274160** (2.083489)	0.558739*** (3.540844)
ROA	4.968789*** (6.105986)	4.338791*** (6.500444)	5.121181*** (6.371585)
R&D	0.255832* (1.774122)	0.381555*** (3.120413)	0.145259 (1.005688)
LEV	0.005257 (0.188006)	0.009078 (0.384252)	0.001383 (0.049707)
YDIV	3.224048*** (3.075915)	1.289196 (1.484827)	2.921194*** (2.764092)
Industry dummies	Yes	yes	yes
Model p-value	0.000000	0.000000	0.000000
R ²	0.362867	0.538800	0.362488
N	985	985	985

* indicate significant at 10% level

** indicate significant at 5% level

*** indicate significant at 1% level

To test this relationship we applied the panel data technique, which is more advanced than time series or cross section analysis. This method better exploits the information contained in the variables because it considers all specific unobservable effects related to the data. Indeed,

observations can include unobserved heterogeneous items related either to firms or years. For example, some firms may have their own traditions, history or culture that make their board structure different from another board and consequently decide differently for some activities. These effects are unobservable and denoted by individual effects. It could refer for example to differences in director's personal incentives and energies to exercise control over management, which remained constant over time.

Likewise, we found some unobservable items associated with firms' characteristics which change from one year to another. We noted for example the introduction of the new law (e.g: *Sarbanes-Oxley Act*) had the same effect on all firms' decisions for some years and remains specific to these dates or also the "high tech bubble" and the major fluctuations in the stock market that took place during the sample period. We refer to this as specific period-effect.

Obviously, because our sample included only firms listed in *Forbes magazine*, we argue that period specific effects are more pronounced than individual specific effects. We could explain this due to *Forbes magazine* that uses the same selection criteria to gather these firms.^[5] Period fixed-effects may therefore take into account the *Sarbanes-Oxley Act* introduced in 2002. We present thus our model as follows:^[6]

$$y_{i,t} = \mathbf{m} + \mathbf{a}_t + \mathbf{b}'x_{i,t} + e_{i,t} \quad (2)$$

Table IV provides statistic tests using the panel data method with period fixed-effects. From regression 1, 2 and 3 we observe that all variables have significant explanatory power on the value created to shareholders with less significant effect for AUD_IND(-1), AUD_OPT(-1) and BOD_TEN. Moreover, the higher is the firm's size, the higher is the value created for their shareholders. This result explains the conclusions of previous works that larger firms are more likely to repurchase more shares (Dittmar, 2000; Fenn and Liang, 2000; Kahle, 2002).

BOD_IND has also highly significant coefficients. Thus, repurchase programs create value to shareholders when there are many independent directors within the board. This result shows that independent directors approve repurchases if this strategy is profitable to shareholders. We also noticed that contrary to past studies (Jensen, 1993; Bai *et al*, 2004), the CEO being the chairman of the board had a positive effect on shareholder value. This result could be explained by a more fluent information transfer into the board when unexpected effect occurs in some period, and it could be helpful to make the CEO position the intermediary role between management and board.

We also noted that having more seats in other firms may improve shareholder value. This is obvious because directors get more experience in these firms and decide only to repurchase if it creates more value to shareholders. By contrast, BOD_TEN does not have the same effect.

Furthermore, as we proposed, there was a limit to which the role of directors was prohibited by the great number of directors. This was shown by the inverse U-shaped relationship between board size and value created to shareholder when we introduced BOD² (the square value of the size of the board) into the regressions. In other words, there was a threshold beyond which board size became inefficient and might, on the contrary, cause a negative effect on board decisions. That is, the board might find it difficult to decide quickly and efficiently control management.

Regarding audit committee proxies, we notice that AUD_MEET could only explain shareholders value. That means we need regular meetings within this committee to indirectly control repurchase decisions. Likewise, the nominating committee appeared to have a consistent impact on shareholders value.

However, we curiously noticed that *OID_OWN* has a negative unexpected sign. That is, value created by repurchase programs was not presumably the result of incentive programs trying to align directors' interests to those of shareholders. In other words, if they are outside, they should not have any percentage of equity share because holding even a small proportion can play against shareholders' interests even if directors are considered independent by governance code. This result may advance the assumption that insider trading may cause the effect of this variable to be negative on shareholders' value because directors may be willing to choose repurchase when it is more profitable for them.

For all other control variables, we observed expected results. Dividend yield (*YDIV*) and performance ratio (*ROA*) had the highest coefficient in comparison to *R&D* and *LEV*. This means that high dividend distribution and best performing firms are those that create value for shareholders by stock repurchase programs.

Robustness checks

It is important to recall, however, that one of the major issues occurring in our sample period is the introduction of *Sarbanes-Oxley Act* in 2002. Interestingly, it is important to perform a series of additional tests to deal with the influence of governance variables before and after *Sarbanes-Oxley Act* and to examine whether this rule changes our results. Indeed, *Sarbanes-Oxley Act* mandates a series of changes in corporate financial reporting and corporate governance for public companies. For example, all members of the audit committee must be independent, and firms must disclose whether at least one member is a financial expert. Or also, executives must report insider trades within two days, rather than within the 10 days following the end of the month in which the transaction occurred. Thus all these provisions may change the relationship between governance variables and value created to shareholders. In Table V, we tested whether the determinants of board structure were significantly different in the pre-SOX and post-SOX period. We used *POSTSOX* as a dummy variable if the observation was after 2002 and zero otherwise, and interacted this variable with each of our independent variables. We also used the log of the *SOB* to account for the nonlinearity of board size. This is preferable to using *SOB* and *SOB*² because our predicted coefficient on board size was opposite to that of the other variables.

The table shows that the sign of all variables remains as expected but less significant. From all regressions, the main determinants are *BOD_EXP*, *SOB*, *BOD_IND* and *NC_IND*. Besides, the effect of directors' ownership post *Sarbanes-Oxley* (*OID_OWN*POSTSOX*) becomes positive and significant with a high coefficient. This means that after adopting SOX, directors' ownership became more influential and efficient to align shareholders interest with those of directors. Further, the interaction term of the audit committee meeting (*AUD_MEET*POSTSOX*) suggests that the positive relationship between *AUD_MEET* and value created to shareholders is stronger after SOX. In summary, it should be noted that after SOX less variables become significant. This could be the result of the market knowing that firms will not repurchase shares if this decision would lead to unsafe capital amounts, regardless of the corporate governance structure within the firm. This result is also confirmed by Webb (2008) in a sample of repurchase announcements by banks after the 2002 tax reform.

Table V :

The determinants of the value created by repurchase programs

The table reports results from regressing value created by repurchase programs on various board characteristics. Dependent variable is the log of value created by stock repurchase. *BOD_IND* is the proportion of independent directors sitting in the Board. *BOD_EXP* is the average number of external directorship that independent directors hold in other firms. *SOB* is the number of directors composing the board of directors. *AUD_IND* is the percentage of independent directors in the audit committee. *NC_IND* is a dummy variable that takes 1 if there is a nomination committee composed in majority of independent directors and 0 otherwise. *AUD_OPT* is the ratio of "In the money" stock options held by independent directors sitting in the audit committee on the sum of the options and ordinary stock held by these directors. *AUD_MEET* is the number of the audit committee meeting. *OID_OW*N is the accumulated proportion of ordinary stocks held by outside directors. *BOD_TEN* is the average number of years each independent director has served on the board. *CUM* is a dummy variable that takes 1 when the chairman is also the CEO and 0 otherwise. *SIZE* is the natural logarithm of volume sales as they are mentioned in the annual reports. *POSTSOX* equal one if the observation is after 2002. *ROA* is net result / total assets. *R&D* is dummy variable that takes 1 if firm is considered intensive in research and development and 0 otherwise. *LEV* is total debt / book value of equity. *YDIV* is dividends paid / total value of equity. For all regression we included industry dummies to control for industry effect. The numbers in parentheses are t-S statistics.

Independent Variables	Dependent variable : VC_REP		
	Regression 1	Regression 2	Regression 3
Intercept	3.542861** (3.818289)	-2.199701*** (-3.203967)	3.091296*** (4.054093)
BOD_IND			3.346368*** (3.427398)
BOD_EXP	0.230666** (2.990869)		
SOB	0.628856** (5.079543)		0.606941*** (3.354322)
SOB^2	-0.015848*** (-3.327268)		-0.014888** (-3.456007)
AUD_IND(-1)	0.897057 (1.590195)	0.156753 (0.328725)	
NC_IND(-1)	0.326599* (1.888082)		
SIZE		1.871481*** (23.06160)	
AUD_OPT(-1)	0.024054 (0.089028)	0.243024 (1.051889)	-0.028351 (-0.106160)
AUD_MEET(-1)	0.103662** (2.882140)	0.031554 (1.046171)	0.104231*** (2.903088)
OID_OWN	-13.70664*** (-4.288081)	-6.209550** (-2.238125)	-14.24331** (-4.292707)
BOD_TEN	0.027424 (1.078149)	0.013885 (0.624746)	0.024243 (0.956471)
CUM	0.658593** (2.991585)	0.267518 (1.329065)	0.529651** (2.396442)
POSTSOX	-1.724323 (-1.267563)	-2.528006*** (-3.117168)	-1.770356 (-1.543404)
BOD_EXP*POSTSOX	0.291309** (2.413957)		
BOD_IND*POSTSOX			-0.770178 (-0.831214)
Log(SOB)*POSTSOX	-0.349138 (-0.736394)		0.160606 (0.351805)
AUD_IND*POSTSOX	0.281738 (0.338827)	0.797394 (1.12166)	
NC_IND*POSTSOX	-0.050995 (-0.170074)		
AUD_OPT*POSTSOX	0.571232 (1.471748)	0.184167 (0.372044)	0.452347 (1.169991)
AUD_MEET*POSTSOX	0.145551** (3.886549)	0.133489*** (4.407693)	0.136719*** (3.582275)
OID_OWN*POSTSOX	14.91926** (4.003703)	6.711271** (2.210544)	14.29943*** (3.722782)
BOD_TEN*POSTSOX	0.002492 (0.065279)	0.042710 (1.313156)	0.017115 (0.457665)
CUM*POSTSOX	0.169978 (0.539066)	0.154362 (0.378506)	0.231974 (0.727762)
ROA	49.40827** (4.949294)	4.816000*** (4.794283)	4.980450*** (5.196317)
R&D	0.273506** (1.971540)	0.397379*** (3.264067)	0.146106 (1.040945)
LEV	0.008137 (0.364325)	0.018791 (0.887790)	0.004733 (0.222572)
YDIV	2.921430** (3.548323)	1.048396 (1.545647)	2.614365*** (3.296986)
Industry dummies	Yes	Yes	Yes
Model p-value	0.000000	0.000000	0.000000
R ²	0.378040	0.536587	0.370296
N	985	985	985

* indicate significant at 10% level

** indicate significant at 5% level

*** indicate significant at 1% level

Finally, it appears that the overwhelming majority of board characteristics had enabled us to understand why repurchase programs created value to shareholders and to some extent to know the important role of *Sarbanes-Oxley Act* in this regard.

Conclusion

Grounded in corporate governance theory, this study has presented an attempt to link stock repurchase programs with value created to shareholders, taking into account board of directors characteristics. The question seems important since the volume of repurchased shares has grown rapidly during these recent years and since repurchase activity has a strategic side compared to other board decisions.

Earlier research tried to explain the abnormal return by several theories like signaling or free cash flow theory (Dittmar, 2000; Grullon and Michaely, 2004). This study presents evidence similar to previous works, but in terms of value created to shareholders, it shows the ability of the board of directors to detect and profitably exploit repurchase to create shareholders value.

Because, repurchase decisions may have positive and negative impacts on shareholders' value (depending on director's ability to recognize this decision as the best means to disgorge cash flows to shareholders (Fairchild, 2006)), the primary contribution of this paper has been to focus on the relatively long "work out" of repurchase decisions.

We used a seven-year panel data set and estimated fixed-effects models to mitigate unobservable effects in variables. Empirical examination shows that repurchase decision created value to shareholders and several board characteristics were the source of this value. Implicitly, consistent with Jensen (1993) and Eisenberg *et al.* (1998), high board size could influence negatively value created for shareholders. However, outside experience in other firms as well as directors' independence are the two main factors that explain value created by repurchase programs. This was intuitively recognized since these directors had more experience and expertise in other firms as well as rich information which allowed them to judge properly if this strategy was done in the shareholders' best interest.

Overall, our results add to our understanding of reasons that explain why repurchase programs add value for shareholders, referring to corporate governance mechanisms and taking into account board control. Although the results are a useful guide for both securities holders and stakeholders to know how the design of stock repurchase activities in firms are improving shareholders value when governance quality is better, it does not however explain what happens if companies that didn't repurchase would destroy value to their shareholders and/or if stakeholders' value are being affected by these programs. An interesting area of future research is to study if there is an accurate time in which firms have to repurchase their own shares and if insiders profit more from this program. Many recent papers have tried to explain why stock repurchases occur in waves such as Dittmar and Dittmar (2007) and Ginglinger and Hamon (2007), but they do not explain if there is better interest for firms to repurchase their own shares in some events.

[1] Interested readers could request corresponding author for all steps required to measures Shareholders value created by stock repurchases.

[2] <http://www.sec.gov:80/rules/final/33-8335.pdf>

[3] The choice was made to give more heterogeneity in the sample between big and small firms.

[4] We assumed correlations significant and higher than 0,3 as our threshold.

^[5] Indeed, Forbes magazine gather firms according to the following criteria: sales, profits, assets, market value and employees.

^[6] For more information interested reader could refer to Sevestre (2002) or to methodological seminary of Hurlin (2001).

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