

THE EFFECTS OF ACCOUNTING TREATMENT AND FINANCIAL CRISIS ON THE STOCK OPTION PLANS OF ITALIAN COMPANIES

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ABSTRACT: *Many studies state that favourable accounting treatment has been one of the main reasons firms issue employee stock options. However, stock options have recently received growing criticism with a possible effect on incentive effectiveness and outrage costs. The main purpose of this study is to explore the impacts of IFRS 2 and the recent financial crisis on stock option compensation. Empirical evidence suggests that (i) IFRS 2 did not have a significant effect on the granting of stock options, and (ii) the issue of stock options is less likely to occur during a financial crisis.*

Keywords: *stock option, IFRS 2, financial crisis, executive compensation, IFRS adoption*

JEL Classification: M41, M48, J33

1. INTRODUCTION

In the last decade, stock option plans (hereafter SOPs) have generated considerable interest among academic researchers, government regulators, business, and the popular press. The topic has fascinated accounting scholars, who have devoted their efforts to exploring possible determinants of SOP adoption and the actual effects of this form of incentive. Among the factors often associated with the issue of SOPs, favorable accounting treatment has been cited in many studies, thus highlighting the low perceived cost of stock options (Hall & Murphy, 2003; Murphy, 2002; Murphy, 2003; Muurling & Lehnert, 2004).

The recognition of SOPs required by IFRS 2 is the outcome of increasing pressure and a long debate on the need for this form of incentive to be more transparent (Ferri & Sandino, 2009; Guay, Kothari, & Sloan, 2003; Hall & Murphy, 2003). Such recognition

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has radically changed the accounting treatment of SOPs within European listed firms. Further, before mandatory recognition, many companies (especially high-tech ones) expressed serious concerns about the significant negative impact of SOPs on their financial accounts (Chalmers & Godfrey, 2005); consequently, their lobbies firmly opposed the new accounting treatment (see Cheng & Smith, 2013; Dechow, Sloan, & Sweeney, 1996; Koh, 2011; Zeff, 2002 for the U.S. perspective and Subramaniam and Tsay, 2012 for the Canadian perspective). Therefore, studying the impact of IFRS 2 on the issuing of SOPs, and investigating whether the reaction to mandatory cost recognition has resulted in a reduction of this practice, are understandably interesting. In this context, it is useful to recall that prior research suggests recognized financial items can attract more investor attention than items simply disclosed in footnotes (Espahbodi et al., 2002; Frederickson, Hodge, & Pratt, 2006).

In order to explore the key determinants of SOPs in recent years, it is worth noting that this kind of incentive is connected to political costs and that SOPs have also been the target of growing criticism, especially when the global financial crisis started to affect the real economy. They may therefore have a significant impact on incentive effectiveness and outrage costs, both of which can limit stock options (Murphy, 2002).

The present study aims to investigate the impact of IFRS 2 and of the financial crisis on the issuing of SOPs. Additionally, we consider determinants derived from stock option literature, with particular reference to incentive alignment, financial constraints, and tax benefits, all of which have proved to have relevant explanatory power for the issuing of SOPs.

The analysis is carried out on the entire population of Italian listed companies over the years 2000-2009. Thus, the time horizon extends over 10 years: the five years before IFRS adoption, and the five years with IFRS-compliant financial statements. We have taken this approach because many SOPs adopted by listed companies include more than one issue of stock options (hence they last for more than one year). We can therefore show the impact on SOPs more accurately by using such an extended time horizon.

In the aforementioned context, Italy is particularly interesting for several reasons. First, the diffusion of Italian stock options seems largely dependent on external factors, as the growth of stock option plans in 1994-1996 (mainly owing to favorable fiscal treatment) demonstrates (Di Pietra & Riccaboni, 2001). Therefore, it is reasonable to suppose that less favorable accounting treatment could also affect corporate behavior. Second, before IFRS 2 the accounting treatment of SOPs in Italy was limited to the disclosure of quantitative information about the number of stock options and their variations during the year, without any data about their fair value. This approach differs significantly from the 1993 version of the Statement of Financial Accounting Standards (SFAS) 123 that requires disclosure of stock-based compensation costs, thereby encouraging their recognition. In such a scenario, IFRS 2 represents a radical change: from total absence of value information (not even in footnotes) to recognition of SOPs in the P&L account and detailed additional disclosure. Further, Italy is one of the few EU countries where the adoption of IFRS is mandatory for

the consolidated and individual accounts of listed companies (none of which have opted for preliminary voluntary transition), while other countries limit the application of the rules of the International Accounting Standards Board (IASB) to consolidated financial statements only. This may imply IFRS 2's stronger influence on corporate practices.

We find that the new accounting treatment that the adoption of IFRS 2 provided did not result in fewer firms issuing SOPs, despite the robust opposition of listed companies to mandatory recognition. In addition, in line with our predictions, empirical evidence suggests that a financial crisis reduces the probability of firms issuing stock options.

Our results contribute to the literature with both theoretical and policy implications. First, they increase our understanding of determinants of SOPs granting by considering several accounting and economic determinants, thereby increasing our understanding of SOP determinants. Our study also explores the effect of IFRS 2 in terms of real earnings management by analyzing the impact of the standard on firms' practices, thus providing useful evidence to standard setters.

The remainder of the paper is structured as follows. The prior literature is discussed in section 2. Section 3 develops the hypotheses to be tested. Section 4 describes the research method employed, and section 5 presents the results of the empirical tests. The last section provides conclusions.

2. REVIEW OF THE LITERATURE

The issuing of SOPs and the motivations behind such decisions have been widely researched from various perspectives. Prior literature has developed several hypotheses that have led to mixed evidence: (a) alignment of interests, (b) rent extraction, (c) personnel retention, (d) tax benefits, and (e) perceived cost.

The agency theory approach analyses the use of SOPs as a form of compensation and incentive, aligning the interests of managers and shareholders (Fama, 1980; Jensen & Murphy, 1990a; Jensen & Murphy, 1990b). In this regard, optimal contracting theory suggests that SOPs can reduce agency problems by combining managers' and shareholders' objectives. From such a perspective, SOPs mitigate risk-related incentive problems, encouraging managers to focus less on reporting short-term accounting profits and more on long-term profitability, thereby increasing their compensation packages. Empirical studies test this hypothesis by considering either the effect of SOPs (Agrawal & Mandelker, 1987; Morgan & Poulsen, 2001) or the corporate characteristics that are consistent with the proposed view such as a firm's Tobin's *q* (Frye, 2004; Kedia & Mozumdar, 2002; Khan, Dharwadkar, & Brandes, 2005; Yermack, 1995).

A second interesting stream of research deals with managers' exploitation of stock options as a legal tool in order to subtract wealth from a company. This "rent extraction" perspective (Bebchuk, Fried, & Walker, 2002; Hanlon, Rajgopal, & Shevlin, 2003; Melis, Carta, & Gaia,

2011) stems from the combined effect of the impressive amounts of options granted in some large U.S. corporations and the growing demand for fair corporate governance rules. Such a managerial power approach is based on the idea that boards do not operate at arm's length when devising executive compensation arrangements; rather, they have power to influence their own pay and use this power to extract rents. Further, the desire to camouflage such behavior could lead to the use of inefficient compensation packages that provide suboptimal incentives and thereby hurt shareholder value.

Another reason for issuing SOPs that has received considerable attention from prior literature (even though only a few empirical studies have explored it) regards the benefits of personnel policies. SOPs can be a particularly useful tool to attract and retain key personnel (Arya & Mittendorf, 2005; Balsam & Miharjo, 2007; Ittner, Lambert, & Larcker, 2003; Kedia & Mozumdar, 2002; Oyer, 2000; Oyer & Schaefer, 2005), an advantage that is twofold. First, young and start-up companies are able to hire managers by offering them compensation that relies more on growth prospects than high cash salaries. Second, this kind of incentive can play a screening or sorting role because talented and less risk-adverse employees will find option-based contracts more attractive.

A significant amount of prior literature also focuses on tax benefits provided by stock options. Depending on national rules and the design of SOPs, this form of compensation can lead to considerable corporate tax and/or executive income tax savings. Empirical studies suggest that the tax component is essential in understanding the SOPs phenomenon (Aboody & Kasznik, 2008; Ciccotello, Grant, & Grant, 2004; Hite & Long, 1982; Klassen & Mawani, 2000; Zattoni & Minichilli, 2009)

The perceived cost view (Murphy, 2002) takes into account two relevant benefits of SOPs. The first enables a firm to obtain the advantages associated with SOPs without requiring cash outflows, thus providing a useful tool for companies that face cash constraints (Core & Guay, 2001; Kedia & Mozumdar, 2002; Matsunaga, Shevlin, & Shores, 1992; Yermack, 1995;). The second refers to the accounting explanation for stock option widespread diffusion (Carter, Lynch, & Tuna, 2007; Hall & Murphy, 2002; Muurling & Lehnert, 2004), a stream of research based on the idea that disclosure is not a substitute for recognition (Espahbodi, 2002; Frederickson, Hodge, & Pratt, 2006). This is consistent with findings from U.S. studies showing that firms voluntarily recognizing stock option expenses (under SFAS 123) have significantly lower expenses than other firms (Aboody, Barth, & Kasznik, 2004).

Using a similar perspective, other studies focus on the link between stock options and earnings management. Matsunaga (1995) tests two hypotheses about the financial costs related to SOPs. The first concerns the relationship between the issuing of incentive share-based plans and the adoption of accounting policies that aim to boost profits (e.g., FIFO instead of LIFO, and faster amortization criteria). The second hypothesis deals with achieving established target profits. Results suggest a relationship between the issuing of stock option plans and earnings management, a connection that has also been hypothesized by Cheng and Warfield (2005). They find a positive relationship between

the amount of compensation in the form of stock options and the amount of discretionary accruals. Other studies (Balsam, Mozes, & Newman, 2003; Bartov & Mohanram, 2004; Bergstresser & Philippon, 2004; Burns & Kedia, 2003; Gao & Shrieves, 2002; Kadan & Yang, 2005; Peng & Röell, 2004) find a positive correlation between the amount of stock options and earnings management practices, especially those practices aimed at manipulating discretionary accruals opportunistically. These policies tend to increase profits when managers exercise their options in order to increase any personal advantage connected to the option exercise when share prices are high. In contrast, when stock option plans are issued, these studies assume opposite earnings management practices. Lower profits favor lower exercise prices, increasing those benefits of managers that are related to the revaluation of share prices in future periods characterized by higher profits. Additionally, empirical evidence shows that managers are more likely to engage in earnings management when they hold a larger proportion of their compensation in performance-vested stock options (Kuang, 2008).

With regard to the perceived cost hypothesis, few empirical studies consider the actual or estimated impact that the application of IFRS 2 may have on the granting of SOPs in terms of real earnings management, a practice that manipulates real business activities to manage reported earnings (Graham, Harvey, & Rajgopal, 2005; Xu, Taylor, & Dugan, 2007). Street and Cereola (2004) evaluate the quantitative impact of the standard and conclude that the new accounting rule will change diluted EPS. Crasselt (2006) studies the impact of IFRS 2 by monitoring the evolution of share-based payments on a sample of German listed firms, focusing on conflict among the different SOP motivations (accounting, fiscal, and incentive). Empirical results indicate that after 2004 accounting reasons drive the design of incentive plans to a lesser extent than in the past.

Even if they do not specifically address IFRS 2 adoption, the main results from recent US literature seem relevant to understanding how fair value recognition of SOPs in P&Ls affects the issuing of stock options. For example, SFAS 123R (the revised version of SFAS 123) and IFRS 2 converge toward P&L recognition of the fair value of equity instruments granted during the vesting period. Further, even if differences about external environment, institutional structures, and culture exist between the U.S. and Europe (Nobes, 1998), the former has provided a good background for studying SOPs because these instruments were a key feature of irrational exuberance during the bubble in the late 1990s.

More specifically, Carter, Lynch, and Tuna (2007) demonstrate that financial reporting costs play a role in determining CEO compensation, reducing the use of options but increasing the use of restricted stocks, without any reduction in overall CEO recompense. In other words, these findings support the idea that it is difficult for firms to downsize executive pay packages that result from prior favorable accounting treatment of SOPs. Choudhary, Venkatachalam, and Rajgopal (2009) confirm that the recognition of stock options in P&Ls plays a role in firms' real actions. Specifically, they find that in anticipation of SFAS 123R several firms accelerated the vesting of employee stock options to avoid recognizing unvested stock options at fair value in the following financial statements. Empirical evidence also confirms a real effect of SFAS 123R on the vesting terms of SOPs,

supporting the idea that firms try to defer recognition of stock option expense (Cadman, Rusticus, & Sunder, 2013)

However, opportunistic reporting on stock options (e.g., the use of volatility to underestimate fair value cost) could be significantly limited by specific and exhaustive authoritative guidance regarding fair value estimation (Choudhary, 2011). This result is interesting because it seems to corroborate the idea that firms treat recognized and disclosure values differently. Particularly, recognized values are more likely to be underestimated because they are usually considered more reliable than disclosed items (Schipper, 2007).

A question remaining unanswered in the literature concerns the effect of the mandatory adoption of IFRS 2 on the issuing of SOPs over an appropriate multi-year period. It should be noted that the design of SOPs usually requires fixed option issues for more than one year (e.g., in Italy, the average is three years) (Ramassa, 2006), and hence, a significant effect might be observed only some years after first time adoption (FTA). This longer time horizon also makes it possible to study the impact of the global financial crisis, which led to mounting pressure on corporate executives, thus increasing the outrage costs of SOPs.

3. DEVELOPMENT OF HYPOTHESES

Prior stock option literature generally acknowledges that the favorable accounting treatment of SOPs played a large role in determining their widespread adoption (Hall & Murphy, 2003; Murphy, 2002; Muurling & Lehnert, 2004). Some years after the mandatory adoption of IFRS for European listed companies, the impact of IFRS 2 on the issuing of SOPs can now be tested in terms of real earnings management. In line with the perceived cost stream of research, it is logical to expect that the mandatory recognition of the cost of SOPs reduced the adoption of this form of incentive. This leads to the following hypothesis:

H1: After the mandatory adoption of IFRS 2, the probability of firms issuing SOPs decreases.

Our expectations with regard to H1 are not straightforward. According to the literature, the low visibility of SOPs because of previous accounting treatment is without doubt a relevant benefit for granting stock options. This is particularly true for countries such as Italy where no disclosure on option value was required before the adoption of IFRS 2. Additionally, prior literature shows that the Italian context is characterized by a high degree of earnings management practices (Leuz, Nanda, & Wysocki, 2003). These considerations would imply a significant association with, and expectation of, a negative sign. However, mixed evidence from the aforementioned streams of research may justify alternative expectations. This is consistent with many scholars who argue that the motivations behind, and determinants of, SOPs are not mutually exclusive and that there is not a perspective that is able to single-handedly explain the widespread adoption of SOPs (Hall & Murphy, 2003).

This line of reasoning suggests that change in accounting treatment may not be significant because of a larger role played by other factors after the transition to IFRS 2.

The second hypothesis refers to the impact of the financial crisis on options. According to Murphy (1999, 2002), stock-based compensation may increase during sustained bull markets for two reasons. First, with many SOPs the number of shares to be granted is determined on just one date and fixed for several years. Therefore, in periods of escalating stock prices, the value of shares and options granted will increase relative to cash compensation. Second, participants are more likely to accept stock-based pay instead of cash during prolonged market upturns. As well as the aforementioned considerations, it is worth noting that the financial crisis highlighted some cases of executives receiving extremely high compensation despite poor corporate performance. This caused growing criticism toward SOPs, increasing outrage costs connected to this kind of incentive. Therefore, we expect a negative association between a financial crisis and the granting of SOPs and suggest that:

H2: During a financial crisis, the probability of firms issuing SOPs decreases.

Because of the role played by many different determinants in explaining SOPs, we also postulate and test three hypotheses relating to the major determinants explored by stock option literature.

Thus, the third hypothesis concerns the incentive alignment perspective, with particular regard to the association between growth opportunities and granting SOPs. It is assumed that a firm's need to align employee incentives with those of shareholders is associated with stock option compensation. Consistent with previous studies (Ding & Sun, 2001; Kedia & Mozumdar, 2002; Yermack, 1995), we hypothesize that firms with valuable growth opportunities will grant incentives. This leads to our third hypothesis:

H3: The probability of firms issuing SOPs increases for firms with higher growth opportunities.

Firms facing financial constraints are expected to be more likely to grant options (Core & Guay, 2001; Kedia & Mozumdar, 2002; Matsunaga, Shevlin, & Shores, 1992; Yermack, 1995). Therefore, for our fourth hypothesis we propose that:

H4: The probability of firms issuing SOPs increases for firms facing liquidity constraints.

Finally, taking into consideration Italian regulations, we test tax benefits, which until 2006 favored the personal income tax returns of plan participants, making this form of incentive preferable to cash compensation. Therefore, our fifth hypothesis can be expressed as follows:

H5: After restrictions on tax benefits for SOPs, the probability of firms issuing SOPs decreases.

4. RESEARCH DESIGN

4.1. Empirical Model and Variable Definitions

In order to verify the aforementioned hypotheses, we use a logistic regression model (LOGIT). The model assumes the following relation between the proposed explanatory variables and firms' decisions to issue SOPs:

$$SO_ISSUE_{it} = 1 / (1 + e^{-Z_{it}})$$

$$Z_{it} = \beta_0 + \beta_1 IFRS_2_{it} + \beta_2 CRISIS_t + \beta_3 GROWTH_{it} + \beta_4 OCF_i + \beta_5 TAX_t + \beta_6 LOG_ASSET_{it} + \beta_7 LEVERAGE_{it} + \beta_8 ROA_{it} + \beta_9 REGULATED_i + \beta_{10} MKT_INDEX_t \quad (1)$$

where

SO_ISSUE_{it}	=	dependent variable equal to 1 if the firm i issues stock options in year t , and 0 otherwise;
$IFRS_2_{it}$	=	dummy variable codified 1 if firm i has financial statements prepared in accordance with IFRS 2 (options' value recognized as an expense) in year t , and 0 otherwise;
$CRISIS_t$	=	dummy variable codified 1 if the year t is a year of financial crisis (2009), and 0 otherwise;
$GROWTH_{it}$	=	proxy for the presence of growth opportunities. For firm i in year t the calculation is made by adding together the book value of assets and the difference between the market and book values of common stock, and dividing the total by the book value of assets (approximation of Tobin's q);
OCF_i	=	cash flow from operations for firm i in year t ;
TAX_t	=	dummy variable equal to 0 if in the year t there are tax incentives for issuing stock options in favor of the employee (2000-2006), and 1 otherwise;
LOG_ASSET_{it}	=	log of the total assets for firm i in year t ;
$LEVERAGE_{it}$	=	total debt divided by total equity for firm i in year t ;
ROA_{it}	=	return on assets for firm i in year t ;
$REGULATED_i$	=	dummy variable codified 1 if firm i operates in a regulated industry, and 0 otherwise. We identify the utilities, banking, and insurance industries as heavily regulated;
MKT_INDEX_t	=	market index (FTSE Italia All-Share) of the Milan Stock Exchange at the end of the year t ;
ϵ_i	=	error term.

With regard to our proxy for crisis, it is useful to underline that the negative effects of the global financial crisis on the real economy did not peak at the same time around the world. Because our study focuses on Italy, we use 2009 as the year in which the impact of the crisis on the real economy became evident. This is supported by the main indexes, which exhibited negative signs starting from the last quarter of 2008 and progressively

worsened in 2009 (e.g., 2009 nominal GDP was equal to -5%, the industrial production index was -18%, and private consumption growth was -1.8%).

Consistent with Smith and Watts (1992) and Yermack (1995), our proxy that captures firm growth opportunities is an approximation of the ratio of market-to-book values of firm assets. For this purpose, we define a variable approximately equal to Tobin's q by adding together the book value of assets and the difference between the market and book values of common stock, and dividing the total by the book value of assets.

In line with prior literature, we control for the five variables that we believe affect the decision to issue stock options by including them as independent variables in the model. Three variables enable us to include some firm characteristics in the analysis (size, profitability, and financial sources). Another variable summarizes exogenous factors, such as stock market performance, which could be important determinants for decision-making because of the market-based nature of stock options.

Lastly, as in prior literature (Demsetz & Lehn, 1985; Smith & Watts, 1992) we conjecture that managers in highly regulated industries will receive lower stock option incentives because of the reduced range of managerial discretion. Thus, we identify three highly regulated industries: banking, insurance, and public utilities (Bizjak, Brickley, & Coles, 1993).

Table 1 presents the proxies used for independent variables and the predicted sign of each relationship between covariates and the decision to issue stock options.

Table 1: *Proxies and predicted signs for explanatory variables (the variables are grouped according to the main hypotheses).*

Hypotheses	Predicted sign	Proxies	Explanatory variables
1) Mandatory adoption of IFRS2	(H1) -	Dummy variable (0 = Italian GAAP, 1 = IFRS 2)	IFRS_2
2) Financial crisis	(H2) -	Dummy variable (1 = year of financial crisis in Italy: 2009)	CRISIS
3) Incentive alignment	(H3) +	Approximately equal to Tobin's q	GROWTH
4) Liquidity constraints	(H4) -	Operating cash flow	OCF
5) Tax benefits	(H5) -	Dummy variable (1 = years 2007-2009; 0 = years 2000-2006)	TAX
6) Control variables:			
Firm size		Log of total assets	LOG_ASSET
Leverage		Debt-equity ratio	LEVERAGE
Firm's profitability		Return on assets	ROA
Regulated industries		Dummy variable (1 = regulated industries: banking, insurance, and utilities)	REGULATED
Stock market performance		FTSE Italia All-Share	MKT_INDEX

4.2. Sample and data

The hypotheses are tested on the entire population of Italian listed companies during the period 2000-2009. From this population, we only exclude foreign firms to ensure homogeneity in accounting standards. Consequently, in our sample there are no firms adopting IFRS 2 on a voluntary basis before 2005. Consistent with prior research, we exclude firm-year observations that do not have sufficient data to compute the variables needed to estimate the model. Collectively, these filters yield a sample of 1,616 firm-year observations.

In order to obtain data for our analysis we relied on Capital IQ, a database provided by Standard and Poor's market and accounting data drawn from corporate financial statements. This source provides data for which we need to define both explanatory and control variables. Non-accounting data consist of the approximation of Tobin's q and stock market performance. Accounting data include operating cash flow, total assets, leverage, and return on assets. Both market and accounting data refer to the end of each fiscal year investigated (2000-2009).

5. ANALYSIS OF RESULTS

5.1. Summary statistics

Because our sample ($N = 1,616$) has outlying observations in most of the explanatory variables, we remove them from the analysis. We isolate outliers by means of the simple three-sigma rule (Barnett and Lewis, 1994), thus isolating companies that have:

$$|x - \mu(x)| > 3 \sigma(x) \quad (2)$$

where

$\sigma(x)$ is the standard deviation of the variable (x).

Table 2 shows descriptive statistics for the full sample investigated ($N = 1,555$) after the outlying observation exclusion. As expected, when comparing mean and standard deviation with the minimum and maximum values, Table 2 seems to reveal the absence of outlying observations. It should be noted that only three variables, Tobin's q (GROWTH), the operating cash flow (OCF), and the debt-equity ratio (LEVERAGE) could give rise to outlying observations implied by the values in the 'Maximum' column of the table. These values, however, do not justify further exclusion.

With respect to the growth opportunities variable (GROWTH), it is interesting to note that 75% of the firms in our sample have limited growth opportunities (see the value of q_1). It would be worth analyzing whether the remaining 25% of firms with high-growth opportunities are those that usually issue stock option plans. Additionally, regarding the

leverage variable (LEVERAGE), Table 2 reveals that 75% of our sample's firms have a considerable proportion between debt and equity (debt-equity ratio with values around 1) even if the remaining 25% might also have a high level of total indebtedness (maximum value equal to 13.11).

Table 2: *Summary statistics of explanatory variables (N = 1,555)*

Variable	Mean	Std. dev.	Minimum	q ₁	Median	q ₃	Maximum
Explanatory variables:							
IFRS_2	.634	.4817	0	0	1	1	1
CRISIS	.139	.346	0	0	0	1	0
GROWTH	1.278	.562	.045	.964	1.129	1.416	7.654
OCF	357.508	1,721.839	-17,987	1.863	18.367	117.702	22,720
TAX	.406	.491	0	0	1	1	0
Control variables:							
LOG_ASSET	6.405	1.872	2.368	5.046	6.044	7.561	12.350
LEVERAGE	1.035	1.215	1.00e-06	.340	.759	1.288	13.116
ROA	2.838	4.375	-13.232	.635	2.890	5.212	18.697
REGULATED	.135	.342	0	0	0	1	1
MKT_INDEX	-.049	.230	-.423	-.217	-.105	.158	.243

IFRS_2 = IFRS 2 adoption (dummy variable); CRISIS = year of financial crisis in Italy (dummy variable); GROWTH = approximately equal to Tobin's q; TAX = year of fiscal incentive for stock option in Italy (dummy variable); LOG_ASSET = log of total assets; LEVERAGE = debt-equity ratio; ROA = return on assets; REGULATED = regulated industries (dummy variable); MKT_INDEX = stock market performance (FTSE Italia All-Share).

5.2. Multivariate analysis

Before proceeding to the regression results, we analyze the Spearman (rank) correlation coefficients for variables (Table 3). With reference to the dependent variable (SO_ISSUE), Table 3 shows a significant association between the decision to issue stock options and three explanatory variables: crisis, growth, and operating cash flow. As suggested by the literature, since SOPs offer companies a method for saving cash (stock options represent "cashless" compensation), the lower the operating cash flow generated in the year, the higher the probability of issuing stock options. In this case, however, the positive association does not support traditional expectations. Nonetheless, the signs for the other two variables seem to support stock option literature. With reference to our measure of growth, the positive association reveals that in companies with large growth opportunities, the use of market-based pay mechanisms could be useful in order to introduce an incentive alignment between managers and shareholders. Further, the negative association between periods of financial crisis and stock option issues seems to reveal that the potential excessive benefits related to these market-based pay mechanisms could be reduced during a crisis. Finally, the control variable reveals that the stock option issue seems to be positively associated with firm size and performance.

With reference to independent variables, Table 3 shows that some statistically significant correlation exists. The relative weakness in the correlation coefficients for these variables suggests that multicollinearity is not likely to be a significant issue in the multivariate analysis. The Pearson correlation (untabulated) shows similar results, validating the robustness of the aforementioned results.

Table 3: *Spearman (rank) correlation matrix*

Variables	SO_ISSUE	IFRS_2	CRISIS	GROWTH	OCF	TAX	LOG_ASSET	LEVERAGE	ROA	REGULATED	MKT_INDEX
SO_ISSUE	1										
IFRS_2	0.007	1									
CRISIS	-0.052**	0.305***	1								
GROWTH	0.151***	0.005	-0.140***	1							
OCF	0.211***	-0.066***	-0.027	0.110***	1						
TAX	-0.015	0.627***	0.487***	-0.176***	-0.060***	1					
LOG_ASSET	0.229***	-0.001	-0.010	-0.074***	0.703***	0.000	1				
LEVERAGE	0.023	0.067***	0.067***	-0.054**	0.003	0.086***	0.202***	1			
ROA	0.177***	-0.120***	-0.120***	0.408***	0.437***	-0.045*	0.224***	-0.145***	1		
REGULATED	0.010	0.009	0.009	-0.129***	0.160***	0.026	0.252***	0.011	-0.063***	1	
MKT_INDEX	0.042*	-0.604***	-0.604***	0.276***	0.018	-0.389***	0.025	-0.054**	0.141***	-0.003	1

This table provides the Spearman (rank) correlation matrix for explanatory and dependent variables. Values indicated in bold show statistically significant relationships between variables. *, **, and *** indicate statistical significance at less than 10%, 5%, and 1% levels respectively (two-tailed). Pearson correlation shows similar results.

SO_ISSUE = stock option issues (dummy variable); IFRS_2 = IFRS 2 adoption (dummy variable); CRISIS = year of financial crisis in Italy (dummy variable); GROWTH = approximately equal to Tobin's q; TAX = year of fiscal incentive for stock options in Italy (dummy variable); LOG_ASSET = log of total assets; LEVERAGE = debt-equity ratio; ROA = return on assets; REGULATED = regulated industries (dummy variable); MKT_INDEX = stock market performance (FTSE Italia All-Share).

Table 4 presents the results of the logistic regression. As already shown in the univariate analyses, the regression coefficients for two explanatory variables (CRISIS and GROWTH) are statistically significant at less than 5% and 1% levels respectively, with signs that support our hypotheses. Specifically, the estimate for the former dummy variable (CRISIS, significant at a .02 level) reveals that the probability of issuing stock options decreases during periods of financial crisis (H2). In order to interpret the possible effect of the dependent variables on the probability of issuing stock options, we take into account the transformation of the regression coefficients (odds ratios).

Since our variable (CRISIS) denotes the presence (1) or the absence (0) of financial crisis in year t , the odds ratio equal to 0.25 indicates that the relative probability of a firm choosing to issue stock options decreases by 75% in years of financial crisis. This result supports the predicted negative association (H2), confirming that during a financial crisis firms are less likely to grant stock options. Such a finding is consistent with the reduced incentive (Murphy, 1999; 2002) and heightened outrage costs associated with this kind of compensation, as confirmed by anecdotal evidence.

With reference to the other variable (GROWTH, significant at a .000 level), the value and sign of the coefficient reveal that the higher a firm's growth opportunities, the higher the probability of issuing stock options. Because of the variable's unit of measure, the interpretation of odds ratios for Tobin's q is not very enlightening. It is more relevant to look at the marginal effect of a firm's growth opportunities on its decision to issue SOPs. In particular, a mean 1% change in Tobin's q is associated with a 1.7% increase in the probability of granting an SOP.

With reference to control variables, Table 4 shows that a firm's size (LOG_ASSET) is positively associated with the decision to issue stock options, significant at a .000 level. This result agrees with the findings of prior stock option literature. Further, in the U.S. context, empirical evidence from prior studies shows that firm size is positively associated with the voluntary recognition of the costs of SOPs. This is in line with our results and suggests that IFRS 2 did not have a relevant impact on the issuing of SOPs because larger firms (which are more likely to adopt SOPs) are less affected by the mandatory recognition of stock option costs.

The other control variables included in the model are not significant at conventional levels. This suggests that they are not relevant determinants in the decision to issue SOPs.

These results, taken together, support the following considerations of our main hypotheses: (i) IFRS 2's introduction has not induced a reduction in the use of SOPs (H1); and (ii) the issue of stock options is much more likely in years without a financial crisis than in years with a financial crisis (H2). With regard to the three hypotheses relating to the major determinants explored by stock option literature, only H3 seems to be confirmed by empirical results, suggesting that the probability of issuing SOPs is higher for firms with better growth opportunities. Estimates do not show that liquidity constraints (H4) and tax benefits (H5) have a significant impact on the granting of SOPs.

Table 4 Panel A indicates the model's goodness of fit for explaining the issuing of SOPs, with a likelihood-ratio chi-squared significance at less than .000, a hit rate of 94.92%, a McFadden pseudo- R^2 of .2585, and a Nagelkerke pseudo- R^2 of .298 (untabulated). The model's goodness of fit should be considered, bearing in mind not only the fact that pseudo- R^2 should not be confused with R^2 for OLS regression, but also that it is often a small value.

In order to deal with concerns about a failure to meet assumptions, we regress logit, estimating the standard errors clustered by firm (Petersen, 2009). Consistent with our univariate results, collinearity diagnostics do not highlight issues for the independent variables, with variance inflation factors (VIFs) lower than 2.5. To check the stability of our results, we re-test our model using alternative proxies for covariates. Estimates (untabulated) do not substantially differ after these robustness checks.

Table 4: *Logistic regression results*

Panel A – Model summary - goodness of fit									
Log-likelihood = -233.790				Number of obs.	=	1,555			
				Wald chi² (10)	=	86.01			
				Prob > chi²	=	0.000			
				Pseudo R²	=	0.258			
Panel B – Estimated coefficients									
LOGIT	Variable	Hypo-thesis	Predicted sign	Coeff.	Std. err.	z	P > z	[95% conf. interval]	
Explanatory variables									
	IFRS_2	(H1)	-	.560	.361	1.55	0.121	-.148	1.268
	CRISIS	(H2)	-	-1.374**	.592	-2.32	0.020	-2.534	-.2148
	GROWTH	(H3)	+	.908***	.342	2.66	0.008	.238	1.578
	OCF	(H4)	-	.000	.000	0.18	0.854	-.000	.000
	TAX	(H5)	-	-.014	.333	-0.04	0.967	-.667	.6396
Control variables									
	LOG_ASSET			.681***	.109	6.27	0.000	.468	.893
	LEVERAGE			.010	.192	0.05	0.960	-.366	.385
	ROA			.099	.086	1.15	0.249	-.069	.267
	REGULATED			-.462	.613	-0.75	0.452	-1.662	.741
	MKT_INDEX			-1.137	.696	-1.63	0.103	-2.501	.229
	constant			-9.908	.957	-10.35	0.000	-11.784	-8.032

This table shows coefficients from logistic regression (LOGIT), with standard errors clustered by firm. We illustrate Wald Statistics, Log Likelihood and McFadden pseudo-R². *, **, and *** indicate significance at less than 10%, 5%, and 1% levels respectively. IFRS_2 = IFRS 2 adoption (dummy variable); CRISIS = year of financial crisis in Italy (dummy variable); GROWTH = approximately equal to Tobin's q; TAX = year of fiscal incentive for stock options in Italy (dummy variable); LOG_ASSET = log of total assets; LEVERAGE = debt-equity ratio; ROA = return on assets; REGULATED = regulated industries (dummy variable); MKT_INDEX = stock market performance (FTSE Italia AllShare).

6. CONCLUSIONS

In the last few decades, many studies have explored corporate and external determinants of the granting of SOPs to employees, providing mixed evidence that has supported different explanations for this phenomenon.

Our study aimed to explore the impact of two recent events: the mandatory recognition of SOPs imposed by IFRS 2 and the recent financial crisis. These two external factors were expected to have a significant impact on corporate compensation policies. With regard to IFRS 2, studies proposing a perceived cost view, and the intense lobbying activity against the standard, suggest that a less favorable accounting treatment (the cost recognition of SOPs) could affect the use of SOPs, with a significant reduction in the number of firms issuing options. The financial crisis was also expected to have a negative impact on SOPs

because of political and outrage costs. These increased when the crisis started to affect the real economy.

A number of benefits and advantages are associated with stock options in prior literature (Muurling & Lehnert, 2004). We tested the impact of these further by taking into consideration the traditional SOP determinants. In particular, we tested minor hypotheses regarding the incentive alignment view and the roles of liquidity constraints and tax benefits.

Thus, we ran a logit regression, adopting the granting of stock options to employees in a specific year (0/1) as a dependent variable. As covariates, we used five variables from our hypotheses (IFRS 2 mandatory adoption, financial crisis, growth opportunities, liquidity constraints, and tax benefits) and controlled for size, leverage, profitability, industry, and stock market performance.

Contrary to the considerable emphasis placed by previous studies on the accounting treatment of SOPs, our work indicates that the increased transparency provided by the mandatory adoption of IFRS 2 (H1) did not result in firms issuing fewer SOPs. It is relevant to point out that our results are obtained over a five-year period after first time adoption (FTA), and hence, they are not limited to the immediate effect of IFRS 2, an effect that could be misleading because of the multi-year design of SOPs. This interpretation is consistent with prior literature because it claims that a specific benefit cannot single-handedly explain corporate behavior and that the influence of different advantages can change over time.

With reference to H2, our findings match Murphy's (2002) and lend empirical support to the observation that a financial crisis reduces the probability of firms issuing stock options. We interpret the results as evidence in support of the idea that a financial crisis not only affects the incentive power of SOPs, but could also increase outrage costs. These two factors seem to be major barriers against the issuing of SOPs. This is not surprising and can be seen as a reaction to growing criticism toward SOPs prompted by cases of executives receiving extremely high compensation despite poor corporate performance.

Consistent with our predictions, growth opportunities (H3) seem to influence the decision to issue SOPs, increasing the probability of using stock-based compensation. This matches the incentive alignment view and is also consistent with the idea that SOPs are adopted when their incentive power is higher, a proposal confirmed by the fall in firms issuing options because of the financial crisis. In contrast, empirical evidence does not support H4 and H5, suggesting that financial constraints and tax benefits are less significant in explaining corporate practices.

Our work has both theoretical and policy implications. First, it contributes to the stock option literature by suggesting that the recent financial crisis has played a role in reducing the number of SOPs issued. This could be explained by increased outrage costs related to this kind of compensation. Our findings also support the idea that the mandatory

introduction of IFRS 2 has not induced a reduction in the use of SOPs, contrary to expectations deriving from the perceived cost view. In this context, the present study also contributes to existing research on the impact of IFRS 2 and has important policy implications about the real effect produced by the increased transparency of SOPs. Finally, unlike most IFRS literature, our interest is not in market reactions or earnings quality, but in the real effect on firms' behavior. This is extremely relevant from a standard setting point of view.

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