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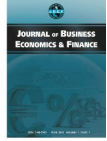
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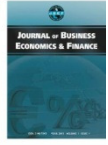
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OPTION VERSUS EQUITY COMPENSATION: THE EFFECT OF INVESTMENT POLICY, DIVIDENDS AND BANKRUPTCY

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KEYWORDS

Executive compensation, investment policy, dividends and bankruptcy.

ABSTRACT

This study models the sensitivity of option versus equity compensation to changes in a firm's investment risk, dividends and bankruptcy costs. Optimal executive compensation is determined by the Nash equilibrium of a two-player game in which the executive chooses the investment, financing and payout policies of the firm, while the shareholders set compensation policy. The model indicates that firms with higher investment risk and higher costs of bankruptcy will use relatively more equity compensation, while firms paying a higher dividend will use relatively more option compensation.

1. INTRODUCTION

Equity holders delegate most business decisions, including the investment and payout policies of the firm, to executives, while retaining for themselves control over the compensation of those executives. To motivate executives effectively, equity holders must introduce forms of variable compensation, e.g., equity participation and options. This study examines the use and efficacy of these forms of compensation to motivate executives employed by firms with different features, i.e., different levels of investment risk, optimal dividends and bankruptcy costs.¹ While the literature on executive compensation has burgeoned in recent years, there has been little attention to how compensation varies between different types of firms. Some empirical studies have looked at compensation within specific industries, e.g., utilities (Joskow *et al.*, 1996), banking (Barro and Barro, 1990), pharmaceuticals (Offstein and Gnyawali, 2005), and technology (Makriet *et al.*, 2006), but comparative studies have not been done. This deficiency is particularly egregious from the theoretical perspective, where models of executive compensation have wholly neglected firm differences. This study hopes to rectify this gap. In particular, the model finds that firms with higher investment risk and higher costs of bankruptcy will use relatively more equity compensation, while firms paying a higher dividend will use relatively more option compensation.

¹ (Schrenk, 2007a) applies this approach to examine how optimal compensation responds to different macroeconomic environments.

2. THE MODEL

The model² represents the interaction of two agents: equity holders and executives. Equity holders are well diversified, while executives are risk-averse and receive all of their wealth from their human capital 'invested' in the firm. Executives and equity holders interact within the context of the firm. Executives are delegated control over the investment, financing and payout policies of the firm and set these to maximize the utility of their own compensation. Executives are compensated through two contingent claims: option compensation, a European call upon the value of equity (contingent upon the terminal value of the equity); and, second, equity compensation, a dividend cash flow and a capital gains cash flow. But to model the risk-averse executive, we must further introduce a non-linearity in the form of a utility function with the risk-averse characteristics described below. The value of compensation to the executive is the non-linear, discounted utility of these two contingent claims. Equity holders retain control over the compensation policy. Executives set policies to maximize the utility of their compensation; equity holders set executive compensation to maximize the value of their equity claim.

The approach develops a discrete model using a binomial tree structure to represent the value processes of the firm and the securities valued upon it. Executives, under a given compensation structure, will choose the optimal corporate policies (from a discrete set of possibilities) maximizing their own utility.

The executive-equity holder conflict is modeled as game between these two agents. If executive action were contractible, then equity holders could always reach the first-best value-maximizing solution. Unfortunately this is not possible, so equity holders must make decisions within an incomplete contracts environment. Equity holders do not have the specialized knowledge required to set optimal investment, financing and payout policies, but they do know the utility functions, risk preferences, etc. of executives and can therefore (with certainty) determine how executives will set the policies of the firm given a specific compensation package. Thus, equity holders must select the compensation plan which is the best response to the predictable decisions of executives under a set of exogenous parameters. Optimal compensation is the Nash equilibrium between the compensation policy (set by equity holders) and the investment, financing and payout policies (set by executives).

2.1. The Firm

The firm begins with an initial equity endowment, and executives, by implementing different policies, may alter firm value. In investment policy, the firm has the opportunity to accept a finite number of risky, positive net present value projects. The executive selects the aggregate level of risk by choosing the volatility, modeled by the standard deviation, of total investment. Second, the level of debt issued by the firm is represented by the coupon paid to debt holders. Finally, there is also an exogenous benefit to a positive dividend payout (independent of the investment policy). As with investment risk and financing, there is an optimal dividend payout that maximizes the unlevered firm value with respect to the dividend payout. While we do not endogenize this function, there is ample evidence of a positive benefit to the payout of dividends due to informational and agency problems.³ Once firm policies have been established, firm value follows a geometric Brownian motion.

² The details of the model are more fully developed in (Schrenk, 2007b).

³ Cf. (Lease et al., 1999) for a broad perspective.

We assume that the equity and bonds are issued by the firm in a complete market and thus use the no arbitrage framework of (Leland, 1994) to determine values for the firm's equity and debt: a fundamental differential equation eliminates the stochastic component through a replicating portfolio and determines the value of all instruments or claims deriving from that security. A formula for valuing each instrument is derived by specifying appropriate boundary conditions with the resulting specifications for the levered firm and the value of the equity.

2.2. The Agents

The model has two agents: the executive and equity holders. Executives receive only their compensation from the firm. All executive cash flows are consumed; executives do not save and do not hold independent portfolios (and therefore cannot hedge the risk of variable compensation⁴). Further, the executive is risk-averse, that is the executive's utility function, is twice differentiable, additive and time independent, i.e., a standard von Neumann-Morgenstein utility function.⁵ We use a simple negative exponential utility function, satisfying the general conditions ($u' > 0$, $u'' < 0$) for a risk-averse utility function (when $\beta > 0$) with $\beta = 0.25$. By contrast, equity holders are diversified and only concerned with the expected value. Their utility is thus monotonically increasing in the level of their wealth, so we need not specify an explicit utility function for equity holders. Instead, we may proxy equity holder utility by their monetary payouts.

While there is, in practice, a great range of forms of variable compensation, we consider the two most common. First, executives may receive compensation in the form of equity participation in the firm, i.e., a restricted equity plan. That is, conditional upon the solvency of the firm, executives receive dividend cash flows throughout their tenure, but obtain capital gains only at a terminal date. Second, executives may receive option compensation in the form of European call options that can be exercised at the termination date.⁶ These forms of compensation differ in two ways: they have different effects on the behavior of executives, and they have different compensation costs to equity holders.⁷ In general, these two factors will have opposing effects, i.e., compensation that more readily aligns executive-equity holders interests are also the most costly to grant, since risk-averse executives discount its value more severely.⁸ The core trade off in the model is between the efficacy of compensation in motivating executives to implement optimal corporate policies (through its effect on their utility) and the cost of that compensation to equity holders.

The option and equity compensation is initially expressed as a proportion of unlevered firm value: thus, a 1% equity position is a restricted equity grant equal to 1% of the value of the unlevered firm, and a 2% option position is a European call on 2% of the value of the unlevered firm with an exercise price equal to the initial value of the firm and an expiration date equal to the terminal period. After the compensation is awarded, executives select the capital structure maximizing

⁴(Ofek and Yermack, 1999) show that managers may 'unwind' positions if they can sell shares which they already own.

⁵This environment is an application of the more general model developed in (Mirrlees, 1976), (Holmström, 1979), and (Grossman and Hart, 1983).

⁶These characteristics are consistent with what managers typically receive (Murphy, 1998).

⁷I distinguish between two types of costs to which the equity holders are exposed: first, the compensation costs (introduced here) derived from the compensation paid to the manager, and, second, the incentive costs (discussed below) that are the opportunity costs of not setting corporate policies optimally.

⁸The lower valuation by executive can be considerable: (Meulbroek, 2000) estimates that the value of option compensation to executives in the case of Internet firms to be only 53% of the total cost to the firm.

utility. Since the grant of an equity stake to executives is restricted and the options cannot be exercised early, we assume that executives neither participate in the equity repurchase nor exercise options prior to the terminal date, and their equity and option proportions are adjusted for any change in the leverage of the firm.

Each agent has choice variable(s) corresponding to the areas of corporate policy under their sway. Executives have control over investment, financing and payout policies: they may choose the level of aggregate investment risk (as measured by the standard deviation of aggregate investment), the level of debt issued by the firm (as represented by the coupon paid to debt holders), and the payout to equity holders (in the form of the dividend yield). Equity holders select the level and mix of compensation paid executives: equity participation in the firm and options on the equity of the firm.

The objective function that must be constructed from these elements is complex, but in general form it follows the traditional agency model,⁹ except that it is not slacking, but sub-optimal policies that equity holders seek to ameliorate. The goal of the executive is to set optimal investment, financing and dividend policies to maximize their own utility. Equity holders seek to maximize their equity gain. Unfortunately, a closed form solution to this stochastic control problem is not possible. As an alternative approach, we use a numerical solution for a simplified, discrete analogy to this problem.

2.3. Incentive Costs versus Compensation Costs

The loss due to a lack of congruence between the objectives of principals (equity holders) and agents (executives) is typically described as an agency cost. To develop our analysis further, we distinguish between the opportunity costs associated with sub-optimal corporate policies and the loss due to a need to compensate the executive. The former are designated 'incentive costs' and are associated with an inability to induce the executive to set policies first-best policies; the latter are called 'compensation costs' and result from the payment of compensation to executives. Optimal compensation design is a trade off between the resolution of incentive costs and the cost of compensation. In some scenarios, if the executive can be induced to set first-best corporate policies, it will be possible to eliminate all incentive costs, so the agency cost will only be the compensation cost. In other situations, however, due to conflicting risk preferences of equity holders and executives, it will not be possible to avoid incentive costs; the compensation necessary to motivate a risk-averse manager to enact first-best policies may be greater than the gain from eliminating all incentive costs, so that second-best solutions are all that may be obtained.

2.4. Model Structure

We construct (for a given set of parameters) a binomial tree of the price paths of the unlevered firm. At each node, we can then price equity using the Leland equity formula to obtain a binomial tree of levered equity values (Leland (1994)). The utility received by the executive at each node is the value of the utility function for the total compensation received at that node. Since there is a time value to utility, executives discount the utility at each node by the intertemporal discount rate of utility. Utility is assumed to be independent and additive, so the aggregate utility of a

⁹Cf. (Campbell, 1995) for the general agency model.

compensation structure is the sum of the weighted¹⁰ discounted utility at each node. We utilize a grid search to find the corporate policies that maximize executive utility for a specified compensation structure.

To explore the implications of this model we use a benchmark set of parameters:¹¹ The firm's initial equity endowment is \$1,000.00. The risk free rate of interest is assumed to be 5% and the corporate marginal tax rate 40%; the former is a typical value for that rate over a long-term economic horizon, later approximates the marginal tax rate for a large corporation. Following general practice, option compensation is awarded at-the-money, and it has a five-year expiration date. The cost of bankruptcy is 10%.

3. THE RESULTS OF THE MODEL

We examine the sensitivity of optimal compensation to variations among individual firms, since we know that executive compensation is sensitive to industry differences.¹² We capture the dissimilarity among firms with three exogenous parameters: First, firms have investment opportunities with varying degrees of optimal risk. Second, firms have divergent optimal dividend yields. And, finally, firms face disparate costs of bankruptcy. As these parameters fluctuate, so too must optimal compensation design.

In analyzing these sensitivities, it is useful to differentiate two ways in which changes in exogenous parameters may affect optimal compensation: 1) by altering the value of the firm's securities (upon which compensation is based) and 2) by altering the incentives for executives setting the policies of the firm. @@@The former are *direct* effects on the value of the equity issued by the firm and of derivative securities written upon that equity. Changes in the value of these securities in turn affect the cost of compensation. The latter are *indirect* effects: changes in exogenous parameters may cause executives to alter corporate policies and changes in corporate policies also influence the cost of compensation. The comparative statics results will be the net outcome of direct effects on the instruments of compensation as well as indirect effects upon compensation mediated through changes in corporate policies.

3.1. Investment Risk

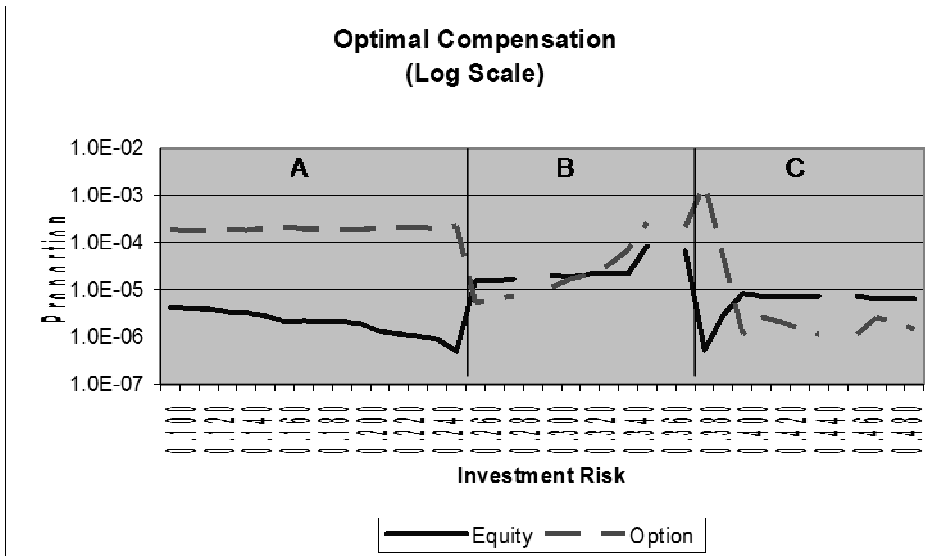
The investment opportunities available to firms are modeled by an investment risk function, which is concave in the aggregate investment risk. The maximum value added to the firm from undertaking investment risk is constant, but the level of risk capturing that value varies. The maximum of that function specifies the optimal level of investment risk, i.e., the level of risk that will *ceteris paribus* maximize firm value. Figure 1 shows how the two forms of compensation respond as the optimal level of investment risk is increased:

¹⁰For simplicity, we use the pseudo probabilities as weights.

¹¹ While many typical values are used in the benchmark, this is not to imply that the model is in any way 'calibrated' to real market conditions.

¹² For example, on utilities, cf. (Joskow *et al.*, 1996) and on banking, cf. (Barro and Barro, 1990)

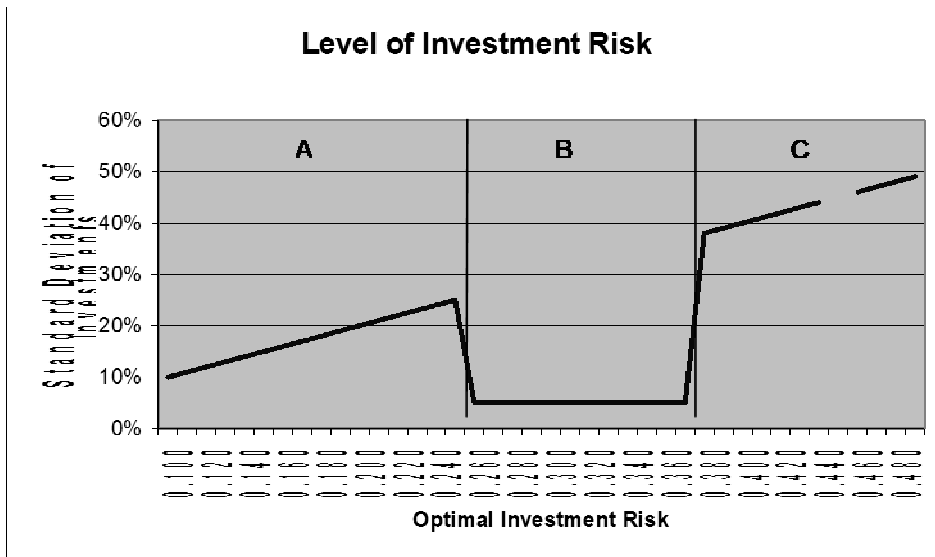
Figure 1: Optimal Compensation as a Log Function of the Optimal Investment Risk.¹³



Since the maximum of the function is the first-best risk level from the perspective of equity holders, as the maximum increases, the optimal compensation design must motivate executives to undertake increasing risky investment. Because executives are risk-averse, the composition of the optimal compensation design shifts as higher levels of risk must be achieved. The optimal solution must balance the executive’s utility from the higher cash flows of variable compensation with the disutility of the higher volatility.

At lower levels of optimal investment risk (Region A), option compensation provides more effective motivation for the executive to undertake risky investment. Figure 1, however, shows that this relationship is not constant over different levels of investment risk. Instead as the optimal level of risk rises, there is a shift from option to equity compensation. Figure 2 shows the effect of increasing the optimal investment risk on the level of risk actually selected by the executive:

¹³ Gaps indicate values for which there were difficulties in obtaining a numerical solution

Figure 2: Actual Investment Risk as a Function of the Optimal Investment Risk.

When the optimal risk level is sufficiently low, option compensation is used to motivate risky investment. As the target increases, however, it is no longer possible to use option compensation since the disutility of its volatility is excessive, and a first-best investment policy cannot be attained (Region B); here sub-optimal investment levels are set with the consequent incentive costs. Once the optimal investment risk is sufficiently high, a level is reached at which the first-best solution is again possible (Region C), but now that solution is reached by compensating the executive more with equity than options.

The first shift (from Region A to Region B) is easily explained as an incentive cost spawned by the risk-aversion of the executive: the higher optimal investment risk increases the risk of the first-best investment policy, but not the value (since that is held constant). Higher option compensation must be paid to the executive, but, since there is no increased value, a point is reached when it is no longer cost effective to increase the option compensation, so there is sub-optimal investment by the firm. Over Region B, the same analysis holds and the firm continues to bear the investment incentive cost.

The unusual result of the model is that at higher levels of optimal investment risk, not only is the first-best investment policy again feasible, but it can be motivated by equity compensation. This outcome is the effect of the higher optimal investment risk on the incentive effects of equity compensation. There is a trade off for the executive: while volatile forms of compensation are needed to motivate the executive to undertake risky investment,¹⁴ if that volatility is too high, the concavity of the utility function eliminates the gain in utility. Compensation is only an effective when it falls within a 'risk window': volatile enough to motivate risky investment, but not so volatile that its utility is destroyed. The volatility of compensation is a function of two factors: 1) the type of compensation, option (higher risk) or equity (lower risk), and 2) the level of investment

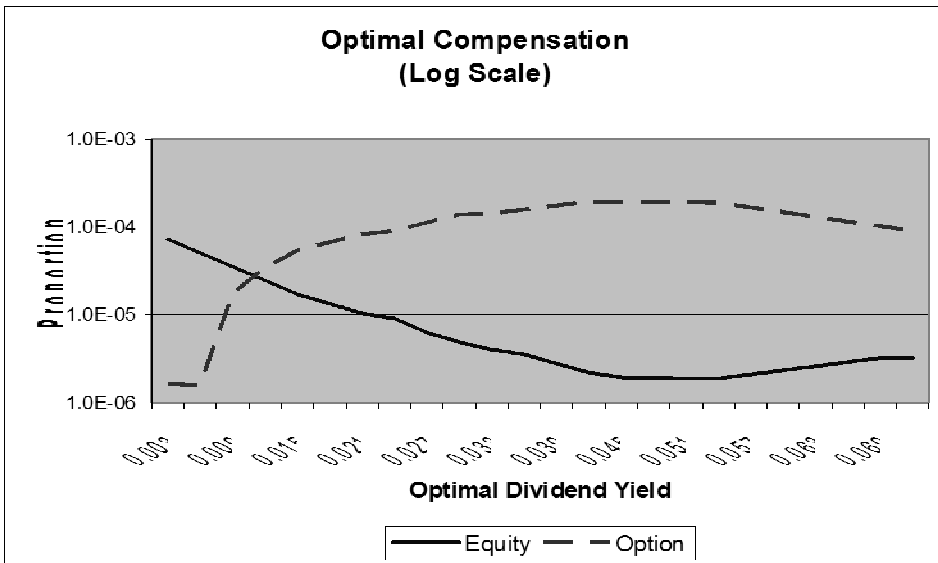
¹⁴ (Coles *et al.*, 2006) show the sensitivity of CEO wealth to equity volatility induces riskier corporate policies. (Chen *et al.*, 2006) show that option compensation induces risk in the case of banks, while (Ghosh and Sirmans, 2006) shows the same result for REITs.

risk. When the optimal investment risk is low (Region A), option compensation falls within the risk window, while the volatility of equity compensation is too low. At moderate levels of optimal investment risk (Region B), the volatility of equity compensation is still insufficient, while option compensation is now excessively risky—neither falls within the risk window and the first-best investment risk is not obtained. Finally, when the optimal investment risk is high enough (Region C), equity compensation is sufficiently risky to motivate the first-best level of investment risk.

3.2. Dividend Yield

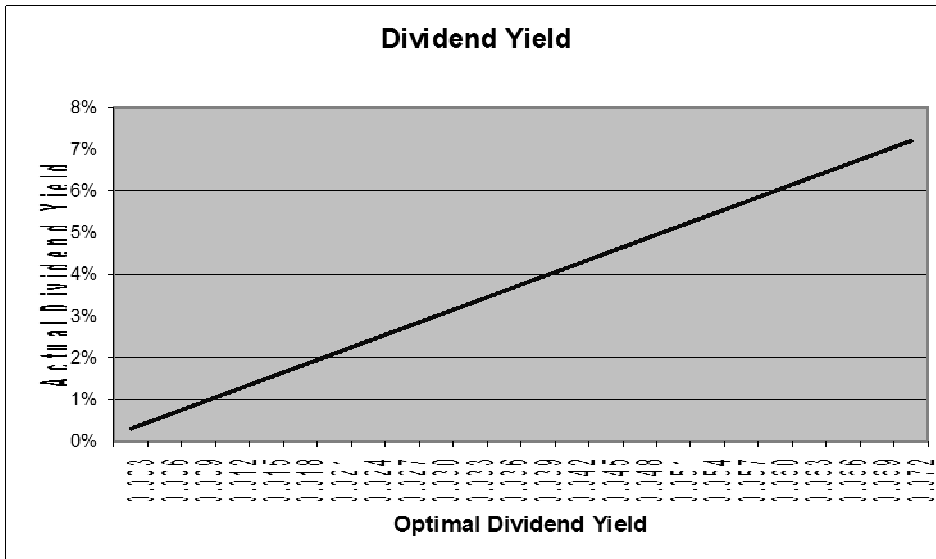
The model also introduces an exogenous advantage from dividends.¹⁵ The dividend yield function is concave in the dividend yield. The maximum of that function specifies the optimal dividend yield, i.e., the dividend yield that will *ceteris paribus* maximize firm value. The value added to the firm from paying out the optimal dividends is constant, but the level of dividend achieving that value varies.

Figure 3: Optimal Compensation as a Log Function of the Optimal Dividend Yield.



As we can see in Figure 3, option compensation is increasing in the optimal dividend yield while equity compensation is decreasing. Nonetheless, over the entire range of optimal dividend yields, the first-best dividend yield is maintained, so that firms do not suffer incentive costs (Figure 4):

¹⁵(Lambert *et al.*, 1989) and (Lewellen *et al.*, 1987) study the relationship between dividends and compensation.

Figure 4: Actual Dividend Yield as a Function of the Optimal Dividend Yield.

Initially, this shift from equity to option compensation may appear counter-intuitive—we would normally associate dividend payments with equity compensation.¹⁶ The reasoning is that executives holding a restricted equity grant have rights to dividends payments even before any vesting occurs¹⁷ and thus directly benefit from an increased dividend yield. By contrast, option compensation gives no claim upon dividends. Further, any payment of dividends lowers the value of the share price, and, consequently, the value of options written on the firm's equity. So it is perplexing to understand why *prima facie* the model would suggest that sustaining a higher dividend yield would require option compensation. But such reasoning remains valid only when we consider the effect of dividends *simpliciter*; it does not take into account the joint modeling of both investment risk and dividends.

In this model, the firm gains value from *both* making risky investments *and* paying dividends. A higher dividend 1) decreases the value of the firm and 2) (in the presence of financial leverage) increases the volatility of equity cash flows—the firm is both worth less and more risky. In response, greater option compensation must be awarded to maintain the same incentives and utility to the risk-averse executive. The increase in option compensation is due to the need to continue to motivate risky investment while the firm is more volatile due to the increased dividend.

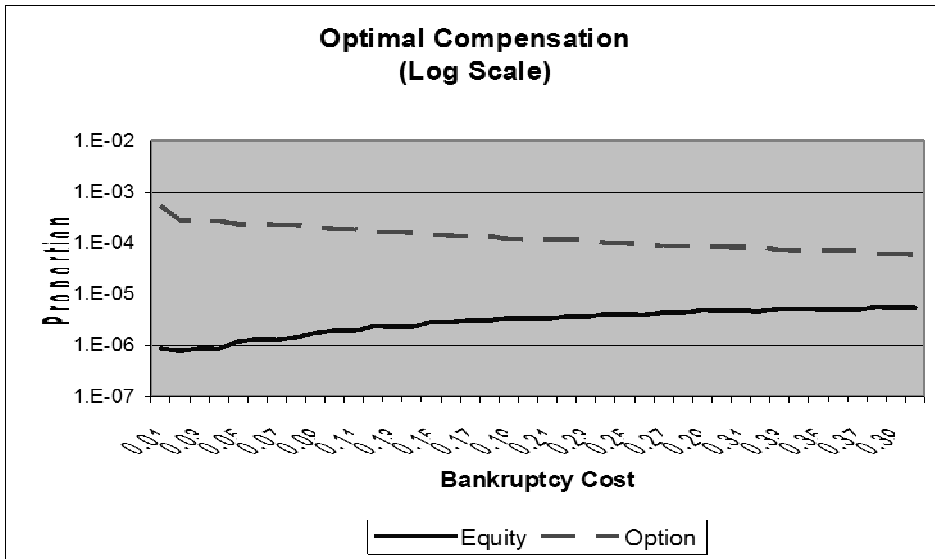
¹⁶ (Brown *et al.*, forthcoming) find that greater executive ownership leads to higher dividends, but they do not, as here, consider the effect of different levels of dividends. (Chetty and Saez, 2005) also support the compensation-dividends connection when they find that, after the 2003 dividend tax cut, firms with high executive ownership and low option compensation were particularly likely to increase dividends.

¹⁷ This is how equity compensation is implicitly modeled here, since the model does not try to capture vesting.

3.3. Bankruptcy Cost

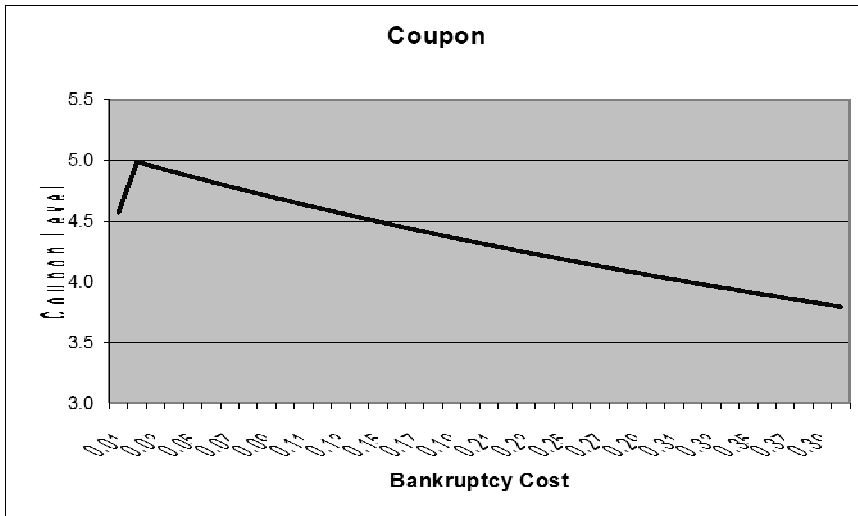
Our final firm parameter is the deadweight cost of bankruptcy. As is well documented, firms face varying costs associated with financial distress and bankruptcy. Here the bankruptcy cost is the deadweight loss to the firm (expressed as a proportion of firm value) associated with bankruptcy. As this cost increases, there is an obvious effect on both the debt and the equity of the firm. Further, however, there is an additional impact upon the optimal compensation awarded to the executive. Figure 5 shows the change in compensation design as the cost of bankruptcy increases:

Figure 5: Optimal Compensation as a Log Function of the Bankruptcy Cost.



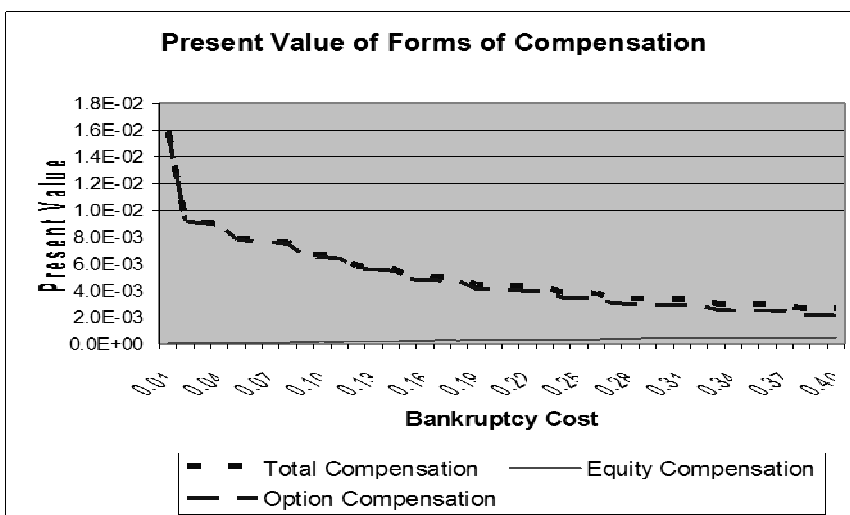
As in the case of investment risk, we see a shift from option to equity compensation. The main influence of bankruptcy costs is on the amount of debt issued by the firm, so, while the executive always implements the first-best debt policy, the optimal level of debt decreases as bankruptcy costs increase (Figure 6):

Figure 6: Debt Coupon as a Function of the Bankruptcy Cost.



When the debt levels moves downward, compensation shifts toward equity compensation because less option compensation is required to achieve the first-best investment level. The higher cost of bankruptcy has reduced the firm’s ability to support debt. This lowers the volatility of firm cash flows and alters the utility obtained from the various forms of compensation. Option compensation, in particular, is now less risky and generates more utility for the risk-averse executive. As firm risk declines, the level (and cost) of option compensation also declines, as less is needed to motivate the executive to set the first-best level of investment. Figure 7 shows how the cost of option (and correspondingly total) compensation is reduced by higher bankruptcy costs:

Figure 7: Compensation Cost as a Function of the Bankruptcy Cost.



While increased bankruptcy costs do lower the value of the firm, they also introduce compensation savings. Thus, the model predicts that the proportion of option compensation will be declining in the cost of bankruptcy.

4. CONCLUSION

This study shows how the optimal compensation package (as a mixture of option and equity awards) responds to changes in the level of investment risk, dividends and bankruptcy costs of the firm.

Investment Risk: As the optimal level of risky investment increases, the concave utility function of the executive places a ‘ceiling’ on the risk acceptable to the executive, and option compensation become too expensive. Also at higher levels of investment risk, equity compensation becomes more efficacious in motivating investment risk, so there is a shift from option to equity compensation.

Dividend Yield: At higher dividend yields the firm losses value and gains volatility. To maintain a consistent level of executive utility, option compensation must be increased resulting in a shift from equity to option compensation.

Bankruptcy Costs: A higher cost of bankruptcy lowers optimal debt levels and firm risk. This, less option compensation is required to achieve the first-best investment level, and there is a shift from option to equity compensation.

While it is widely acknowledged that executive compensation should contain some performance-based reward, we lack a model that explains the specific types of variable compensation needed for firms with different properties. It is too often assumed that these different forms of compensation are (at least approximate) substitutes. In addition, executives are multitasking—while the abstract goal may be to increase the value of the firm; this is achieved through different, concrete channels, e.g., investment vs. financing. This model shows that the relationships between different forms of compensation and corporate policies are complex and depend on the specific character of individual firms: what is optimal compensation for one firm will not necessarily be optimal for another.

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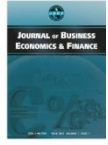
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SHORT AND LONG-TERM EFFECTS OF SEPTEMBER 11 ON STOCK RETURNS: EVIDENCE FROM U.S. DEFENSE FIRMS

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Terrorism, volatility, GARCH, event study.

ABSTRACT

Using the multivariate regression methodology, we investigate the short-term effect of September 11, 2001 on US defense firms. Our findings suggest that the market differentiated among US defense firms based on the percentage of defense sales to total sales. In addition, the behaviour of the abnormal returns does not change when we use models that account for time variation of stock return volatility (GARCH). In the long-term, our results suggest that the US defense firms only outperform over a twelve-month period. However, the significant abnormal performance disappears over an eighteen-month period.

1. INTRODUCTION

The objective of this paper is to study the short- and long-term performance of the US defense industry in the aftermath of September 11. We would naturally expect that US defense firms would be positively affected because of the potential increases in US defense spending. Indeed, the total cost of US military operations from fiscal year 2001 through May 2007 reached \$610 billion (Congress Report Service, 2007 (CRS)). Of this total, CRS estimated that Operation Iraqi Freedom received about \$450 billion (74%), Operation Enduring Freedom (Afghanistan) about \$127 billion (21%), and enhanced base security about \$28 billion (5%), as well as another \$5 billion that CRS could not allocate (1%). The Congressional Budget Office estimated that war costs for the next 10 years could be anywhere from \$1 trillion to \$1.45 trillion by 2017. Some economists believe that the cost of the Iraq War could even exceed \$2 trillion by 2015 (Bilmes and Stiglitz, 2006). Conversely, the impact of the event could be negative because of the existence of civilian activities in US defense firms. For example, Boeing, which is a very important contractor to the US Department of Defense, also has civilian activities and is in fact a major player in the aerospace industry. According to the CEO of Boeing, Phil Condit, the company has experienced the biggest downturn ever on the commercial side and a significant growth on the defense side (BBC interview, September 2, 2002). Several factors justify such studies. First, unlike the previous papers that studied the impact of the short-term effect of September 11 (Carter and Simkins, 2004; Chaudry, 2005; Chen and Siems, 2004; Hon, Strauss and Young, 2004; Karyoli and Martell, 2010), very few have studied the attack's long-term effect on stock prices (Chaudry, 2005; Richman, Santos and Barkoulas, 2006).¹ Second, to the best of our knowledge, this research is the first to assess the performance of US defense firms after September 11. This contrasts with

¹ These studies have captured the long-term effect by estimating the beta after September 11. In our study, we use stock return to assess the performance of US defense firms.

previous research focusing on the effect of September 11 on US firms in general (Carter, 2006; Chaudry, 2005; Karyoli and Martell, 2010). Third, a similar attack could happen again. It would be useful from a portfolio management perspective to identify those firms that would be less affected and to assess their performance. For instance, many corporate executives believe terrorism related business risks will increase in the coming years (Lloyd's of London, 2007).

In this investigation and for the short-term, we use a multivariate regression model methodology (MVRM) to assess the short-term effects of this event. The use of this technique allows us to test a number of hypotheses including whether the market reaction was uniform among defense firms or whether there was differentiation based on firm specific characteristics.

To assess the long-term effect of September 11 and given the sensitivity of abnormal performance to specific measurement methods, we use three different metrics. The first is the buy-and-hold return in excess of the market return. The second is the daily cumulative abnormal return, which is a less biased method for assessing the long-term return (Fama, 1998; Mitchell and Stafford, 2000). The last is the Fama and French multifactor model in which the daily calendar-time return on a portfolio of defense firms is regressed on three factors (Fama and French, 1993). The model is used to control for event clustering and cross correlation in defense firms. The remainder of the paper is organized as follows. In section 2, we present the literature review and research questions. Section 3 presents the methodology. In section 4, we describe our sample. Section 5 presents the results, while section 6 concludes.

2. LITERATURE REVIEW AND RESEARCH QUESTIONS

A number of studies have investigated the short-term effect of September 11 on US financial markets. For example, Carter and Simkins (2004) study the reaction of US airline stocks to the September 11 attack. Their research indicates that major and non-major airlines exhibit significant negative abnormal returns for September 11. Furthermore, the market reacted differently for various air transport firms. Chaudry (2005) investigates the return and time varying beta effect of the September 11 attack for 20 US firms and found that the direction of the effect varied according to the firms. In addition, not all firms experienced an increase in their beta. Cummins and Lewis (2003) analyze the returns of 43 property-casualty insurers and also find evidence of strong negative reactions to 9/11. Doherty, Lamm-Tennant and Starks (2003) develop a testable hypothesis on the cross-sectional variation in price reaction of insurance companies following September 11, employing capacity constraint, post loss investment and a variety of implicit insurance contract models, and find results in support of their hypothesis. Finally, Kallberg, Liu and Pasquariello (2008) analyze the behavior of New York real estate investment trusts in response to the 9/11 attack and report an initial positive reaction followed by downward revisions of expectations a couple of weeks after the attacks.

Other research focuses on the short-term effect of September 11 on the world capital markets (Richman, Santos and Barkoulas, 2005; Chen and Siems, 2004; Hon, Strauss and Young, 2005). For example, Chen and Siems (2004) find that September 11 had a significant impact on the stock market around the world. Hon, Strauss and Young (2004) investigate the contagion effect of the September 11 attack and report an increased correlation across global stock markets in the aftermath of September 11. Along the same line Eldor and Melnick (2004) show that financial markets are efficient in pricing the shocks associated with terrorist attacks. Richman, Santos and Barkoulas (2005) document an increase in the level of systematic risk for 10 stock markets. The majority of industrial and emerging economies did not experience statistically significant increases in systematic risk in the post September 11 period. Dakos (2004) investigates the effects of terror

attacks of September 11 on a set of airline stocks listed at various international stock markets. Utilizing the Market Model as the relevant return generating mechanism, he documents a structural break in systematic risk (beta) for airline stock. Nikkinen and Vähämaa (2010) examines the effects of terrorism on stock market sentiment by focusing on the behavior of expected probability density functions of the FTSE 100 index around September 11 attack. They find that terrorism has a strong adverse impact on stock market sentiment. In particular, terrorist attacks are found to cause a pronounced downward shift in the expected value of the FTSE 100 index and a significant increase in stock market uncertainty. More recently, Chesney, Reshetar and Karaman (2011) examine the impact of terrorism events (Including September 11 event) taking place in 25 countries over an 11-year period on the behaviour of stocks, bonds and the commodity market. They find that terrorist attacks have a significant effect on global, European, American, and Swiss markets. All these studies show that the September 11 event had a significant negative impact on stock returns around world. These studies used market indices in order to assess the impact of September 11 on the financial markets.

Despite the existence of a large academic literature on the subject, there are still unanswered questions regarding the short and long-term influences of the event on US defense firms, namely:

What is the short-term effect of September 11 on US defense firms?

Is the reaction to such an event uniform among all US defense firms?

What is the long-term effect of September 11 on US defense firms?

3. METHODOLOGY

In this investigation, we use a multivariate regression model methodology (MVRM), similar to that used by Shipper and Thompson (1983) and Binder (1985a, 1985b), to assess the short-term effect of this event. The use of this technique will allow us to test a number of hypotheses including whether the market reaction was uniform among defense firms or whether there was differentiation based on firm specific characteristics. For example, a defense firm with civilian activities should react in a different way from a firm with strictly military activities. The use of this model is also helpful because it explicitly incorporates the contemporaneous dependence of the disturbances into the test statistic. This is important since the September 11 attack affected all firms during the same calendar time period, creating cross-sectional correlation of the error term. Therefore, we estimate a system of equations in which returns for each of our sample firms are represented as follows:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \alpha'_i D_a + \beta'_i D_a R_{mt} + \delta_i D_1 + \varepsilon_{i,t} \quad (1)$$

Where $R_{i,t}$ is the return on firm i at time t , $R_{m,t}$ is the return on the CRSP value-weighted market index at time t , D_a is a dummy variable that takes the value of one after September 11 and zero otherwise, D_1 is a dummy variable that takes the value of one on September 11 and zero otherwise, α_i is the parameter used to measure the abnormal return on the event window for firm i , and $\varepsilon_{i,t}$ is the error term from the regression on date t for firm i . This term is treated as normally distributed with a mean of zero and a constant variance. We include parameters β_i , α'_i , and β'_i to assess any shift in risk perceptions after the attacks. Equation 1 is estimated using returns for 250-day period around September 11 events.

A number of hypotheses can be tested with the MVRM. We begin by testing whether significant abnormal returns occurred in response to the September 11 attack.

Hypothesis 1 (H1)

$$\delta_i = 0$$

Rejection of H1 suggests that the market viewed the attack as having important implications for US defense firms and the information was updated in the stock prices.

We test an additional hypothesis to examine the overall economic significance of the market's reaction to September 11. Hypothesis 2 tests whether the sum of the abnormal returns for each firm is zero.

Hypothesis 2 (H2)

$$\sum \delta_i = 0$$

Rejection of H2 indicates that the abnormal returns of US defense firms are jointly non-zero which indicates a potential contagion effect in response to the attack. If H2 is rejected, we need to determine whether the abnormal returns were uniform among the different US defense firm.

Hypothesis 3 (H3)

$$\delta_1 = \delta_2, \dots = \delta_n$$

To assess the long-term effect of September 11 and given the sensitivity of abnormal performance to specific measurement methods, we use three different metrics. The first is the buy-and-hold return in excess of the market return. The second is the daily cumulative abnormal return, which is a less biased method for assessing the long-term return (Fama, 1998; Mitchell and Stafford, 2000). The last is the Fama and French multifactor model in which the daily calendar-time return on a portfolio of defense firms is regressed on three factors (Fama and French, 1993). The model is used to control for event clustering and cross correlation in defense firms.

The Buy and Hold Return (BHAR) for each firm from period T1 to T2 is calculated as follows:

$$BHAR_{(T_1, T_2)} = \left[\prod_{t=T_1}^{T_2} (1 + r_{it}) \right] - \left[\prod_{t=T_1}^{T_2} (1 + r_{mt}) \right] \quad (2)$$

Where r_{it} is the daily return for firm i on day t and r_{mt} is the return on the CRSP value-weighted market index for the same day. The holding period begins with the first trading after September 11 (T1). T2 is the last day of the holding period. For each holding period, we calculate equally-weighted and value-weighted average BHARs where the weight is the relative market capitalization of a defense firm in the sample. The statistical significance of the average buy and hold returns is calculated using two different procedures. The first one is the conventional t-statistic. The second procedure is the calculation of a bootstrapped skewness-adjusted t-statistic (Lyon and al., 1999). The bootstrapped skewness-adjusted t-statistic is computed as:

$t_{sa} = \sqrt{n} \left(S + \frac{1}{3} \gamma S^2 + \frac{1}{6n} \hat{\gamma} \right)$ where $\hat{\gamma}$ is the estimate of the coefficient of skewness and $\sqrt{n}S$ is the conventional t-statistic.

The procedure was used to obtain an appropriate critical value when using the bootstrapping approach (Lyon and al. (1999)).

We also calculate the abnormal performance using the cumulative abnormal return approach (CAR) since it is a less biased method to assess the long-term return (Fama, 1998; Mitchell and Stafford, 2000). CARs are calculated as follows:

$$CAR_{(T_1, T_2)} = \sum_{t=T_1}^{T_2} (r_{it} - r_{mt}) \quad (3)$$

Where r_{it} is the daily return for firm i on day t and r_{mt} is the return on the CRSP value-weighted market index for the same day. The holding period starts with the first trading day after September 11, 2001. Both equally-weighted and value-weighted averages are calculated.

An important issue in calculating the BHARs is to account for cross-sectional correlation between the long-horizon returns of different firms that may result in mis-specified test statistics. The calendar time approach is used to control for event clustering and cross correlation in defense firms. The Fama and French three-factor model is employed rather than the capital pricing model (CAPM) because of the well-known failure of the CAPM to describe the cross-section of expected returns (Fama and French, 1993). For each calendar day, we form both equally-weighted and value-weighted portfolios of defense firms. The returns of the portfolios are used to estimate the Fama and French three factor model as follows:

$$r_t - r_{ft} = \alpha + \beta(r_{mt} - r_{ft}) + \gamma SMB_t + \lambda Hml_t + \varepsilon_t \quad (4)$$

Where r_t is the calendar time portfolio of defense firms on day t and r_{ft} is the risk free return for the same day t . The independent variables of the regression are the excess market return ($r_{mt} - r_{ft}$), the difference in returns of value-weighted portfolios of small firms and large stocks (SMB_t), and the difference in returns of value-weighted portfolios of high book to market stocks and low book to market stocks (HML_t). We have constructed the SMB and HML in keeping with Fama and French (1993). The intercept term is used as an indicator of risk-adjusted performance of defense firms.

4. DATA

The data source of defense firms is the 2001 edition of the world's top 100 defense firms, a ranking published annually since 1991 by a defense news media group. The ranking is based on annual defense sales. Our initial sample comprises 42 US firms. Of these, we drop 20 firms due to a lack of information on stock prices and another 2 because their defense revenue was less than 10% of total revenue. Our final sample consists of 20 US firms. We use daily returns for each firm. The stock price series are extracted from Datastream. The time period extends from March 2001 to

March 18, 2003. We choose to focus on the September 11 effects and therefore do not go beyond March 18 because the Bush administration decided to invade Iraq on March 19, 2003.

Table 1 shows the list of US defense firms and the distribution of defense revenue to total revenue in our final sample.

Table1: The List of US Defense Firms

Firms	(% Sales)
Lockheed Martin Corp.	93.80
Oshkosh Truck Corp.	29.3
Alliant Techsystems	88.9
L-3 Communications Corp.	76.9
Boeing Co.	32.6
United Technologies Corp.	13.6
Harris Corp.	42.4
Northrop Grumman	68.9
ITT Industries	27.9
Kaman Corp.	34.4
General Dynamics Corp.	64
Jacob Engineering Group Inc.	18.5
Titan Corp.	78.6
Raytheon Co.	71
URS	15.1
Computer Sciences Corp.	15.8
Textron Inc.	11.7
Cubic Corp.	56.2
DRS Technologies Inc.	97.1
Teledyne Technologies	37

The sample consists of twenty firms. The sales data are from a defense news media group in 2001.

5. RESULTS

5.1. Short-Term Performance of US Defense Firms

Table 2 presents the SUR estimates for equation 1. The estimates provide the basis for testing whether September 11 contained new information for defense firms.

Table 2: Short-Term Performance of US Defense Firms after September 11, 2001

Firms	α_i	β_i	δ_i	α_i'	β_i'
Lockheed Martin Corp.	0.0002 (0.0015)	0.4002* (0.1123)	0.1381* (0.0180)	0.0018 (0.0021)	-0.3389* (0.1711)
Oshkosh Truck Corp.	-0.0018 (0.0026)	0.5470* (0.1995)	0.0819* (0.0320)	0.0042 (0.0038)	-0.0110 (0.3039)
Alliant Techsystems	0.0015 (0.0021)	0.4148* (0.1574)	0.1869* (0.0252)	0.0003 (0.0030)	-0.3787 (0.2397)
L-3 Communications Corp.	-0.0021 (0.0019)	0.8346* (0.1433)	0.3368* (0.0230)	0.0039 (0.0027)	-0.5215* (0.2182)
Boeing Co.	-0.0022 (0.0018)	0.8152* (0.1367)	-0.1351* (0.0219)	0.0031 (0.0026)	0.3619 (0.2082)
United Technologies Corp.	-0.0009 (0.0016)	0.9183* (0.1242)	-0.2739* (0.0199)	0.0032 (0.0023)	0.2712 (0.1892)
Harris Corp.	0.0021 (0.0020)	1.3127* (0.1532)	0.1119* (0.0246)	-0.0012 (0.0029)	-0.9310* (0.2334)
Northrop Grumman	-0.0007 (0.0016)	0.4959* (0.1176)	0.1349* (0.0189)	0.0020 (0.0022)	-0.6864* (0.1791)
ITT Industries	0.0011 (0.0012)	0.6659* (0.0881)	0.0012 (0.0141)	0.0013 (0.0017)	-0.0543 (0.1342)
Kaman Corp.	-0.0009 (0.0029)	0.7120* (0.2150)	0.0761* (0.0345)	0.0007 (0.0041)	0.0552 (0.3275)
General Dynamics Corp.	0.0010 (0.0017)	0.5733 (0.1290)	0.1096* (0.0207)	-0.0008 (0.0024)	-0.1295 (0.1964)
Jacob Engineering Group Inc.	0.0007 (0.0022)	0.5913 (0.1685)	0.1011* (0.0270)	-0.0002 (0.0032)	0.1565 (0.2566)
Titan Corp.	-0.0014 (0.0033)	1.7787* (0.2458)	0.1943* (0.0394)	0.0004 (0.0046)	-0.6116 (0.3743)
Raytheon Co.	-0.0012 (0.0021)	0.3404* (0.1563)	0.2316* (0.0251)	0.0032 (0.0029)	-0.4120 (0.2380)
URS	-0.0003 (0.0024)	0.6941* (0.1845)	0.1584* (0.0296)	0.0033 (0.0035)	-0.0842 (0.2809)
Computer Sciences Corp.	-0.0031 (0.0036)	1.6021* (0.2692)	-0.0053 (0.0432)	0.0061 (0.0051)	-0.9260* (0.4099)
Textron Inc.	-0.0007 (0.0021)	0.8161* (0.1554)	-0.0370 (0.0249)	-0.0001 (0.0029)	0.5635* (0.2367)
Cubic Corp.	0.0000 (0.0025)	0.6584* (0.1874)	0.0968* (0.0300)	0.0058 (0.0035)	-0.1061 (0.2854)
DRS Technologies Inc.	0.0028 (0.0029)	0.5161* (0.2213)	0.2183* (0.0355)	-0.0010 (0.0042)	-0.4565 (0.3370)
Teledyne Technologies	0.0004 (0.0018)	0.8835* (0.1329)	-0.0116 (0.0213)	-0.0019 (0.0025)	0.3650 (0.2024)
			H₂		H₃
F-statistic			27.69*		25.15*

The equation is as follows::

Where $R_{i,t}$ is the return on firm i at time t, $R_{m,t}$ is the return on the CRSP value-weighted market index at time t, D_a is a dummy variable that takes the value of one after September 11 and zero otherwise, D_1 is a dummy variable that takes the value of one on September 17 and zero otherwise, δ_i is the parameter used to measure the abnormal return on the event window for firm i, and $\epsilon_{i,t}$ is the error term from the regression on date t for firm i. The term is treated as normally distributed with a mean of zero and a constant. H_2 is the hypothesis testing whether the δ 's all are equal to zero. H_3 is the hypothesis testing whether all the δ 's are equal among themselves. The sample period goes from March 2001 to March 2002. Data sources: Datastream. * represents significant coefficients at the 5% level.

The results indicate that September 11 had a positive and significant effect on 70% of our sample. The abnormal returns for the firms range from 7% to 33%. In addition, the percentage of defense sales to total sales is usually higher than 40% for the firms. We also notice that only 10% of our sample exhibits a significant negative return on September 17. Further, five out of twenty firms in our sample show a significant decline in their beta after the attack. The negative coefficients indicate that the beta of the firms may have decreased in September and the following period. This decline occurs again for firms with defense revenue higher than 40% of total revenue. The H2 and H3 tests are also presented. The F test rejects the null hypothesis that there was no impact on abnormal returns after the September 11 attack (H2). We also reject H3. These results indicate that the market does not price all firms in the same way. Even though such an event has a large emotional impact, investors seem to differentiate between firms.

The results from the table 2 indicate that defense sales could serve as a good measure with which to assess the degree of exposure to the September 11 attack. Accordingly, we subdivide our sample into two portfolios based on the percentage of defense revenue to total revenue, thereby giving rise to: (1) firms with high defense revenue and (2) firms with low defense revenue. To classify a firm with high defense revenue, the percentage of defense revenue to total revenue should be higher than the median of the sample. We then re-estimate equation 1 for the two portfolios. Table 3 shows that the portfolio with low defense sales exhibits a positive and statistically significant abnormal returns. However, the impact of September 11 was not statistically significant for firms with low defense sales. The latter result indicates that the existence of fewer defense activities in these firms helped them to minimize the effect of the September 11 attack.

Table 3: Return Equations of Portfolios of US Defenses Firms

	α_i	β_i	δ_i	α_i'	β_i'
LDSF	-0.0008 (0.0011)	0.8245* (0.0795)	-0.0044 (0.0127)	0.0020 (0.0015)	0.0698 (0.1210)
HDSF	0.0002 (0.0011)	0.7325* (0.0812)	0.1759* (0.0130)	0.0014 (0.0015)	-0.4572* (0.1236)
		H₂		H₃	
F-statistic		95.007*		132.09*	

The equations are as follows:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \alpha'_i D_a + \beta'_i D_a R_{m,t} + \delta_i D_1 + \varepsilon_{i,t}$$

$$R_{j,t} = \alpha_j + \beta_j R_{m,t} + \alpha'_j D_a + \beta'_j D_a R_{m,t} + \delta_j D_1 + \varepsilon_{j,t}$$

Where i is the index associated with the low defense revenue portfolio (LDSF) and j is the index associated with the high defense revenue portfolio (HDSF), $R_{i,t}$ ($R_{j,t}$) is the return on portfolio i (j) at time t , $R_{m,t}$ is the return on the CRSP value-weighted market index at time t , D_a is a dummy variable that takes the value of one after September 11 and zero otherwise, D_1 is a dummy variable that takes the value of one on September 11 and zero otherwise, δ_i (δ_j) is the parameter used to measure the abnormal return on the event window for portfolio i (j), and $\varepsilon_{i,t}$ ($\varepsilon_{j,t}$) is the error term from the regression on date t for portfolio i (j). The term is treated as normally distributed with a mean of zero and a constant variance. H_2 is the hypothesis testing whether the δ 's all are equal to zero. H_3 is the hypothesis testing whether all the δ 's are equal to each other. The sample period goes from March 2001 to March 2002. Data sources: Datastream. * represents significant coefficients at the 5% level.

In order to assess the validity of our results based on portfolio formation, we also regress a firm's excess returns on the percentage of defense revenue to total revenue as continuous variables. Results reported in table 4 indicate that, for our event window, the defense revenue factor is statistically positive at the 5% level.

Table 4: Cross-Sectional Regression of Abnormal Returns for the Event Day

Parameter	Coefficient	Standard error
Constant	-0.0708	0.0454
%DS	0.0032*	0.0008
R²	0.47	
F-statistic	15.88*	

This table presents cross sectional regression for the abnormal returns of defense firms on September 11, 2001. %DS is total defense sales to total sales. * represents significant coefficients at the 5% level.

5.2. Long-Term Performance of US Defense Firms

The 12- and 18-month BHARs are reported in table 6. When the returns are equally weighted, the US defense firms outperform the market index by 27.52% after one year. The positive abnormal returns of US defense firms diminish substantially when returns are value weighted for the same holding period. After one year, the value-weighted BHARs are only 1.68%. When we investigate whether our value-weighted BHARs are driven by a few large firms by excluding Boeing from our sample (a weight average of approximately 30%), the value-weighted BHARs are not different from the equally-weighted BHARs. For an investor buying US defense firms after September 11, 2001 and holding them for 18 months, the US defense firms trail the market by an average of 1.07% and 0.48% for equally-weighted and value-weighted returns respectively. Due to the skewness of the BHAR distribution, the bootstrapping method suggested by Lyon et al. (1999) was used. The bootstrapped skewness-adjusted t-statistics are reported in table 6 and show that the results are not markedly different from when we use the conventional t statistics.

Table5: Long-Term Performance of US Defense Firms

Panel A	Long-term measure	12 months	18 months
BHARs	Equally-weighted	27.52%	-1.07%
	t-statistic	3.07*	-0.12
	Bootstrapped skewness-adj.	2.95*	-0.13
	Value-weighted	1.68%	-0.48%
	t-statistic	1.56	-0.93
	Bootstrapped skewness-adj.	2.39*	-1.29

Panel B	Long-term measure	12 months	18 months
CARs	Equally-weighted	24.06%	-2.73%
	t-statistic	2.53*	-0.21
	Value-weighted	0.79%	-0.29%
	t-statistic	2.36*	-0.49

Panel A reports the 12- and 18-month buy-and-hold returns (BHARs) which are measured as follows:

$$BHAR_{(T_1, T_2)} = \left[\prod_{t=T_1}^{T_2} (1 + r_{it}) \right] - \left[\prod_{t=T_1}^{T_2} (1 + r_{mt}) \right]$$

Where r_{it} is the daily return for firm i on day t and r_{mt} is the return on the CRSP value-weighted market index for the same day. The holding period begins with the first trading after September 11 (T1). T2 is the last day of the holding period. The equally-weighted average and value-weighted average are calculated for each holding period. The weight is the relative market capitalization of a defense firm in the sample. Panel B reports the 12- and 18-month cumulative abnormal returns (CARs) which are measured as follows:

$$CAR_{(T_1, T_2)} = \sum_{t=T_1}^{T_2} (r_{it} - r_{mt})$$

Where r_{it} is the daily return for firm i on day t and r_{mt} is the return on the CRSP value-weighted market index for the same day. The holding period starts with the first trading day after September 11, 2001. T2 is the last day of the holding period. The equally-weighted average and value-weighted average are calculated for each holding period. The weight is the relative market capitalization of a defense firm in the sample. The sample period goes from September 11, 2001 to March 18, 2003. Data sources: Datastream. * represents significant coefficients at the 5% level.

We calculate abnormal performance using the cumulative abnormal return approach. The results reported in table 7 indicate that the equally-weighted 12- and 18-month returns are respectively 24.06% and -2.73% for US defense firms. As with the BHARs, the value-weighted CARs tend to decrease the degree of over-performance for the 12-month holding period, this decrease being explained by the existence of Boeing in our sample. The results indicate that the equally-weighted and value-weighted BHARs of US defense firms for the 18 month-holding period are negative but not statistically significant.

As a final check of the robustness of our results, we use the Fama and French three factor model. Table 8 reports the 12- and 18-month performance of US defense firms using the intercept from the Fama and French three factor regression. The ordinary least regression is presented in table 8. The intercept is positive and statistically different from zero when we use the equally-weighted portfolio over the 12-month holding period.² However, the magnitude of the abnormal returns is lower when we use the value-weighted portfolio, and the intercept in this case is not statistically significant. Once again, the existence of Boeing in our sample could explain the decline. For instance, when we exclude this firm from our sample, the intercept becomes statistically significant. When we examine the 18-month holding period, we find that US defense firms earn negative abnormal returns. The under-performance is not statistically significant for both equally- and value-weighted US defense firms.

TABLE 6: Long-Term Performance of US Defense Firms Using the Fama and French Three-Factor Approach

Panel A	Holding period: 12 months	
	Equally-weighted	Value-weighted
α	0.0016 (0.0008)	0.0005 (0.0009)
β	0.5407 (0.0652)	0.9392 (0.0740)
γ	0.3868 (0.1284)	0.2125 (0.1453)
λ	-0.2093 (0.1540)	0.1265 (0.1749)

²For the robustness check, we also consider monthly returns instead of daily returns to estimate the intercept since the usage of the monthly returns are less susceptible to the bad asset-pricing model problem. The results are not affected by this change.

Panel B	Holding period: 18 months	
	Equally-weighted	Value-weighted
α	-0.0003 (0.0006)	-0.0002 (0.0007)
β	0.8382 (0.0482)	1.0001 (0.0569)
γ	0.2063 (0.1017)	0.1878 (0.1199)
λ	0.2820 (0.1197)	0.3763 (0.1411)

The returns of the portfolio are used to estimate the Fama and French three-factor approach as follows: $r_t - r_{ft} = \alpha + \beta(r_{mt} - r_{ft}) + \gamma SMB_t + \lambda Hml_t + \varepsilon_t$ Where r_t is the calendar time portfolio of defense firms on day t and r_{ft} is the risk free return for the same day t. The independent variables of the regression are the excess market return ($r_{mt} - r_{ft}$), the difference in returns of value-weighted portfolios of small firms and large stocks (SMB_t), and the difference in returns of value-weighted portfolios of high book to market stocks and low book to market stocks (HML_t). We have constructed SMB and HML in keeping with Fama and French (1993). The intercept term α is used as an indicator of risk-adjusted performance of the defense firms. The sample period goes from September 11, 2001 to March 18, 2003. Data sources: Datastream. * represents significant coefficients at the 5% level.

5. 3. Robustness Check

In the previous section, we used multivariate equation estimates to investigate the presence of abnormal returns in our sample. In this section, we model conditional residual variances using the GARCH process. The objective is to examine whether abnormal returns found are still present when we use a different estimation approach. In an event study framework, this adjustment is important when the event results in changes in volatility. Indeed, the abnormal returns identified in an event study could be due to a change in volatility rather than a change in the required return (Brown, Harlow and Ticnic, 1998).

In order to do that, we use GARCH.

When using a GARCH parameterization, we let Γ be a 2 x 2 positive definite matrix, B be a symmetric 2 x 2 matrix for GARCH effects, A be a symmetric 2 x 2 matrix for ARCH effects, ε_{it} is the vector $(\varepsilon_{it}, \varepsilon_{jt})'$ which follows a bivariate normal distribution of mean zero and conditional variance H_t . The conditional variance model we consider is as follows

$$H_t = \Gamma + BH_{t-1}B' + A\varepsilon_{t-1}\varepsilon'_{t-1}A' \tag{5}$$

Table (5) indicates that the behaviour of abnormal returns does not change markedly following the GARCH modeling of conditional residual variances. We also reran all of the previous analyses

using the MSCI index return instead of the CRSP weighted average index. Results are not reported here and are not significantly affected by this change.

Table 7: Return Equations of Portfolios of US Defense Firms Using a Bivariate GARCH Model

	α_i	β_i	δ_i	α_i'	β_i'
LDSF	0.0009 (0.0007)	0.7704* (0.0688)	-0.0105 (0.00118)	0.0008 (0.0011)	0.1109 (0.1101)
HDSF	0.0002 (0.0008)	0.7428* (0.0500)	0.1634* (0.0059)	0.0008 (0.0013)	-0.3121* (0.1105)

The equations are as follows:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \alpha'_i D_a + \beta'_i D_a R_m + \delta_i D_1 + \epsilon_{i,t}$$

$$R_{j,t} = \alpha_j + \beta_j R_{m,t} + \alpha'_j D_a + \beta'_j D_a R_m + \delta_j D_1 + \epsilon_{j,t}$$

$$H_t = \Gamma + BH_{t-1} B'A + \mathcal{E}_{t-1} \mathcal{E}'_{t-1} A'$$

Where *i* is the index associated with the low defense revenue portfolio and *j* is the index associated with the high defense revenue portfolio, $R_{i,t}$ ($R_{j,t}$) is the return on portfolio *i* (*j*) at time *t*, $R_{m,t}$ is the return on the CRSP value-weighted market index at time *t*, D_a is a dummy variable that takes the value of one after September 11 and zero otherwise, D_1 is a dummy variable that takes the value of one on September 17 and zero otherwise, δ_i (δ_j) is the parameter used to measure the abnormal return on the event window for portfolio *i* (*j*), and $\epsilon_{i,t}$ ($\epsilon_{j,t}$) is the error term from the regression on date *t* for portfolio *i* (*j*). The term is treated as normally distributed with a mean of zero and conditional variance H_t . * represents significant coefficients under robust standard errors (Bollerslev and Wooldridge, 1992) at the 5% level of significance. Standard error are in parentheses. The sample period goes from March 2001 to March 2002. Data sources: Datastream.

6. CONCLUSION

In this paper, we investigate the short- and long-term performance of the US defense industry in the aftermath of September 11. We use a multivariate regression analysis to test a number of hypotheses, including whether the market reaction was the same for each firm or whether the market differentiated based on differences among defense firms. We find that defense firms are not equally exposed to the September 11 attack. Indeed, 60% of our sample exhibit significant negative abnormal returns. In addition, the impact is not statistically significant for almost one third of our sample. More importantly, we find that investors distinguish between defense firms based on the level of defense sales. In the long-term, given the sensitivity of abnormal performance to specific measurement methods, we use three different metrics. The first is the buy-and-hold return in excess of the market return. The second is the daily cumulative abnormal return, which is a less biased method for assessing the long-term return (Fama, 1998; Mitchell and Stafford, 2000). The last is the Fama and French multifactor model in which the daily calendar-time return on a portfolio of defense firms is regressed on three factors (Fama and French, 1993). The model is used to control for event clustering and cross correlation in defense firms. Our results indicate that US defense firms exhibit positive abnormal returns after twelve months. However, when we examine the 18-month holding period, we find that the US defense firms earn negative abnormal returns. Nonetheless, the under-performance is not statistically significant for both

equally- and value-weighted US defense firms. These results make an appreciable contribution to research related to terrorism and stock markets through their discussion of the long-term effect of terrorism on firms' returns. We also show how some firms could benefit from terrorism activities such as the September 11 event. Finally, in spite of the emotional impact of this event, our results are consistent with the proposition of rational pricing in the U.S. financial markets and suggest that the market differentiated among defense firms.

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PRELIMINARY STUDY FOR THE DEVELOPMENT OF UNCERTAINTY AVOIDANCE INSTRUMENT IN TURKEY

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Uncertainty avoidance, scale development, Turkish culture.

ABSTRACT

Hofstede's five cross-cultural dimensions have been broadly studied in the literature. One of these dimensions, uncertainty avoidance (UA) is defined as the extent to which the members of a culture feel threatened by uncertain or unknown situations. This is a preliminary study for the development of a new UA scale for Turkish culture. First, an item pool was generated by a qualitative analysis that included collecting suggestions from a group of respondents and by using items from pre-existing scales. Then, an advisory board assessed the similarity of the generated items and deleted those items that meant the same thing with different words. After the experts' evaluation process, the remaining 61-items were distributed to 378 participants, and the data was analyzed by conducting exploratory factor analysis. The results revealed 35 items with six factor solutions – (1) Openness to Innovation and Change, (2) Authority of Rules, (3) Information Seeking and Controlling, (4) Anxiety, (5) Definiteness and (6) Strictness of Rules. Finally each factor was discussed in terms of current literature and characteristics of Turkish culture.

1. INTRODUCTION

Nowadays, due to the effect of globalization and the development of technology, most of the problems have become “common” all over the world. The problems do not belong to the national or organizational borders anymore. Although, all societies, whether modern or traditional, are facing the same basic problems; answers to these problems differ. Hofstede's research which was conducted over IBM countries has also revealed the existence of “*common problems*” and “*differing solutions*” among different nations. For Hofstede (1991), solutions to the problems differ according to four dimensions: Power Distance, Individualism / Collectivism, Masculinity / Femininity, and Uncertainty Avoidance. (Hofstede,1991, p.14). Hofstede(1991) defined these dimensions as stated below:

Power Distance: It refers to the degree of preference for, or tolerance of, inequality. It reflects the consequences of power inequality and authority relations in society. Power distance affects hierarchy and dependence relationships in the family and organizational contexts. It reflects the degree of equality and inequality among people in a society.

Individualism / Collectivism: This dimension describes the relationships individuals have in each culture. In individualistic societies, individuals look after themselves and their immediate family only whereas in collectivistic cultures, individuals belong to groups that look after them in

exchange for loyalty. It refers to what extent the society is individual or collective in relation to achievement and interpersonal relationships

Masculinity / Femininity: This dimension refers to the degree the society reinforces, or does not reinforce, the traditional masculine work role model of male achievement. This is shown by the level of inequality between males and females. High masculine cultures are characterized by higher degree of gender differentiation. In these cultures, the male controls a significant portion of the society and power structure, with females being dominated by males. On the other hand, a low masculinity culture has a small level of differentiation and discrimination between genders; females are treated equally with males. Dominant values in masculine cultures are achievement and success and in feminine cultures caring for others and quality of life.

Uncertainty Avoidance: This dimension refers to “the extent to which people feel threatened by and try to avoid uncertainty and ambiguity” (Hofstede, 1991, p. 113). It is strongly associated with individual attitudes towards risk and uncertainty. According to Hofstede (2001), high uncertainty avoidance culture feels threatened by uncertain or unknown situations. In these cultures, people look for structure in their organizations, institutions and relationships, for clear interpretation and prediction of events (Hofstede 2001).

Since the aim of this study is UA scale development, UA dimensions will be reviewed in detail.

2. UNCERTAINTY AVOIDANCE

Uncertainty avoidance has been defined by different researchers in different ways. These definitions reflect different approaches to the concept.

2.1. The Concept of Uncertainty Avoidance (UA)

Uncertainty Avoidance is used as a concept for the first time, by U.S. organization theorists Richard M. Cyert and James G. March in 1963, in their book “A Behavioral Theory of the Firm” (Hofstede, 2001, p.147). For them, “*Uncertainty Avoidance measures the extent to which people feel threatened by ambiguity and uncertainty*”. Hofstede treats the dimension at two levels: society and organization. Hofstede links the two levels stating that: At the organizational level, the concept of uncertainty is often linked to the concept of environment; “*The environment which is usually taken includes everything not under the direct control of the organization is a source of uncertainty for which the organization tries to compensate*” (Schramm-Nielsen, 2000, p.5).

Uncertainty can be defined as “*an individual’s perceived inability to predict something accurately*” (, 2004; Milliken, 1987). As Schuler (1980) stated UA is considered to be an aversive state. Not knowing something about ourselves or the environment around us is maladaptive as we cannot prepare for or deal with the unknown (Bordia, 2004). Uncertainty avoidance refers to the individual’s need for security. As Van Oudenhoven and colleagues (1998) stated, in some cultures, the need of security is low, “*people tend to accept life as it comes, they get more easily engaged in new situations, and different religions or political views may coexist rather peacefully*”. In cultures with high UA there is more need for security, and then people stick to the routines and are reluctant to absorb new ideas. Formal and informal prescriptions regulate daily life strongly (Van Oudenhoven et al., 1998).

Yan & Hunt (2005) stated that “*Uncertainty avoidance reflects a culture’s stance toward the authority of rules*”. According to this definition, it is expected that in cultures that have high UA scores, institutions adopt structural formalization and centralization (Yan & Hunt, 2005; Wong and Birnbaum-More, 1994). Additionally, cultures with high UA prefer to reduce the degree of information sharing with subordinates about important situations and do not permit subordinates to take part in decision-making process. Again, in such cultures, followers show great obedience to the authority, and “*they also expect their leaders to act according to the ways that are historically accepted. Any new initiatives by the leaders, even though they may be successful, will tend to bring a feeling of uncertainty to the followers, thus reducing their trust in the leadership*”.

In contrast, cultures with low UA scores are expected to be more tolerant about deviations from social norms, because they are more tolerant of uncertainty and also open to new ideas. Cultures with low UA scores, give more importance to the results of a behavior rather than behavior’s conformity to rules and norms. Entrepreneurship is supported in cultures with low UA (Shane, 1995). *Leadership is often perceived not because of a leader’s maintenance of and compliance with tradition but because of the leader’s performance*” (Yan & Hunt, 2005).

People from cultures with high UA may perceive norms as courses of action when facing ethical situations. For cultures with high UA, following the norms may be a way of avoiding uncertain or risky consequences. People in such cultures, stick dogmatically to historically tested patterns of behavior. Such behaviors become inviolable rules that are used by people as a way to reduce uncertainty, in time. It is important to conform to social and organizational norms and procedures to reduce ambiguity (Yan & Hunt, 2005). Schneider (1989) stated that cultures with high UA are intolerant of ambiguity and prefer historically tested patterns of behavior. These behaviors become inviolable rules which are used as a tool to reduce uncertainty. In such countries, it is important to conform to social and organizational norms and procedures to reduce ambiguity.

Steenkamp et al. (1999) found that innovativeness is weaker in cultures with higher uncertainty avoidance (Sundqvist, Franka & Puumalainen, 2005). On the other hand, in a culture with low UA, people are more tolerant of uncertainty and they are open to new ideas and norms (Yan & Hunt, 2005). Not knowing the aim of change and not knowing the outcomes of change creates uncertainty about the aim, process, and the outcomes of the change (Bordia, 2004).

Simeon et al (2000) proposed that uncertainty avoidance has an impact on the individual’s information gathering process before making decisions. Their assumption is that “*individuals who try to avoid uncertainty will take the necessary steps to reduce ambiguity*”. They asked two questions to respondents to measure uncertainty avoidance. One of the questions is: “*I prefer having clear rules & procedures where I work*” to measure work related uncertainty avoidance. And the other is “*I like to plan as far into the future as possible*”. These two questions measure general uncertainty avoidance. They found that general uncertainty avoidance measures the *predictive power* for consumer product purchasing and general non-work decisions.

Simeon (2000) stated that this cultural concept has rarely been linked with studies on information gathering behavior. He argued that UA orientation should have an impact on the extent to which individuals gather information before reaching certain decisions. The assumption of his work is that “*individuals who try to avoid uncertainty will take the necessary steps to reduce ambiguity. This will be especially pertinent when information is needed to make decisions*”.

All the mentioned characteristics of UA have arisen the curiosity related with the applicability of the scales based on the data collected in other nations but applied in Turkish culture. It is decided to develop a scale for measuring “UA” in Turkish organizations. Before the scale development process, literature on measurement of UA should be reviewed.

2.2. Measurement of Uncertainty Avoidance

Many cross-cultural studies over the last two decades have found national differences in uncertainty avoidance (Quintal et al., 2005). Hofstede (1980) developed the most influential instrument of measuring UA by analyzing national-level cultural values in more than 50 countries. Hofstede defined uncertainty avoidance as “the extent to which people are threatened by uncertain or unknown situations” (Hofstede, 1991, p.113).

For Hofstede, cultures with high UA place much value on strict rules, protocols and procedures which make conduct more predictable and life more secure. Managers tend to favor decisions with low-risk and lifetime employment is common (Culpepper et al., 1999). Most of the studies, like the study of Hofstede conducted in countries where IBM is conducting business, measured culture’s dimensions at the societal level by aggregating respondent scores within cultures. Hofstede made UA measurable by utilizing three survey questions about “*adherence to company rules*”, “*expected job stability of employees*” and “*how often they feel nervous or tense at work*” (Wennekers et al., 2003). People were asked to assess the situations like the ones below in a likert scale:

Company rules should not be broken - even if the employee thinks it is in the company’s best interests (Rule orientation).

How long do you think you will continue working for this company? (Employment stability).

How often do you feel nervous or tense at work? (Stress).

In addition, there are also a group of studies which replicated Hofstede’s UA Index (UAI) in different populations. One of them is the replication of Shane (1995). Shane used the original UAI in 68 countries, over more than 4400 employees in work organizations. From 68 countries, 32 countries were from IBM set. Shane had similar results with Hofstede and found a correlation of $r = .44^{**}$ with the IBM results. Some others are Hoppe’s (1990, 1993), Helmreich & Merritt’s (1998) and EMS 97 (European Media and Marketing Survey) replication studies. Hoppe’s scale contained the three questions of Hofstede’s UAI. Hoppe applied his scale on 1.590 Salzburg Seminar Alumni from 17 European countries plus Turkey and USA. This study had $r = .64^{**}$ correlation with Hoppe’s scores and the IBM scores. Helmreich & Merritt’s (1998) study was applied on more than 15.000 commercial airline pilots from 23 countries. They carried the survey between 1993-1997 and asked the three questions of Hofstede. They found a correlation of $r = .49^{**}$ with the scores of IBM and the pilots. This study is important because in IBM case respondents of UAI had the same “employer” but in the pilots case, respondents had the same “profession”. Then, this study revealed that “for people in this profession the three questions of “rule orientation”, “employment stability”, and “stress” carried different connotations from those carried within IBM (Hofstede, 2001). EMS 97 surveyed higher income consumers in Europe. Scales included two questions from IBM survey, “rule orientation” and “stress” questions. The employment question was dropped from this survey. Instead of employment question, two questions were inserted into the scale. One question is: “One can be a good manager without having precise answers to most questions that subordinates may raise about their work. For this question “strongly agree” means “low UA”. The other question is “Competition between employees usually does more harm than good”. For this question “strongly agree” means “high UA”. EMS 97 survey was carried out in 15 overlapping countries with IBM sample. The correlation between EMS 97 UAI scores and IBM UAI scores is $r = .86^{**}$ (Hofstede, 2001).

On the other hand, there are more recent attempts to measure the dimensions of Hofstede at the individual level (Dorfman & Howell, (1988); Culpepper & Watts, (1999). The scale items used by Dorfman & Howell (1988) to measure UA at individual level are as follows:

It is important to have job requirements and instructions spelled out in detail so that employees always know what they are expected to do.

Managers expect employees to closely follow instructions.

Rules and regulations are important because they inform employees what the organization expects of them.

Standard operating procedures are helpful to employees on the job.

Instructions for operations are important for employees on the job.

Dorfman and Howell (1988) did a great contribution to the measurement of culture's dimensions by developing scales assessing *all of the four Hofstede's dimensions* at the individual level, firstly. Scales were applied to a sample of managers employed in multinational firms; 243 in Mexico, and 509 in Taiwan. The only information provided about measurement properties of the new scale was reliability coefficients. *"No factor loadings or other information relating to discriminant validity was provided. Respective reliability for Mexican and Chinese samples were 0.71 and 0.73 for the uncertainty avoidance scale. Regarding construct validity, the relationships between individual level culture constructs were similar to those obtained using Hofstede's society-level measures"* (Culpepper et al., 1999).

Another study was conducted by Quintal et al. (2005). They developed a scale by reviewing the *risk avoidance* and *UA literature* to see whether "risk" and "uncertainty avoidance" are distinct constructs. They constructed 5- item UA scale, and then added 6 more. After elimination of vague, repetitive or ambiguous items, there remained 8 UA items. These items were included in a large Australian consumer survey administered over the Internet. Approximately 650 people were invited to participate in the survey and 96 percent completed the survey. After elimination of low-scored items, only the items measuring *"uncertainty avoidance in the workplace"* remained. These items used in that scale to measure UA are listed below, and they are quite similar in wording, to those items developed by Dorfman and Howell (1988):

It is important to have instructions spelled out in detail so that I always know what I am expected to do

It is important to closely follow instructions and procedures

Rules and regulations are important because they inform me of what is expected of me

Instructions for operations are important

Standardised work procedures are helpful

As a result of Quintal et al.'s research, the reliability, factor structure, and validity tests undertaken indicated that the final scales had sound measurement properties and that, unlike previous measures, risk avoidance and uncertainty avoidance are shown to be related, but different constructs (Quintal et al., 2005). Jung and Kellaris (2004) also developed an individual level 8-itemed Uncertainty Avoidance Scale through an independent measure development study. *"The scale items were based on Hofstede's definition of UA. The UA scale was found to have convergent, discriminant, and predictive validity in a study with American and Korean subjects"*. Participants of scale were upper-level undergraduate students attending marketing classes at a

large university in the midwestern United States and three business schools in France (Jung & Kellaris, 2004). One of the items stating “*I would prefer to stay with one employer as long as possible*” was dropped because the confirmatory factor loading was less than 0.4. The items and their factor loadings are listed below:

- I prefer structured situations to unstructured situations. 0.73
- I prefer specific instructions to broad guidelines. 0.66
- I tend to get anxious easily when I don't know an outcome. 0.74
- I feel stressful when I cannot predict consequences. 0.79
- I would not take risks when an outcome cannot be predicted. 0.64
- I believe that rules should not be broken for mere pragmatic reasons. 0.58
- I don't like ambiguous situations. 0.55

3. METHODOLOGY

The aim of the study was to develop a scale for measuring uncertainty avoidance in Turkish Culture. There was threefold of item generation analysis: conceptual analysis, item pool generation with a qualitative study, assessment of advisory board committee. Hinkin (1995) emphasizes that item generation is the most important part of scale development. Two basic approaches in item generation were used in the study: deductive and inductive classification. Firstly, for deductive classification, conceptual analysis which runs from theory to practice through literature review is utilized. Then qualitative analysis which includes information at individual level and generates measures from individual responses was conducted for inductive classification. Lastly, exploratory factor analysis was run for exploring and verifying factors of the construct.

3.1. Item development

3.1.1. Conceptual Analysis

Uncertainty avoidance which is conceptually defined as the extent to which individuals of a culture feel threatened by uncertain or unknown situations is the definition primarily used in the study (Hofstede, 2001). Dimensions of uncertainty avoidance were reviewed by the research committee. Literature review revealed various dimensions of uncertainty avoidance. Uncertainty avoidance is the reactions against the unknown which is the result of inability to predict the possible outcomes (Bordia, 2004). Another dimension considered as a reflection of cultural stance is towards the authority of rules. High uncertainty avoidance cultures are likely to be distrustful towards new ideas and behaviors and prefer to obey rules and regulations (Schneider, 1989).

The need for security is also a motivational factor lying behind psychological distress due to uncertainty. Information seeking behavior is a dimension of uncertainty avoidance cultures. Knowledge is the power against the shadows created in the uncertainty avoidance minds. Technology, law and religion help to cope with the unknown through rules, regulations and rituals (Hofstede, 1991). The items which reflect the characteristics of uncertainty avoidance were collected from different scales used in the literature and among them, the most accepted and promising factors were selected based on the repetition of the similar items related to uncertainty avoidance within the literature.

3.1.2. Qualitative Analysis

Along with literature review, a qualitative study was conducted in order to generate items at the individual level. Initially a brief description of uncertainty avoidance which was used at the rest of the analysis was given to the participants. The description used in the study is as follows:

“Uncertainty avoidance is the extent which an individual feel anxious in the circumstances where the information is perceived as inadequate. Individuals with high uncertainty avoidance are anxious and distressed in unpredictable situation as compared to those with low uncertainty”.

In order to determine underlying dimensions of uncertainty avoidance, an open ended questionnaire was developed to consolidate thoughts, feelings, behaviors that fit the definition of uncertainty avoidance given above. In qualitative study, four open ended questions were generated to collect relevant behaviors related to the uncertainty avoidance and distributed to 73 participants by the research committee members.

After a brief definition of uncertainty avoidance, the four questions asked are as follows:

How can you describe an uncertainty avoidant individual?

How can you describe an individual who is not uncertainty avoidant?

What kind of adjectives would you use to describe uncertainty avoidant individual?

What kind of adjectives would you use to describe an individual who is not uncertainty avoidant?

For the item pool, 297 descriptions related to uncertainty avoidance were collected. The recurrent items were eliminated. Integrating qualitative data with the items generated from the literature review and different questionnaires used in previous research were combined and 89-item questionnaire was developed after deleting the ambiguous, repeated and similar items.

3.1.3. Advisory Board Committee

89-item questionnaire generated from the qualitative study with four questions and the literature review related to uncertainty avoidance was distributed to advisory board which consists of 12 academicians. After giving the previously mentioned definition of the concept of UA, items which were randomly ordered were rated by the academicians in terms of “relatedness to uncertainty avoidance” on 3-point scale as related, unrelated, not understood. The research committee agreed to include the items which were rated as related by 66% of the academicians. 61 items were left after the academicians’ evaluations. According to the item generation process, 61 items were eventually included in the questionnaire and distributed online and by hand to the participants who were working in private as well as public sector.

3.1.4. Instruments

Scale purification accomplished through conceptual analysis, qualitative analysis, advisory board committee assessment and 61 items were generated. The 61 items were asked to be assessed on a 5-point scale (ranging from not related (1), to very much related (5)) regarding their relatedness to the construct “uncertainty avoidance” following the uncertainty avoidance description.

3.1.5. Participants

Convenience sampling method is used in the study. The data was gathered from 378 volunteer participants who were employed in public and private sector. However, the questionnaires of 17 participants were excluded due to missing data. Two participants did not answer gender question, 15 participants did not answer their status in the organization as manager or employee. The demographical characteristics of the remaining participants (N=361) are given in TABLE 1. Participants’ ages ranged from 18 to 55.

Table1: Demographics (N=361)

	Mean
AGE	
Male (n=169)	33,67(sd=6,69)
Female (n=192)	30,30(sd=6,47)
JOB EXPERIENCE	
Tenure in work life	10,44(sd=7,72)
Tenure in current organization	5,18(sd=5,26)
POSITION IN THE COMPANY	
Manager	101(28%)
Employee	260(72%)

4.RESULTS

4.1. Exploratory Factor Analysis

To analyze the data, exploratory factor analysis was conducted in order to determine factorial structure of the sixty one items. These items were subjected to Principal Component Analysis with Varimax Rotation. After the first analysis, the items were gathered under 12 factors. When examined in detail, it was found that 15 items had factor loadings in two or more factors or loaded under 0.50. Six items were single loaded in one factor. Thus, these items were eliminated from the analysis. The factor analysis was repeated with the remaining 40 items. The items were loaded in six factors and reliability analysis was run for all factors. As a result of the analysis, the five items with higher cronbach alpha level from the overall cronbach alpha level of each factor were excluded (Table2). With the remaining 35 items, a final Principal Component Analysis was conducted. In order to check sampling adequacy Kaiser – Meyer – Olkin (KMO) and Bartlett’s test of sphericity were controlled. KMO measure of sampling adequacy test showed that partial correlations among items were small and KMO value of ,92 was above the recommended value of ,50. Furthermore, Bartlett’s test of sphericity was significant, $\chi^2(595) = 6608,834, p < .001$. These results indicated that it was appropriate to conduct factor analysis for 35 items.

The results showed that there were 6 factors with eigenvalues above 1,00. Items of each factor and their loadings are given in Table 2. Reliability analysis showed that the overall Cronbach's alpha for 35 items was 0.87, where the whole scale explained 60,74% of the total variance of uncertainty avoidance concept.

Table 2: Results of Principal Components Analysis of Uncertainty Avoidance Factors (N =361)

FACTOR 1: Openness to Innovation and Change	
	Factor Loadings
Cronbach's Alpha= ,92	
18. Flexible (R)	0,744
36. Entrepreneur (R)	0,766
38. Open to learning (R)	0,790
40. Creative (R)	0,835
34. Brave (R)	0,800
56. Easily adopting to changes (R)	0,737
64. Making instant decisions (R)	0,725
65. Innovative (R)	0,868
FACTOR 2: Authority of Rules	
	Factor Loadings
Cronbach's Alpha= ,880	
68. Emphasizing details	0,528
61 Cautious	0,645
53. Asking detailed questions to clarify an ambiguous problem	0,584
47.Preferring to have instructions spelled out in details so that employees know what is expected to be done	0,734
48. Preferring specific instructions for the tasks to be performed	0,772
49.Wanting to have more control on one's future	0,676
50.Believing in the requirement of the rules to be able to know what is expected of oneself	0,723
41.Spending effort to comply with the rules	0,573
33. Expecting subordinates to follow the instructions strictly	0,554

FACTOR 3: Information seeking and controlling

	Factor Loadings
Cronbach's Alpha= 0,814	
13.Preferring to be sure of something before buying	0,681
14.Strictly following instructions and procedures	0,669
15. Strictly differentiating between what is forbidden and what is allowed	0,614
16. Taking precautions for the unexpected before starting a task	0,691
17.Controlling one's behavior	0,611
26.Prudent	0,558

FACTOR 4: Anxiety

	Factor Loadings
Cronbach's Alpha= ,851	
23. Anxious	0,701
31. Feeling stresses when faced with situations for which the results cannot be predicted	0,737
32. Getting worried when the end results are not known	0,779
44. Feeling anxious about the future	0,725
66.Tense	0,757
67.Having difficulty in making decisions	0,510

FACTOR 5: Definiteness

	Factor Loadings
Cronbach's Alpha=0,693	
62. Postponing a prospective ambiguous situation	0,684
63. Keeping away from the danger	0,617
69.Not choosing risky alternatives when needed to make decision.	0,637

FACTOR 6: Strictness of rules

	Factor Loadings
Cronbach's Alpha= 0,643	
29.Believing in the strictness of the truth, that the truth can't change from person to person	0,686
52.Thinking that the women's and men's roles are strictly different	0,760
71. Believing in the requirements of the rules that show how to behave in a social situation	0,560

R= Reverse item

Eight items of F1 are about "Openness to Innovation and Change", which reflected adaptability to new situations, resilience and entrepreneurship. This factor explained 16,1 % of the total variance and Cronbach's α coefficient was ,92. Nine items of F2 emerged as "Authority of Rules"; and was related to be rule oriented, follow instructions, and struggle for obedience to rules. This factor explained 13,8 % of the variance with a Cronbach's α coefficient of ,88. "Information seeking and controlling" emerged as the third factor with six items explaining 9,8 % of the total variance with Cronbach's α coefficient of ,81. This factor is related to planning the future and seeking information to clarify uncertainty, being precautionous and prudent with the unknown. Forth factor emerged from the analysis was "Anxiety". This factor included 6 items measuring the stress and

anxiety of a person as well as his/her perception of threat. The factor explained 9,8 % of the total variance and its inter item consistency was ,85. Fifth factor had three items and named as “Definiteness”. The items were related to avoiding risk and ambiguity. The factor explained 5,5% of the total variance and had Cronbach’s α coefficient of ,693. The last three items were related to “Strictness of rules” such as believing in the strictness of the Truth and the rules. The factor explained 5,8% of the total variance and had Cronbach’s α coefficient of ,643.

4.2. Descriptives and Correlations of the Dimensions

Zero-order bivariate correlations were calculated among all uncertainty avoidance factors. Means, standard deviation scores, significant and non-significant correlations among the factors are presented in Table 3.

Table 3: Means, Standard Deviations, and Bivariate Correlations for Variables of Scale Development Study (N = 361)

	Mean	Std. Dev.	1	2	3	4	5
1 Openness to innovation and change	3,72	0,86					
2 Authority of rules	3,88	0,59	-,180**				
3 Information seeking and controlling	3,22	0,78	-0,277**	0,664**			
4 Anxiety	4,01	0,61	0,434**	0,262**	0,092		
5 Definiteness	2,93	0,90	0,188**	0,492**	0,348**	0,414**	
6 Strictness of rules	3,50	0,78	0,035	0,466**	0,400**	0,271**	0,417**

** $p < 0,001$.

The results revealed that there was significant negative correlation between “Openness to Innovation and Change” and “Authority of Rules” ($r(361) = -0,180, p < ,01$), positive correlations between “Openness to Innovation and Change” and “Anxiety” ($r(361) = 0,434, p < ,01$).

There is a significant positive correlation between “Authority of rules” and “Information seeking and controlling” ($r(361) = 0,664, p < ,01$). In addition, there were medium positive correlation between “Authority of rules” and “Anxiety” ($r(361) = 0,262, p < ,01$). Additionally, “Anxiety” found to be significantly correlated with “Strictness of rules” ($r(361) = 0,271, p < ,01$).

Finally, there is a significant positive correlation between “Information seeking and controlling” and “Strictness of rules” ($r(361) = 0,400, p < ,01$). These positive correlations indicate that although there are six factors of uncertainty avoidance, these factors are related factors rather than being independent ones.

5. DISCUSSION

As discussed in Literature Review part of the current study, the Uncertainty Avoidance (UA) concept has differing conceptualizations. However, present paper was not an attempt to clarify the discussions in the literature, but to test relevant theories, and start a preliminary study to develop "Uncertainty Avoidance" scale in Turkey. When compared with Hofstede's (1980) factors for UA, there were meaningful similarities and differences in the results of the current study. To start with, one factor of UA stated by Hofstede was the rule orientation. Similar to this label, Schneider (1989) defined UA to be related with "Authority of Rules". Congruently with these suggestions, a similar factor emerged in the current study. This factor, measuring the conformity to rules, being rule oriented, following instructions, and struggle to obey rules, were named as "Authority of Rules".

According to Hofstede, another factor of UA is related to perceived level of stress. Similar to what Hofstede suggested, our findings revealed a factor covering the stress and anxiety of a person as well as his perception of threat. This dimension is named as "Anxiety", which is underlying motive of the concepts such as avoidance of anxiety, stress, and threat. Hofstede's final factor of UA was related with employment stability. Current study contained items such as "preferring having a consistent salary", "easily changing job" and "preferring stable conditions" in pre-analysis version of the UA scale. However, these and similar items did not emerge as a separate factor, but cross-loaded under two or more different factors. Therefore, they are excluded from the final version of the scale.

In the present study, three factors were found in addition to the three above mentioned dimensions of Hofstede. The first one was named as "Openness to Innovation and Change", as it measured adaptability to new situations, resilience, entrepreneurship and flexibility. This finding supported the theory of Steenkamp et al. (1999) and Yan and Hunt (2005), who claimed that innovativeness and being open to the new ideas are related to the concept of UA, where high UA suggested to lead to less level of creativity. Similarly, Bordia et al. (2004) proposed that change may be a source of UA, especially when the aim and outcomes of the change are unclear. In the current analysis, change and innovation related items unified and loaded in a single factor, i.e. "Openness to Innovation and Change", which emerged as the first factor with the highest variance explanation power. Simeon et al. (2000) assumed that, information gathering is an important aspect of UA. They suggested that to avoid uncertain situations, people attempt to reduce ambiguity by taking some *proactive actions*. Although they proposed items like "I prefer having clear rules and procedures where I work" to measure information gathering dimension, these types of items loaded under "Authority of Rules" factor in the present study. The reason of this may be the fact that the items proposed to measure information gathering by these researchers are not relevant to the information gathering action, but with a choice of situation, where the *rules/procedures* are clear. On the other hand, in the current study, items directly related with information gathering, such as "taking preventive actions to avoid the troubles while doing something" or "asking detailed questions in order to clarify uncertain situations" constituted the third factor. This dimension is called as "Information seeking and controlling" factor of UA, and supported the idea that information seeking/gathering to clarify ambiguous situation is an important part of the investigated construct.

Another factor emerged in the current study is called as "Strictness of rules". This dimension included items such as "Preferring that there should be clear rules describing how to behave in social environments" and "Believing in the strictness of the truth" and "Requirements of the rules". Although these items seem to be related to "Authority of Rules" factor, in Turkish sample, they constituted another factor, which emphasize not the written rules and procedures, but the unwritten

social norms. Considering the importance of traditional values in Turkish society (Tuncer, 2005), this new factor suggested to be an important part of UA construct, especially in cultures promoting traditional values. One of the limitations of this study is the sample size. In scale development studies, higher numbers of participants ensure the reliability and generalizability of the results. Therefore, confirmation of the current study should be done with a larger sample, preferably with participants coming from different socio-economic levels.

While conducting this study, there was a global economic crisis which might influence the people's preferences/attitudes toward uncertainty. On the other hand, high test-retest reliability coefficient as a sign of stability and consistency indicates that measurement of underlying construct is not influenced by temporary changes in a person's state at the time of testing (Sekaran, 2003). Therefore, test reliabilities give important insights about the existence of UA construct. The current study did not investigate this kind of reliability, due to limited resources. Further studies should be conducted to test the consistency of the UA scale over time.

Finally, the researchers believe that the new dimension "Strictness of the Rules" emerged in the current study should be further investigated as a part of UA construct. As this dimension is suggested to be related with cultural values in Turkish society, cross-cultural studies would shed light to the generalizability of this factor across cultures.

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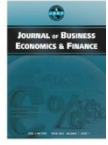
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VOLUNTARY DISCLOSURE STRATEGIES AND THE COST OF CAPITAL OF ITALIAN BLUE CHIPS

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KEYWORDS

Voluntary disclosure, information asymmetries, risk premia.

ABSTRACT

How do Italian blue chips actually deal with disclosure about their business model? Does their disclosure strategies affect the cost of capital through a reduction of the information risk premia? The paper identifies four different disclosure strategies through a cluster analysis on the contents of the annual reports, the investor relations and press releases of a set of Italian Blue Chips in 2003. The it uses an original model to extract the information risk premia from the time series of stock prices and trading volumes time. The level of information risk premia is split between market-related and firm-specific drivers to permit the estimation and discussion of the correlation with trading volume and the different disclosure strategies identified. Overlaps from results in cluster analysis and information risk premia determinants let us conclude that broad and exhaustive financial communication allows reduction of the cost of capital.

1. INTRODUCTION

Italy is well known for several things, i.e. arts, food, lifestyle, dressing, “made in Italy”, small business and ... financial markets inefficiency, mainly due to information asymmetries. Is it possible that no Italian listed company is aware of the benefits arising from financial disclosure strategies resolving the information asymmetries? The answer is “no, for sure!”. This study investigates how the Italian Blue Chips use voluntary disclosure strategies to reduce their cost-of-equity-capital by compressing the embedded information risk premia. The paper examines two main questions.

Firstly, we focus on choices concerning voluntary disclosure of the business models. The Italian Company Law fixes a minimum standard both in quantity and quality of information to be distributed through financial reporting. Mandatory information may be inefficient to resolve the information asymmetries. In fact, competition forces corporations to innovate strategies to keep business models more and more effective. In this framework of fluid business evolution, rigidity imposed by financial figures and commercial law may be misleading. That is why, several companies prefer to provide additional information, by a voluntary disclosure strategy. Such a strategy requires to manage trade-offs between costs arising from keep public strategic trends of the company and benefits related to higher investor attraction due to the deeper knowledge of long-term sources of competitive advantage. Secondly, we are interested in verifying whether such expensive strategies can benefit the corporation of an effective cost of capital reduction. Investors in inefficient financial markets add further risk premia to their expected return being aware of bias

in mapping the true risk-to-return performance of the investment due to information asymmetries. Like for the payoff risk, even information risk may be unbundled into systematic and firm specific. That is why the real impact on the cost-of-capital can be thus very different between corporations as it can be the efficacy of disclosure strategies. Contrarian to other studies, we argue that the “quality” of information can have higher impact than the “quantity” in finalizing the impact of disclosure strategies. In case of inefficient regulatory framework of financial communication it will be even possible that some disclosure strategies may result inefficient because of massive impact of systematic information risk.

The conclusion is based on empirical results over a sample of 40 Italian Blue Chips listed in Borsa Italiana Market in 2003 and involved in manufacture business (thus excluding financial industries companies). For any of the company in the sample we collected all the information-having-strategic-impact included in the annual report, in all the investor relation activities and in the press releases available through the corporation web site. Then, we ranked any specific informative item has been fixed by computing: (i) the frequency in the use of words referring to the specific subject; (ii) the number of connections with the other subjects in order to understand their relative importance in the exposition context. Therefore we ran a cluster analysis over such two aspect and crossed the emerging results. Furthermore, we collected time series of stock prices and trading volumes to compute the excess-volatility due to the information risk, recurring to an original model developed by the authors. Such indicator has been split into firm-specific and systematic quotas, to be compared with the actual investor behaviour as emerged from trading volumes, particularly in case of over-volatility reduction. The higher the correlation the higher is supposed to be the cost-of-capital impact. Results from this analysis has been compared with those emerging from the previous semantic one, searching for overlaps.

The paper is deployed as follows: next paragraph (#2) reports literature referring to voluntary disclosure strategies of the business model and their impact over the equity cost-of-capital, thus formulating specific research questions; in paragraph #3 the sample is discovered along with the mass of informative documents that were analyzed and their analysis; in section #4 results about the disclosure strategies are discussed; in section #5 the information risk proxies are measured and discussed for their effective impact over the cost-of-capital. Section 6 shows some concluding remarks striking both limits and potential developments for the research.

2. LITERATURE REVIEW AND RESEARCH QUESTIONS

Research about voluntary disclosure strategies aims to verify the opportunity to avoid adverse selection situations that emerged after Akerlof's seminal paper (Akerlof, 1970). Managers should have incentives to communicate to the financial market all the pieces of information they have in order to reduce the information asymmetries and, by that way, the actual level of the equity cost-of-capital (Grossman e Hart, 1980; Grossman, 1981; Milgrom, 1981).

Since no empirical evidence suggests the opportunity of full disclosure, further research has been developed in order to find possible constraints to such a strategy. Some authors suggest the existence of indirect costs of full disclosure; such costs are linked to the negative impact over the competitive advantage (Verrecchia, 1983; Darrrough e Stoughton, 1990, Wagenhofer, 1990; Feltham e Xie, 1992; Newman e Sansing, 1993; Darrrough, 1993; Gigler, 1994; Hayes e Lundholm, 1996). Such researches conclude that there can be a rational economic proof of not-to-communicate since the compression of expected return could be higher than the reduction in cost-

of-capital (a wide and deep analysis of the literature can be found in Verrecchia, 2001 e Dye, 2001).

This conclusion is against the growing evidence of huge amount of capital requirements related to modern business models and the correlated requirement to keep them clear to investors in order to avoid capital rationing. Global markets and rapid technology evolution increase the possible configurations of the business model along with their evolution, thus increasing the difficulties in communicating them. Intangibles and the know-how embedded in the so-called “human capital” let the business model being more and more original and firm specific, so that the schemes of the mandatory financial communication imposed by regulation find hard to transmit the entire set of information (Lev e Zarowin, 1999). Both aspects do contribute to increase the minimum capital required so that corporations increase their trust over the equity capital for funding and get further pressure to disseminate more “sensitive” information to investor for their value assessment (Beretta, 2006).

On these basis, AICPA (*American Institute of Certified Public Accountants*), FASB (*Financial Accounting Standards Board*), CICA (*Canadian Institute of Chartered Accountants*) and IASB (*International Accounting Standards Board*) deployed proposals to improve the information flows inside the annual report, particularly in sections referring to the business model description. Italian Law fixes suggestions into rule #2428 of the Civil Code, specifying the necessity to detect the value drivers arising from the business model of the corporation even in qualitative terms. Effectively we agree with Agliati when specifies that “A business model is mainly a case history; a history telling us how this model should react to solicitation generating inside the market and from the other members of the competitive arena such as the competitors” (our free translation from Agliati, 2006, page 29)

Can we definitively say that listed companies have more and more incentives to increase voluntary disclosure about their business model to allow investors to get the underpinnings of a sustainable competitive advantage, so reducing adverse selection phenomena and, by that way, reducing their cost of equity capital? Can we trust over trueness of such hypothesis even in the case of possible short term damages that might impact over the competitive position? No clear empirical evidence let us answer these questions, but it is very interesting to observe how the main efforts of research emerge from authors coming from countries where the level of information efficiency is low. According to the Italian evidence, Bagnoli (2005) investigated how annual financial reporting is composed as per the management activities and find out three possible strategies of voluntary disclosure, to be detected according to the intensity of disclosure about top-strategic information. Prencipe (2004) verified the impact of direct costs over voluntary disclosure related to specific business areas.

No research has been conducted about voluntary disclosure strategies for the business model. Please notice the use of the expression “strategy” in order to specify that they are based on specific decision process aiming to compare the cost-to-benefit ratio of the activities required to prepare, disseminate and controlling the impact of deploying “critical” information (Lev, 1992; Healy e Palepu, 1993). So our first target in this paper is to check such strategies of voluntary disclosure and, in the meanwhile, their drivers according to the experience of non-financial Italian Blue Chips. Here’s the emerging our first research question

RQ1: which are the strategies mainly used by Italian Blue Chips to disclose their business model? Which are their main drivers?

To get full evidence of the drivers we begun from checking the relationship existing between the industry and the adopted communication strategies. This is because we can suppose that communication practices may differ between industries both for historical reasons, fixing, for example, specific benchmarks connected to the specific ways competition is carried on: "... in particular whether firms face existing competitors or merely the threat of entry, and on whether firms compete primarily on the basis of price or long-run capacity decisions" (Healy e Palepu, 2001, page 424). For this scope we distinguished the sample companies into Manufacturers, Commercial/Service and Holdings (Cooke, 1991; Raffournier, 1995)¹.

Further analysis has been made to discover if the number of employees, the total invested capital, the equity and the revenues can be drivers of the disclosure strategies. We expect that bigger corporations are to conduct greater investments that let them keep more connected to the equity capital, thus more sensible to the adverse selection problem. Moreover, they have higher incentives to reduce private information dealing to cut the transaction costs (Diamond, 1985). Competition costs are probably lower for bigger corporations since, *ceteris paribus*, they have more defensive tools for their competitive position (Raffournier, 1995). Even costs to prepare, disseminate and controlling data are lower in the case of big corporation because of lower impact of fixed costs (Lang e Lundholm, 1993). Legal costs related to sues could instead being higher because of their stronger impact (Skinner, 1994). Finally, the bigger is the corporation, the higher will be the number of financial analysts and of the stakeholders (trade unions, Government, etc.) who will be interested in their performances, thus generating pressure to get information (Schipper, 1991).

Finally we have controlled the impact over return variables such as the return on equity (ROE) (Raffournier, 1995; Inchausti, 1997), usually used to measure the quality of the investment. The higher is the return on equity, the higher will be the degree of voluntary disclosure in order to reduce the risk of adverse selection (Lang e Lundholm, 1993). For sure, the higher is the corporate rate of return, the higher will be the attention that the corporation does attract from other stakeholders including competitors, clients, suppliers and workers. They could conclude that the higher corporate return is direct consequence of their lower return, thus sustaining greater transaction costs. Moreover, a low-return corporation should carry on more voluntary disclosure in order to reduce the negative impact arising from legal sues from investors due to lack of information (Skinner, 1994)

Focusing now on the effects of strategies of voluntary disclosure of the business model, we may find a couple of possible explication of cost of capital reduction (Healy e Palepu, 2001).

The former is due to the increase of liquidity of the security, thus reducing the equity cost of capital by an increase in the demand of the security (Diamond e Verrecchia, 1991) and a reduction in the expected value of losses due to transaction against informed traders (Easley e O'Hara, 2004).

¹Darrough e Stoughton (1990) show that costs of higher disclosure are directly linked to the number and dimension of the competitors.

The reduction of transaction costs might also affect the bid-ask spread in security trading (Amihud e Mendelson, 1986). Some authors strike out a possible positive relationship between voluntary disclosure, information asymmetries and equity cost of capital (Kim e Verrecchia, 1994; Zhang, 2001), even if several empirical evidences support a negative correlation (Welker, 1995; Coller e Yohn, 1997; Healy et al., 1999; Leuz e Verrecchia, 2000; Heflin et al., 2005; Brown e Hillegeist, 2007). Not all the empirical researches seem to be consistent (Francis et al., 2008).

The latter, is connected to the assumption that when the disclosure is imperfect, investors are charged with a further information risk due to wider uncertainty in expectations concerning payoffs. If this kind of risk is systematic (Barry e Brown, 1985; Handa e Linn, 1993; Coles et al., 1995), many investors will require a further return to bear such a risk; more recently (Mantovani, 2008) information risk premia link to firm-specific risk has been discovered. In effect, there seems to be no full consensus about the effective possibility to diversify the information risk (Clarkson et al., 1996) and how disclosure might reduce it, having redundant evidence about this (Botosan, 2006). Some authors show a significant relationship only in the case of securities generating low interest for analyst (Botosan, 1997) or corporation carrying on aggressive accounting strategies (Gietzmann e Ireland, 2005), or carrying on *disclosure* strategies only through the annual report (Botosan e Plumlee, 2002).

For sure, results from empirical evidence might be connected to the choices made by researchers for measuring disclosure: self-made ratios can overweight some subjects according to the researcher point of view, while independent index (such as the AIMR one) may be inefficient to describe the specific problem to be investigated. Healy and Palepu (2001) support the use of self-made ratios because of their better support to a specific disclosure investigation, but they strike out the higher costs of their computation in terms of reduces samples that can be analyzed. That's why several research based on self-made ratios do not attribute relative weight to the importance of specific items (Ahmed e Courtis, 1999). In our opinion, the real problem is connected to the choice of only measuring the level of disclosure, thus making the hypothesis that quality and quantity of disclosure will be strongly related (Botosan, 1997): we suggest, instead, a disclosure index will not be able to consider all the relationships between the different components of the items to be communicated, just like the strategy of disclosure should suggest to corporations. Thus, we support the idea of reject the mere quantitative approach to adopt a more systemic one (Drazin e Van de Ven, 1985) or a configurative one (Meyer et al. 1993) as usually done in the analysis of strategies of production, organization and competition (Dess et al., 1993; Miller, 1986; Milgrom e Roberts, 1995), just like a paper of Chavent et al. propose (2006).

Referring now to the measurement of information risk we must first distinguish between risk existence and the effective impact it may have on the financial markets equilibrium (so, the existence of an actual information risk premia). This separation is required in order to find an economic support to the choices in terms of disclosures; in fact, as a paradox, in a world without information risk premia, no economic incentive would exists to carry on strategies of voluntary disclosure. The question is still more complicated from the necessity to standardize the information flows to the investors (thus increasing the information efficiency of the markets) against the possibility that highly standardized information flows can impede to diffuse very specific pieces of information, particularly those connected to the competitive advantage of the corporation (thus impacting on the value creation process). That's why it is technically possible that an increase in the quantity of information could reduce its quality and, by that way, the appetite for a specific investment. Allen and Gale (1994) proposed to split the total risk of an

investment into two components: the “payoff risk”, representing the actual risk embedded in cash flows and the “information risk” being it the gap between the risk perceived from investors and the payoff one. The actual investment behaviour will be based on the sum of the two risks and, by this way, the actual level of the prices of the securities. Bertinetti et Al (2004) tried to analyze the possible sources of information risk and found out that some of them are endogenous to the financial markets so are of systematic source. Two classes of systematic information risk have been identified: (i) those generated by the information timing, i.e. connected to the natural quantity of time required to widespread information into the markets; (ii) those generated by the so called “information error”, i.e. related to biases in perception of risk due to the application of specific techniques. A third possible source of information risk may be the financial communication processes (Bertinetti, 1996) mainly connected to the firm-specific part of it.

According to the proposal of Bertinetti et Al, (2004), Mantovani (2004 and 2012) proposed an original methodology to identify some proxies of the information risk that entitle to distinguish between systematic and firm specific components of it. The methodology is based on the idea that in financial markets evolving toward efficiency (even in a weak form) the information risk can be proxy by the spread existing between long term and short term volatility of stock returns. In fact, investors will choose investments on the base of biased short-term volatility while the action of the information traders will contribute to widespread information inside the market (Grossman and Stiglitz, 1980), thus fixing the volatility to the long term value, i.e. to the payoff risk only. The wider is the time window used to compute the short-term volatility the lower will be the gap between long-term and short-term computation. Bertinetti et Al, (2005) try to test the model by detecting the information risk premia in special events in the financial markets such as the sale of newly issued shares, comparing the experience in different European Countries (Italy, France and Spain); relevant results were found, thus trusting the methodology. Gardenal (2007) try to detect the connections between the information risk and the risk aversion of investors in a behavioural finance context, while Mantovani (2008) proposed a very long term analysis (15 years) for the information risk to find out the possible drivers of an information risk premia model.

Our second target in this paper is to investigate the impact of the different strategies of voluntary disclosure about the business model on the information risk premia as measured in Mantovani (2008), thus answering to the following research question

RQ2: which is the actual impact of the disclosure strategies over the information risk premia (and the cost of equity capital)?

You can better understand while the information risk premium is included in the equity cost of capital by looking at an example that synthetically compares the price paths in financial markets due to the wide spreading of new pieces of information in two different possible scenarios: from one side, the theoretical path supposed by frictionless markets; on the other side, the diesel market where along with long-term investors even information traders, stock pickers and market timers do act.

Proof of the methodology to proxy estimate the information risk premia can be found in Mantovani (2012). According to the paper we may conclude that the information risk

- is not simply linked to the “quantity of information” diffused to investors (if information cannot be elaborated the acknowledge does not increase) but also by their “quality”;
- must be split into two parts: the systematic one, due to the mechanism that in a concrete way the market use to process information (both quantity and quality); the firm-specific one, strictly connected to the disclosure strategies adopted by corporations.

The equity cost of capital will be then determined by these components. So can be explained why companies fully disclosed may have information risk: the market could not be able to process the information or the standard imposed are not fully capable to transfer the entire set of information. We are expecting, then, that optimal disclosure strategies should reduce at least the firm-specific level of risk premium.

3. SAMPLE SELECTION AND METHODOLOGY

We investigate the voluntary strategies of the entire set of the 40 Italian Blue Chips listed in the Milan stock exchange in year 2003 (annex 1). We do focus on the Italian experience in order to emphasize the gap with the best practice in financial communication and even to determine the opportunities that such a gap can generate. The inner differences between the Italian model and the Anglo-Saxon one can be also correlated to the level of protection to the investor, being higher in formal terms in Italy, being higher in substantial term in the Anglo-Saxon system, thus generating several doubts about the efficacy of the two models (Francis et al., 2005). Finally we must consider that the reduced propensity to voluntary disclosure in Italian corporation is widely documented (Guatri e Eccles, 2000; Bagnoli, 2005) and for sure determined by the high concentration of shareholders and the diffusion of the model of “family corporations” (Beretta 2006).

We have chosen to look at the bigger corporations in order to have a more uniform sample to analyze while including companies having the highest possible degree of voluntary disclosure. Moreover, the absolute dimension of the corporation may affect the equity cost of capital because of higher level of liquidity in share trading (Botosan e Plumlee, 2002). On the opposite we decided to exclude the companies operating in the financial industries because of the specific information model they usually adopt and particular regulatory framework for their financial communication activities (Hossain et al., 1995), strictly related to their business.

We are aware of the limits that may arise from analyzing only year 2003. Nevertheless, it is likely that voluntary disclosure strategies have an intertemporal dependence since choices made in a certain period influence those made in the next period. Cosimano et al. (2002) and Einhorn e Ziv (2008) affirm the existence of this dependence in a relatively stable environment. Bagnoli (2009) affirms, with particular reference to Italian listed companies, the existence of important intertemporal dependence effects also with strong discontinuities at a competitive environment and informative level that make them relatively instable and unpredictable. We preferred to increase the number of corporations and of documents analyzed for each year instead of increasing the frequency of years.

The documents analyzed are mainly the annual report with particularly reference to the sections dealing with the business model – particularly as regulated in section 2428 of the Italian Civil Code – the investor relations activities and the press release available through the web site. From the beginning of the 90's several professional associations and regulators (AICPA, 1994; FASB, 2001; CICA, 2001; IASB, 2005) try to propose standards to increase sections of the annual report concerning the description of the business model. Italy adopted a specific application of the suggestions in its civil law as suggested by EASG, 2000.

The Italian legislator, in line with the European one, left high discretion to the companies on how to translate these binding issues into types of information to be provided and their level of depth. Therefore, the methods of drawing up the annual report are mandatory in form, but essentially voluntary in content. The decision to consider alongside the narrative sections of the annual report also the investor relations and press releases depends on the evidence that their coordination, in terms of strategies of disclosure, is not perfect. For example, using the disclosure index produced by AIMR, Lang and Lundholm (1993) documented the presence of a correlation of only 0.41 between the annual report and investor relations. The method used for the analysis of the documents is the content analysis, widely used in studies on corporate voluntary disclosure (Guthrie et al., 2004) and because it allows a good reproducibility and valid inferences from the data (Krippendorff, 1980). In particular, we assume that the importance attached by each company to the various strategic issues depends on (and is therefore indicative of) the strategy of voluntary disclosure of the business model adopted. Therefore, for each company we have identified and then coded information with strategic content reported on the documents analyzed, taking as unit of analysis the single sentence (Hackston and Milne, 1996).

The analysis grid was derived from the model of the “Rombo del Valore” by Olivotto (2000) that identifies, in the aspects below, the basic mechanisms generating economic value²:

1. Attractiveness of the *Competitive Environment*;
2. Strength of the *Competitive Specificities*;
3. Excellence of the *Process System*;
4. Validity of the *Exploitable Skills*.

In particular, the analysis grid was divided into three levels (Annex 2):

1. six macro-headings (marked by capital letters) that act as information areas and are attributable to the macro-theme of economic value and its determinants where, however, the competitive environment has been divided into: General Environment and Specific Environment;
2. twenty-one *headings* (marked by the capital letter of the macro-item which they belong to and by a lowercase letter) resulting from the breakdown of macro-items (not the economic value which is also a macro-headings) and representing the strategic issues that companies should handle with;
3. nineteen sub-items (marked with uppercase and lowercase letters of the source entry and with a numeric value) resulting from the decomposition of some items.

²The use of a self- built grid of analysis is, according to Francis et al. (2008), justified by the likely stability of the voluntary disclosure strategies.

A list of coding rules was defined for each no further decomposable item and for each sub-component of the grid of analysis. A preliminary test to verify the completeness of the grid of analysis and the robustness of the coding rules (refining eventually the ambiguous ones and at the same time standardizing the coding capacity of the analysis) was conducted on two companies (5% of the sample) belonging to different sectors. These companies were independently reviewed by one of the authors and two junior analysts. The results of the individual analysis were compared, the differences discussed and the list of coding rules refined.

Using this new list of coding rules, the two junior analysts analyzed separately the remaining 38 selected companies. Every 5 companies analyzed, the results separately obtained by the junior analysts were compared. If they did not coincide, the junior analysts were asked to reconsider the point and agree on a position. After 2 discussions, the differences nearly disappeared³.

In the analysis we estimated the importance of every individual business topics by identifying both the number of words dedicated to them, and the number of their connections with other themes. We assumed that the number of words devoted to a certain issue is a significant estimator of its level of detail. It is possible that some issues are, because of their nature, synthetic, so that a more extensive analysis does not enrich their informative power, or that they require a discussion of amplitude which widely varies from company to company.

These exceptions are not such that to lead to the rejection of the assumption mentioned above (Copeland and Fredericks, 1968; Tsalta and Walker, 2001; Leuze and Schrand, 2008). We also assumed that the number of connections that a theme has with the other themes is a significant estimator of its level of importance.

The connections were divided into causal links: $A \rightarrow B$ (A causes B) and connotative: $A \leftrightarrow B$ (A and B are related). Accepting the assumptions of the software used for the reconstruction of the connections (Decision Explorer), the importance score was calculated by assigning a value of: 1 on each link of grade 1 ($A \rightarrow B$), 0.5 to each link of grade 2 ($A \rightarrow B \rightarrow C$) and 0.33 to link each of grade 3 ($A \rightarrow B \rightarrow C \rightarrow B$), and then summing up the values given to each individual connection.

We then proceeded to aggregate, through a cluster analysis (SPSS 13.0), the companies selected on the basis of both the number of words devoted to each individual topic, and the number of their connections with other themes. This was made in order to identify two sets of strategies of voluntary disclosure of the business model: one based on the importance of the issues in terms of space and one based mostly on the importance of the issues in terms of importance. These two sets must have this feature: to be made of groups in which the statistical variance between grouped items is low (internal cohesion), whereas the variance between different groups is maximized (external separation). The choice of the clustering algorithm led to the use of the Ward agglomerative hierarchical method with the Euclidean distance. This algorithm was used by Bagnoli (2005) and is most commonly used in strategic management (Ketchen and Shook, 1996). This algorithm moves from considering every single element of a group and proceeds through a series of passages in which the nearest groups are grouped two by two until you get to the identification of a single group. This brings to a tree-chart showing how the groups were built. To

³This process of systematic comparison ensures high reliability of the results achieved through the codification, thus making unnecessary the calculation of indices of reliability (Krippendorf, 1980).

identify the number of groups to consider in order to derive the most significant results, we proceeded visually inspecting the tree and cutting it in proximity of the highest jump (Ketchen and Shook, 1996). The results achieved in both clustering procedures were nevertheless confirmed by the analysis of the agglomeration coefficient, which shows the Euclidean distances for all the progressive steps of grouping. The groups identified through the cluster analysis, conducted on the basis of the number of words devoted to each individual topic, were crossed with those emerged from the cluster analysis conducted on the number of their connections. This was to identify a taxonomy of strategies for voluntary disclosure of the business model based on the importance of the issues in terms of both space dedicated to them and importance assumed.

We then moved to recognize if and how the voluntary disclosure strategies of the business model identified had an impact on the information risk of the companies belonging to the sample. To do that, we first collected the time series of their stock prices and their related trading volumes. On this basis, we adopted the procedure firstly used by Mantovani (2004) and briefly described above. Its application follows the rules below.

The time series of prices used in the analysis ranges from 1.1.2002 - 30.12.2005, a total of 1'043 daily observations for each individual stock and also for the general market index (Comit Global Index). The observation period was chosen in order to be able to recognize the disclosure strategies adopted by the firms analyzed for the first research question. The choice of the range of analysis took place so that the time horizons before and after the analysis were identical and, simultaneously, large enough to be able to calculate average levels of volatility, compatible with the minimization of the information information on the whole time horizon (only in this way, in fact, we can highlight, by difference, the short term information risk). Previous analysis show that three years are a sufficiently long period of time; this is because the dissemination of information in 2003 takes place in the same year (especially in the second half) and then again in the first half of next year 2004.

The methodology is fully explained in Mantovani (2012). From the time series of prices we first computed the returns of each trading day using the following formula:

$$r_t = (P_t - P_{t-1})/P_{t-1} \quad [1]$$

Starting from the returns time series, it is then possible to calculate, for the specific period of analysis, the traditional indicators of risk (measured by the standard deviation of returns), and an estimate of the stock beta which allows to decompose the total risk (as expressed by the standard deviation) into the diversifiable and the systematic part.

The standard deviation refers to the entire set of daily returns (i.e. 1043-1 returns); for this reason, it was used in this study as an indicator of the investment risk not influenced by the information risk (σ_{LT}), at least from the short-term risks.

Analytically:

$$\sigma_{LT} = \sqrt{\sum_{t=1}^{1+1042} \frac{(r_t - \bar{r}_t)^2}{1043}} \quad [2]$$

Restricting the analyses to 60 consecutive observations, we get the value of the overall risk in the short term (σ_{ST}), obviously different from the long-term one because of the presence of information risk. Analytically:

$$\sigma_{ST} = \sqrt{\frac{\sum_{t=1}^{1+60} (r_t - \bar{r}_t)^2}{60}} \quad [3]$$

For each stock index (and for the general index), we then calculated the series of the 983 short term standard deviations. These are obviously shorter time series than the previous ones, since they range from March 28, 2002 (i.e. 60 days later) to December 30, 2005 (like the other series).

To be precise, we should emphasize that the use of historical data computed ex-post is equivalent to hypothesize a market model of rational expectations. In the writer's opinion, the solution does not conflict with the hypothesis underlying this study only if we accept that the information risk may be also systematic in nature and that the informed agents are not exactly equal to the total number of agents operating in the financial market. The alternative hypothesis to take the expected volatility as our risk measure would be more effective only if one contemporaneously accepted the absence of information risk on the financial instrument, which allows to estimate the expectations about the volatility levels. Since this calculation is usually made on the basis of the derivative prices, like e.g. options, it is difficult to claim that the additional hypothesis is more easily met than the one we adopted.

Subtracting from σ_{ST} the unique value of σ_{LT} calculated for the whole period, we get an indicator of the *pro-tempore* total information risk impact (TIR) on the market:

$$TIR = \sigma_{ST} - \sigma_{LT} \quad [4]$$

Being TIR the measure of the information risk impact, its proxy is instead identified by variations of TIR over time or by changes in volatility in excess with respect to the equilibrium levels, changes that we can attribute to the mechanics of new information diffusion on the market (systematic part) and also to the disclosure policies adopted by the companies (idiosyncratic part).

The evidence of high impacts of the information risk on the risk indicators characterizing the investment (including the idiosyncratic part) and of these risks on daily returns will justify the subsequent search for connections with relevant facts, specific of each investment.

$$\partial TIR / \partial t \cong TIR_t - TIR_{t-1} = dTIR \quad [5]$$

We obtain in this case a further reduced set of data to the period March 29, 2002 – December 30, 2005, which amounts to 982 observations, one fewer than the previous one. It is possible to estimate the proxy of the information risk also for the general index, consistently with the theoretical evidence according to which the information asymmetries in the market are not necessarily linked only to the choices made by enterprises, but also to the mechanisms by which the market as a whole deals with the available information and also to the information standards imposed by the regulation, whose effectiveness remains, *erga omnes*, in doubt. The evidence of low levels of the ratio between $dTIR$ and TIR discovered in other studies (Mantovani, 2008) indicates that the persistence of the information risk tends to be significant, a fact this to be imputed to the time needed by the markets to adapt their mechanisms of working, particularly the institutional ones. The research of the systematic information risk level can be made following the

same logic as seen before for the total risk (i.e. contrasting levels calculated over long periods of time with those over shorter periods). Differently from before, however, we proceed with the calculation of the betas of the stocks and from them with the identification of the share of standard deviation which describes the systematic risk. The short term beta was calculated using the traditional formula applied on a 60 days-series of the stock returns and of the market index, consistently with the procedure used for the short-term volatility. Analytically:

$$\beta_{ST} = \frac{Cov_{t=60}(r_t; r_m)}{Var_{t=60}(r_m)} \quad [6]$$

where the suffix “m” refers to the market as a whole.

On the basis of the traditional decomposition of the variance of a stock return into its systematic part and its idiosyncratic one, we can also decompose the overall returns standard deviation and isolate the idiosyncratic part. Analytically:

$$,Var(r_t) = \beta^2 Var(r_m) + \varepsilon^2 \quad [7]$$

Equation 7 refers to the efficient frontier. We prefer to refer to the capital market line portfolio having the same expected return but a systematic risk as depicted in equation [8]:

$$\delta = \sigma(r_t) - \beta \times \sigma(r_m) \quad [8]$$

where $\beta \times \sigma(r_m)$, the share of systematic risk supposing a fully efficient market, thus let us include in δ even the over-volatility due to any source of risk: the idiosyncratic and the information one. Both indicators are calculated both for the long and the short term, allowing to determine the impact of the systematic information risk (SIR) and its variability (dSIR) and, by difference, the impact of the idiosyncratic information risk (DIR) and its variability (dDIR), of course not present in the case of the general market index.

Finally, to highlight the actual impact of the disclosure policies adopted by the companies we need to understand what is the contribution of the idiosyncratic information (DIR) to the total information information (TIR) and compare it with the systematic part. By calculating the correlation between SIR and TIR and then between DIR and TIR for the time horizon under analysis we can draw some preliminary results. Of course, the correlation levels between individual securities will never be perfect (1.00); only for the general market index TIR is fully determined by SIR. However, the sum of the two correlations won't be 1, being a part of the SIR determined by the inadequacy of the information standards to represent the riskiness of the specific investment.

In these cases, then, the strategies of disclosure will act both on the level of idiosyncratic information risk, according to the traditional doctrine, and on the systematic one if the company voluntarily decides to integrate the information where insufficient (assuming of course that it is aware of that). The actual benefit on the cost of capital will depend also on the reaction that the financial market can develop. Partially integrating the original model, we tried to understand this phenomenon through the degree of correlation between changes in the DIR and the trading volumes of the securities along the time period of interest. The idea is that if changes in dDIR determine changes also in the volumes, then not only the potential exists, but the financial market is ready to recognize it. The threshold of 13% is the reference point, as being the average level of the Italian market (see Bertinetti et al., 2004).

4. THE DISCLOSURE STRATEGIES OF THE BUSINESS MODEL AND THEIR DETERMINANTS

The first objective of this paper is to recognize the strategic choices regarding the voluntary disclosure of the business model adopted by the Italian blue chips and their determinants. The cluster analysis procedure described in the previous paragraph led us to distinguish firms into two groups if we consider the number of words devoted to each individual topic (Annex 3), and in two other groups (different from the two just mentioned) if we consider the number of their connections with other themes (Annex 4). The first two groups were then crossed with the second two groups. This led us to identify four groups of companies with different strategies for voluntary disclosure. To identify the disclosure strategies, we have compared the average number of words dedicated and connections established by different groups of firms in the description of their business models and of the individual topics discussed (Annex 5 and 6). To test the statistical significance of the differences between these averages we used the One-Way ANOVA (SPSS 13 for Windows). Before this analysis we tested if the underlying variables were normally distributed using the Kolmogorov-Smirnov test of (Annex 7 and 8). Unlike most of the statistical tests, a significant result is, in this case, bad news: the normal distribution does not approximate well the one characterizing the variable in the analysis ($Z < 0.05$). Comparing the average number of words dedicated and connections established by different groups of firms in the description of their business models we discovered their voluntary disclosure strategies can be broadly characterized as follows (Table 1):

- *Group A*: very well described but little interrelated themes;
- *Group B*: very well described and very much interrelated themes;
- *Group C*: bad described and little interrelated themes;
- *Group D*: bad described but very much interrelated themes.

Table 1: Groups of Firms and Relative Voluntary Disclosure Strategies

	Low interrelation among themes	High interrelation among themes
Very well described themes	Group A	Group B
	Acea Alitalia Autogrill Autostrade per l'Italia Bayer Davide Campari Enel St. Microelettronics	Eni Fiat Luxottica Mediaset Telecom Tenaris Volkswagen
Bad described themes	Group C	Group D
	Asm Brescia Autostrada To-Mi Bulgari Buzzi Unicem Caltagirone Editore Finmeccanica Gruppo Editoriale l'Espresso Italcementi Lottomatica Rcs Mediagroup Recordati Sias Snia Telecom Italia Media Tod's	Aem Arnoldo Mondadori Editore. Benetton Group Edison Hera Merloni Elettrodomestici. Saipem Seat Pagine Gialle Snam Rete Gas Tim

After that, comparing the average number of words devoted by the different groups of firms in the description of individual strategic issues and restricting the analyses only on the variables whose distribution is a normal, we discovered that what mostly differentiates the voluntary disclosure strategies of the firms belonging to groups A and B compared to the firms belonging to groups C and D is a more in depth discussion of the first item *Bb) Relative position of the firm* which indicates the competitive strength of the company with respect to its competitors, and then of all the headings and subheadings related to the macro-heading *C) Competitive Specificities* which highlight the sources of competitive strength with the exception of the sub-heading *CC2) Adaptability in discontinuity*. Also the major deepening of the voice *Dc) Processes for the amplification of the firm value* which describes the actions developed to improve the efficiency and effectiveness of the business processes, and the voice *De) Processes of value creation* which, instead, highlights the actual procedures of development of these processes and differentiates the strategies for voluntary disclosure of companies belonging to groups A and B with respect to the others. With particular reference to the last heading mentioned, the most significant differences are found at the level of sub-headings *De4) Marketing*; *De7) Human Resources* and *DE9) Support activities*. Those listed are, moreover, generally recognized as the most critical business processes. Finally, the greater deepening of the item *Eb) Orientation to the incremental improvement* differentiates the voluntary disclosure strategies of firms belonging to

groups A and B from the others. Instead, the lack of differentiation at the level of heading *Ec) Orientation to radical improvement*, consistent with the result found above in the subheading *CC2) Adaptability in absence of continuity*, seems to prove the companies' choice, regardless of the groups they belong, not to investigate issues related to their ability to respond to strategic risk (ICAEW, 1997, Jorion, 1997). All this despite the huge number of studies focused to deepen the quality of financial reporting with particular attention to the disclosure of business risks (Bozzolan and Beretta, 2004). Moreover, comparing the average number of connections established by different groups of firms in the description of individual strategic issues and always concentrating on the variables normally distributed, we can see that the issues that mostly differentiate the disclosure strategies of the firms belonging to groups B and, in a less strong way, D with respect to groups A and C nearly coincide with the themes mentioned before.

This result seems to show that these issues are actually the most crucial and characterizing the different disclosure strategies of the business model. The not perfect coincidence is due to a major role of the headings *Aa) Financial-economic Environment* and *Ac) Political and Institutional Environment* in the disclosure strategies of firms belonging to groups B and D compared to others. This lack of coincidence may be due to the fact that despite the central role assumed by them in dealing with strategic issues, clearly important premises for the overall corporate actions, their depth can be achieved also by dedicating to them reduced spaces. The not perfect coincidence is mainly due to a reinforced role of the headings *Bc) Variability of the specific environment; Db) Processes for the research of opportunities; De) Technology Management* and *Ea) Orientation to the expectations of stakeholders* in the firms' strategies of disclosure belonging to groups B and D compared to others. This greater importance points out a particular attention given to the evolution of the specific environment. Thus, the importance of the processes aiming at recognizing latent potentials to generate value (environmental scanning), through both: (i) entering new markets, and (ii) developing new products and processes through new technologies, especially those allowing a better satisfaction of the stakeholders (e.g., occupational safety, eco-compatible transformation processes, etc.). The fact that this concern is not translated into greater exploration of these strategic issues may depend on the fear of providing too detailed information to competitors⁴.

To understand the determinants of the voluntary disclosure strategies recognized so far, we controlled for the impact on the latest of the average Dimension measured by Number of employees, Invested capital, Equity, Net revenue, and Profitability, measured in terms of ROE of companies belonging to the different groups, and thus their distribution across sectors. To test the statistical significance of differences between these averages we used the One-Way ANOVA (SPSS 13 for windows). Before doing this, however, we verified if the underlying variables were normally distributed with the Kolmogorov-Smirnov test (Annex 9).

Given that none of the dimensional variables observed is normally distributed, we proceeded to test the statistical significance of the differences between means including by non-parametric test of Kruskal Wallis. Both tests (parametric and nonparametric) showed a statistically significant difference in terms of average dimension, however measured, but not at the level of profitability among the firms belonging to the different groups identified. In particular, firms belonging to

⁴Three factors appear to determine whether information creates competitive disadvantage: the *type* of information, the *level of detail*, and the *timing* of the disclosure. As for the type of information, routine operating data (companies often provide such operating data for inclusion in industry-wide statistics) are generally less likely to cause competitive disadvantage than information about product development. However, the greater the level of detail about new product plans - for example, including unique features and the reasons for their potential appeal - the greater the likelihood of competitive disadvantage. Similarly, the level of detail about other types of disclosures determines whether they can cause competitive disadvantage". FASB (2001: 18).

groups A and especially B have a significantly higher average dimension than those belonging to groups C and D (Table 2). The dimension seems to explain at least as much as the average number of words devoted by firms belonging to groups A and B in the description of their business models and of the individual topics. By contrast, the distribution among industrial sectors of the companies belonging to the different groups found does not seem significantly different and does not appear to explain the different strategies of voluntary disclosure of the business model recognized.

Table2: The Drivers of the Identified Groups.

Variable	Gr.	μ	σ	Min	Max	Anova		Kruskal Wallis Test	
						F	Sig.	χ^2	Asymp. Sig.
<i>Dimension</i>									
Employees	A	37.456	38.375	1.390	115.400	6,792	0,001	18,08	0,000
	B	104.184	114.638	5.600	334.873				
	C	6.491	11.859	909	46.861				
	D	8.614	7.038	2.484	21.314				
Invested Capital	A	18.022.347	23.754.163	1.214.606	69.015.000	8,660	0,000	9,78	0,021
	B	50.348.882	43.886.166	3.912.676	119.136.000				
	C	3.415.282	6.587.764	505.203	26.556.385				
	D	5.345.238	4.588.256	1.726.023	16.495.000				
Equity	A	1.513.178	1.940.883	29.040	6.063.000	3,563	0,023	19,40	0,000
	B	2.859.924	3.244.944	27.269	8.854.000				
	C	327.681	495.704	20.741	1.855.571				
	D	992.263	1.265.865	67.452	4.212.000				
Sales	A	9.566.670	12.281.328	729.655	30.022.000	9,426	0,000	18,38	0,000
	B	33.217.362	30.824.386	2.824.636	87.153.000				
	C	1.541.731	2.119.336	244.306	8.233.040				
	D	2.420.782	1.608.445	735.565	5.985.000				
ROE	A	1%	20%	-42%	19%	0,875	0,463	2,08	0,557
	B	10%	18%	-25%	30%				
	C	6%	12%	-20%	20%				
	D	12%	8%	-1%	25%				
<i>Sector</i>		Manufacturing		Commercial/Services		Holding		Total	
Sector	A	13%		50%		37%		100%	
	B	14%		29%		57%		100%	
	C	13%		27%		60%		100%	
	D	0%		50%		50%		100%	

5. IMPACT OF DISCLOSURE STRATEGIES OF THE BUSINESS MODEL ON THE INFORMATION RISK PREMIA

The second objective of this paper is to recognize the impact of different strategic choices in terms of voluntary disclosure of the business model adopted by the Italian blue chips on their level of information risk. The procedure described in paragraph 3 led to first calculate the average daily returns of the securities of companies in the sample, their total risk (standard deviation) and systematic risk (beta of the title), and the total risk composition (in %) in systematic and idiosyncratic part (3le 5).

Looking at Table 3, some aspects are worth being highlighted:

- the high level of volatility with respect to the daily return (on average, the former is over 61 times the latter), sign of the continuous adjustment of market prices, even after the flow of information;
- the consistency of the idiosyncratic risk with respect to the total risk, on average equal to 61.36%, and never smaller than 36.78% with a maximum of 89.70%.

Without entering into details of academic discussions, the data presented in the table put in evidence that the idiosyncratic risk factors characterizing these investments are substantial, both in relation to the payoff risk and to the information risk.

Instead, Table 4 shows the results of the calculations of the total information risk in accordance with the methodology described before and its impact compared to the levels of total risk and idiosyncratic risk of the investment. It should be noted immediately that also the general index shows information risk, inconsistently with the theoretical predictions, thus confirming that the problem of asymmetric information on the market should not be related only to the choices made by the enterprises, but also to the mechanisms by which the market as a whole provides information and also to the standards imposed by the regulators, whose effectiveness, *erga omnes*, remains doubtful.

Table 3: Analysis of the Relation Between Returns and Risk

Company	Daily Returns		Beta	Weight of Risk (%)	
	Average	St. Dev.	of the period	Systematic	Diversifiable
Acea	0,0183%	1,7118%	0,8392	45,09%	54,91%
Aem	-0,0260%	1,6011%	0,7929	45,55%	54,45%
Alitalia	-0,1562%	2,6210%	0,9845	34,55%	65,45%
Arnoldo Mondadori Editore	0,0277%	1,7340%	1,0506	55,72%	44,28%
Asm Brescia	0,0365%	1,2236%	0,2591	19,48%	80,52%
Autogrill	0,0231%	1,7401%	0,8513	45,00%	55,00%
Autostrada To-Mi	0,0911%	1,3495%	0,3410	23,24%	76,76%
Autostrade per l'Italia	0,0831%	1,1892%	0,2888	22,34%	77,66%
Bayer	0,0153%	2,2818%	1,3955	56,25%	43,75%
Benetton	-0,0146%	2,0876%	0,9698	42,73%	57,27%
Bulgari	0,0289%	2,3193%	1,3858	54,96%	45,04%
Buzzi Unicem	0,0588%	1,7343%	0,8099	42,95%	57,05%
Caltagirone Editore	0,0045%	1,5542%	0,5731	33,91%	66,09%
Davide Campari	0,0913%	1,5581%	0,2971	17,54%	82,46%
Edison	0,0131%	1,9326%	0,6712	31,95%	68,05%
Enel	0,0181%	1,3451%	0,6536	44,69%	55,31%
Eni	0,0563%	1,4651%	0,7363	46,23%	53,77%
Fiat	-0,0633%	2,1656%	1,1774	50,01%	49,99%
Finmeccanica	-0,0054%	1,9878%	1,3446	62,22%	37,78%
Gruppo Editoriale l'Espresso	0,0375%	1,9199%	1,1693	56,02%	43,98%
Hera	0,1027%	1,2678%	0,1800	13,06%	86,94%
Italcementi	0,0598%	1,3951%	0,5689	37,51%	62,49%
Lottomatica	0,1224%	1,5633%	0,3585	21,09%	78,91%
Luxottica	0,0231%	1,7370%	0,6879	36,43%	63,57%
Mediaset	0,0140%	1,8041%	1,0450	53,27%	46,73%
Merloni Elettrodomestici	0,0547%	1,8578%	0,5763	28,53%	71,47%
Rcs Mediagroup	0,0303%	2,2751%	1,1954	48,33%	51,67%
Recordati	0,0220%	1,9965%	0,6590	30,36%	69,64%
Saipem	0,1066%	1,9203%	0,6992	33,49%	66,51%
Seat Pagine Gialle	0,0189%	1,6674%	0,3326	18,34%	81,66%
Sias	0,1135%	1,4783%	0,3277	20,39%	79,61%
Snam Rete Gas	0,0356%	1,1067%	0,1239	10,30%	89,70%
Snia	-0,0190%	2,0222%	0,3048	13,86%	86,14%
St Microelectronics	-0,0706%	2,5697%	1,7044	61,00%	39,00%
Telecom Italia	-0,0166%	1,6568%	1,0035	55,71%	44,29%
Telecom Italia Media	0,0334%	2,2736%	0,9351	37,83%	62,17%
Tim	-0,0220%	1,6485%	1,0933	61,00%	39,00%
Tenaris	0,2414%	2,0633%	0,4721	21,05%	78,95%
Tod's Group	0,0268%	2,0835%	1,1387	50,27%	49,73%
Volkswagen	-0,0032%	2,0987%	1,4425	63,22%	36,78%
Milan Comit Global	0,0150%	0,9198%	1,0000	100,00%	0,00%

Table 4: Relation Between Information Risk and Total Risk

Company	Risk			Incidence of info-risk on tot-risk:	
	Total	Idiosyncratic	Information	Total	Idiosyncratic
Acea	1,7118%	0,9400%	0,0740%	4,33%	7,88%
Aem	1,6011%	0,8718%	0,0801%	5,00%	9,19%
Alitalia	2,6210%	1,7154%	0,1357%	5,18%	7,91%
Arnoldo Mondadori Editore	1,7340%	0,7678%	0,1590%	9,17%	20,71%
Asm Brescia	1,2236%	0,9853%	0,0412%	3,37%	4,18%
Autogrill	1,7401%	0,9571%	0,1451%	8,34%	15,17%
Autostrada To-Mi	1,3495%	1,0359%	0,0263%	1,95%	2,54%
Autostrade per l'Italia	1,1892%	0,9236%	0,0715%	6,01%	7,74%
Bayer	2,2818%	0,9983%	0,2378%	10,42%	23,82%
Benetton	2,0876%	1,1957%	0,0885%	4,24%	7,40%
Bulgari	2,3193%	1,0447%	0,1687%	7,27%	16,15%
Buzzi Unicem	1,7343%	0,9894%	0,0567%	3,27%	5,74%
Caltagirone Editore	1,5542%	1,0271%	0,0771%	4,96%	7,51%
Daive Campari	1,5581%	1,2848%	0,0758%	4,86%	5,90%
Edison	1,9326%	1,3152%	0,2429%	12,57%	18,47%
Enel	1,3451%	0,7440%	0,0938%	6,98%	12,61%
Eni	1,4651%	0,7879%	0,1019%	6,95%	12,93%
Fiat	2,1656%	1,0826%	0,0527%	2,44%	4,87%
Finmeccanica	1,9878%	0,7511%	0,1696%	8,53%	22,58%
Gruppo Editoriale l'Espresso	1,9199%	0,8444%	0,1190%	6,20%	14,10%
Hera	1,2678%	1,1022%	0,0725%	5,72%	6,58%
Italcementi	1,3951%	0,8718%	0,0417%	2,99%	4,78%
Lottomatica	1,5633%	1,2336%	0,1058%	6,77%	8,58%
Luxottica	1,7370%	1,1043%	0,0876%	5,04%	7,93%
Mediaset	1,8041%	0,8430%	0,1372%	7,60%	16,28%
Merloni Elettrodomestici	1,8578%	1,3277%	0,1052%	5,66%	7,92%
Rcs Mediagroup	2,2751%	1,1756%	0,0801%	3,52%	6,81%
Recordati	1,9965%	1,3904%	0,1853%	9,28%	13,33%
Saipem	1,9203%	1,2772%	0,1019%	5,31%	7,98%
Seat Pagine Gialle	1,6674%	1,3615%	0,0350%	2,10%	2,57%
Sias	1,4783%	1,1768%	0,0497%	3,36%	4,22%
Snam Rete Gas	1,1067%	0,9927%	0,0434%	3,92%	4,37%
Snia	2,0222%	1,7419%	0,0823%	4,07%	4,72%
St Microelectronics	2,5697%	1,0021%	0,2130%	8,29%	21,26%
Telecom Italia	1,6568%	0,7338%	0,1379%	8,32%	18,80%
Telecom Italia Media	2,2736%	1,4136%	0,0709%	3,12%	5,02%
Tim	1,6485%	0,6430%	0,1749%	10,61%	27,20%
Tenaris	2,0633%	1,6290%	0,0187%	0,91%	1,15%
Tod's Group	2,0835%	1,0362%	0,1037%	4,98%	10,01%
Volkswagen	2,0987%	0,7720%	0,1742%	8,30%	22,57%
Milan Comit Global	0,9198%	0,0000%	0,0938%	10,19%	n.s.

The average impact of the information risk is around 5.80% of the daily total risk highlighted by the securities, with a maximum value equal to 12.57% and a minimum equal to 0.91% of the total.

A notable fact is that the minimum incidence of the information risk is not reached by the general market index (which shows an incidence equal to 10.19%), but by a single firm. Note that the minimal impact of the information risk is not reached by the market index (which shows an incidence equal to 10.19%), but by a single firm. The fact that several companies are characterized by a lower incidence than the market shows that the level of information risk in the total system can also be influenced by a reduced number of stocks characterized by high incidence.

The cross-reading of this data with the one about the consistency of the total investment risk compared to the returns (Table 3) leads to the conclusion that the information risk is a significant determinant of the daily performance of an investment. If we consider only the case of the general market index, for example, the total investment risk has a standard deviation of 0.9198%, namely 61 times the average daily return which is equal to 0.0150%. The impact of the information risk estimated for the index is equal to 0.0938%, representing 10.19% of the total risk of the stock, still over 6 times the daily average return. We can conclude that the opportunity to generate extra returns (positive and negative) on a daily basis is very high, and this is a possible reason of some traders' activities in our market.

If we consider only the idiosyncratic risk which has a heavy weight on the overall risk, as seen in Table 3, we discover that the incidence for the various investments is more pronounced (of course this evidence is not detectable for the market index that, by nature, does not incorporate risk diversifiable). Table 4 then reports the impact of the information risk on the total idiosyncratic risk of each specific investment. Here the incidence is obviously higher than the incidence on the total risk, and has an average of 10.74%. The high incidence of the idiosyncratic risk on the total risk of the investment combined with the significant impact of the information risk on the diversifiable one, let us think that the effects of the voluntary disclosure strategies on the cost of capital of the firms can be considered very significant.

Table 5 compares the total value of TIR with the average value of its daily variation (dTIR) in order to understand the major / minor persistence over time of information risk on a specific investment. It is worthwhile to recall that this indicator requires particular attention to be interpreted, since when it is low it means that the daily changes are modest, and the persistence of risk information is higher. *Vice versa*, high values of the indicator, demonstrate that the total information risk has undergone substantial changes, but limited in time.

Table 5: Drivers of the TIR Persistence

Company	TIR	dTIR	dTIR/TIR
	Total Info-risk	Average daily variation	Average persistence of RIT
Acea	0,0740%	0,0003%	0,3623%
Aem	0,0801%	0,0008%	0,9732%
Alitalia	0,1357%	0,0004%	0,2908%
Arnoldo Mondadori Editore	0,1590%	0,0016%	1,0194%
Asm Brescia	0,0412%	0,0006%	1,5702%
Autogrill	0,1451%	0,0010%	0,6800%
Autostrada To-Mi	0,0263%	0,0001%	0,2209%
Autostrade per l'Italia	0,0715%	0,0000%	0,0641%
Bayer	0,2378%	0,0003%	0,1305%
Benetton	0,0885%	0,0002%	0,2596%
Bulgari	0,1687%	0,0006%	0,3363%
Buzzi Unicem	0,0567%	0,0002%	0,4168%
Caltagirone Editore	0,0771%	0,0012%	1,5519%
Davide Campari	0,0758%	0,0001%	0,1175%
Edison	0,2429%	0,0004%	0,1520%
Enel	0,0938%	0,0002%	0,2660%
Eni	0,1019%	0,0005%	0,4934%
Fiat	0,0527%	0,0007%	1,2604%
Finmeccanica	0,1696%	0,0010%	0,5721%
Gruppo Editoriale l'Espresso	0,1190%	0,0015%	1,2871%
Hera	0,0725%	0,0021%	2,8435%
Italcementi	0,0417%	0,0003%	0,7008%
Lottomatica	0,1058%	0,0007%	0,6267%
Luxottica	0,0876%	0,0001%	0,0787%
Mediaset	0,1372%	0,0012%	0,8423%
Merloni Elettrodomestici	0,1052%	0,0012%	1,1774%
Rcs Mediagroup	0,0801%	0,0001%	0,1702%
Recordati	0,1853%	0,0001%	0,0803%
Saipem	0,1019%	0,0004%	0,4343%
Seat Pagine Gialle	0,0350%	0,0020%	5,7284%
Sias	0,0497%	0,0009%	1,8641%
Snam Rete Gas	0,0434%	0,0001%	0,2004%
Snia	0,0823%	0,0003%	0,3059%
St Microelectronics	0,2130%	0,0009%	0,4372%
Telecom Italia	0,1379%	0,0008%	0,5637%
Telecom Italia Media	0,0709%	0,0005%	0,6936%
Tim	0,1749%	0,0021%	1,2258%
Tenaris	0,0187%	0,0033%	17,7561%
Tod's Group	0,1037%	0,0008%	0,8137%
Volkswagen	0,1742%	0,0019%	1,0738%
Milan Comit Global	0,0938%	0,0002%	0,2656%

The evidence of a low level of the ratio between dTIR and TIR for the market index indicates that the persistence of information risk tends to be significant, a fact to be connected to the time needed by the market to change its mechanics, in particular the institutional ones. Instead, analyzing the data for individual securities, we observe that in ten cases⁵ (out of forty), the indicator is smaller than that calculated for the whole market. Seven out of these cases⁶ also show a TIR smaller than the market one. For them, therefore, the information risk is one of the less incident and less variable (and

⁵ Autostrada To-Mi, Autostrade per l'Italia, Bayer, Benetton, Davide Campari, Edison, Luxottica, RCS Mediagroup, Recordati, Snam Rete Gas.

⁶ Autostrada To-Mi, Autostrade per l'Italia, Benetton, Davide Campari, Luxottica, RCS Mediagroup, Snam Rete Gas.

therefore more persistent in its low levels). Table 6 displays the average of the three indicators of information risk (total, systematic, idiosyncratic) estimated for each of the forty companies analyzed.

Table 6: Components of the Information Risk

Company	Average dTIR	Average dSIR *	Average dDIR **
Acea	-0,0002683%	-0,0002837%	0,0000154%
Aem	-0,0007798%	-0,0006356%	-0,0001442%
Alitalia	0,0003944%	-0,0006463%	0,0010407%
Arnoldo Mondadori Editore	-0,0016209%	-0,0011279%	-0,0004930%
Asm Brescia	0,0006474%	0,0002459%	0,0004016%
Autogrill	-0,0009869%	-0,0001994%	-0,0007876%
Autostrada To-Mi	0,0000581%	-0,0000552%	0,0001134%
Autostrade per l'Italia	0,0000458%	0,0003272%	-0,0002815%
Bayer	-0,0003103%	-0,0002662%	-0,0000440%
Benetton	0,0002298%	0,0006055%	-0,0003757%
Bulgari	-0,0005674%	-0,0003320%	-0,0002355%
Buzzi Unicem	-0,0002365%	0,0002386%	-0,0004751%
Caltagirone Ed.	-0,0011967%	-0,0000063%	-0,0011904%
Davide Campari	0,0000890%	0,0004873%	-0,0003983%
Edison	0,0003691%	0,0001750%	0,0001941%
Enel	-0,0002496%	0,0002608%	-0,0005104%
Eni	-0,0005026%	0,0002925%	-0,0007951%
Fiat	-0,0006647%	-0,0004931%	-0,0001716%
Finmeccanica	-0,0009703%	-0,0006767%	-0,0002937%
Gruppo Editoriale l'Espresso	-0,0015322%	-0,0012104%	-0,0003218%
Hera	0,0020614%	0,0011544%	0,0009070%
Italcementi	-0,0002919%	0,0004342%	-0,0007261%
Lottomatica	-0,0006632%	0,0002195%	-0,0008827%
Luxottica	-0,0000690%	0,0007135%	-0,0007825%
Mediaset	-0,0011556%	-0,0010290%	-0,0001266%
Merloni Elettrodomestici	-0,0012384%	0,0000989%	-0,0013373%
Rcs Mediagroup	0,0001363%	-0,0001375%	0,0002738%
Recordati	0,0001487%	0,0000310%	0,0001177%
Saipem	-0,0004427%	0,0009727%	-0,0014154%
Seat Pagine Gialle	0,0020042%	0,0003521%	0,0016522%
Sias	-0,0009266%	-0,0001698%	-0,0007568%
Snam Rete Gas	0,0000869%	0,0003479%	-0,0002610%
Snia	-0,0002516%	-0,0002724%	0,0000207%
St Microelectronics	-0,0009314%	-0,0008082%	-0,0001231%
Telecom Italia	-0,0007775%	-0,0006886%	-0,0000890%
Telecom Italia Media	-0,0004919%	-0,0001441%	-0,0003478%
Tim	-0,0021437%	-0,0012685%	-0,0008752%
Tenaris	0,0033245%	0,0022928%	0,0010317%
Tod's Group	-0,0008437%	0,0001333%	-0,0009770%
Volkswagen	-0,0018706%	-0,0012541%	-0,0006165%

* Systematic component of the observed variations of Information Risk

** Idiosyncratic component of the observed variations of Information Risk

A caveat. The presence of systematic information risk for each of the companies analyzed is the result of two aspects: first, the structural mechanisms by which the financial market disseminates information, which are attributable to the market itself and to its informational efficiency; second, however, it is generated by the higher/lower adequacy that the informational standards provide in order to facilitate the investment evaluation process for the investors. In other words, the market may take too long to disseminate information, but it is also possible that information, although quantitatively appropriate, is not qualitatively effective.

Table 7 shows the correlations of the two components, which allow to distinguish the analyzed sample in two parts:

- on one hand, securities whose information risk is mostly driven by systematic risk factors (i.e. the functioning of the market or the inadequacy of the disclosure standards adopted by the market to effectively represent the risk of each specific company);
- on the other hand, securities whose information risk is mainly due to idiosyncratic risk factors, which make financial disclosure policies (possibly) more effective.

Table 7: Determinants of the Total Information Risk

Company	Average correlation between dTIR and		Key
	dSIR	dDIR	Driver
Acqa	0,4923	0,5715	Dir
Aem	0,5537	0,4180	Sir
Alitalia	0,2255	0,8449	Dir
Arnoldo Mondadori Editore	0,7461	0,0664	Sir
Asm Brescia	0,5175	0,5038	Sir
Autogrill	0,5975	0,1971	Sir
Autostrada To-Mi	0,3648	0,3847	Dir
Autostrade per l'Italia	0,5476	0,6468	Dir
Bayer	0,6568	0,4883	Sir
Benetton	0,3776	0,6100	Dir
Bulgari	0,6971	0,2087	Sir
Buzzi Unicem	0,6215	0,1920	Sir
Caltagirone Editore	0,5843	0,2542	Sir
Davide Campari	0,2596	0,5036	Dir
Edison	0,4604	0,6209	Dir
Enel	0,7021	0,4609	Sir
Eni	0,6217	0,1652	Sir
Fiat	0,5815	0,3325	Sir
Finmeccanica	0,7105	0,2697	Sir
Gruppo Editoriale l'Espresso	0,7116	0,1363	Sir
Hera	0,2469	0,6770	Dir
Italcementi	0,4475	0,3119	Sir
Lottomatica	0,1940	0,8435	Dir
Luxottica	0,1475	0,6007	Dir
Mediaset	0,7056	0,1566	Sir
Merloni Elettrodomestici	0,4094	0,6466	Dir
Rcs Mediagroup	0,5649	0,3320	Sir
Recordati	0,7186	0,7645	Dir
Saipem	0,4491	0,3810	Sir
Seat Pagine Gialle	0,7797	0,9321	Dir
Sias	0,2212	0,5788	Dir
Snam Rete Gas	0,3359	0,6341	Dir
Snia	0,2394	0,7542	Dir
St Microelectronics	0,7513	0,0673	Sir
Telecom Italia	0,6856	0,1828	Sir
Telecom Italia Media	0,4379	0,6084	Dir
Tim	0,7963	0,1149	Sir
Tenaris	0,7341	0,6364	Sir
Tod's Group	0,6398	0,5540	Sir
Volkswagen	0,6011	0,5720	Sir

From the table, we discover that for 17 firms⁷ (out of 40) the impact of DIR is greater than the impact of SIR, highlighting in this way the greater potential economic benefit resulting from better disclosure policies. For the other firms, the systematic information risk has a greater impact, so that their best choices will be to integrate the mandatory information. The table above presents a potential advantage, which can become a real benefit for the cost of capital according to the reaction the financial market could develop. The transformation of this potential advantage into an actual advantage will depend on the interaction with the negotiation volumes, whose links are highlighted in Table 8.

Table 8: Volume's Sensitivity to Variations of DIR

Company	Key Driver	Average correlation between volumes (*) and dDIR	
Acea	DIR	0,254423653	Significative
Aem	SIR	0,223030824	
Alitalia	DIR	0,205261689	Significative
Arnoldo Mondadori Editore	SIR	0,00519644	
Asm Brescia	SIR	0,014430504	
Autogrill	SIR	0,094549478	
Autostrada To-Mi	DIR	0,153139755	Significative
Autostrade per l'Italia	DIR	0,059794906	
Bayer	SIR	0,160240064	
Benetton	DIR	0,381926277	Significative
Bulgari	SIR	0,178125542	
Buzzi Unicem	SIR	0,148445959	
Caltagirone Editore	SIR	0,008611688	
Davide Campari	DIR	0,08715219	
Edison	DIR	0,148291985	
Enel	SIR	0,114530088	
Eni	SIR	0,015473053	
Fiat	SIR	0,189819567	
Finmeccanica	SIR	0,211185222	
Gruppo Editoriale l'Espresso	SIR	0,143171456	
Hera	DIR	0,094976288	
Italcementi	SIR	0,186171622	
Lottomatica	DIR	0,222382187	Significative
Luxottica	DIR	0,129732347	
Mediaset	SIR	0,11666375	
Merloni Elettrodomestici	DIR	0,34267757	Significative
Res Mediagroup	SIR	0,236433995	
Recordati	DIR	0,275007133	Significative
Saipem	SIR	0,194059856	
Seat Pagine Gialle	DIR	0,24795105	Significative
Sias	DIR	0,165499899	Significative
Snam Rete Gas	DIR	0,206458225	Significative
Snia	DIR	0,130736747	
St Microelectronics	SIR	0,017106034	
Telecom Italia	SIR	0,077649933	
Telecom Italia Media	DIR	0,128874649	
Tim	SIR	0,117891402	
Tenaris	SIR	0,01002964	
Tod's Group	SIR	0,195248138	
Volkswagen	SIR	0,097024461	

⁷Acea, Alitalia, Autostrada To-Mi, Autostrade per l'Italia, Benetton, Davide Campari, Edison, Hera, Lottomatica, Luxottica, Merloni, Recordati, Seat Pagine Gialle, Sias, Snam Rete Gas, Snia, Telecom Italia Media.

Intencases(Acea, Alitalia, AutostradaTo-Mi, Benetton, Lottomatica, Merloni, Recordati,Seat PagineGialle, Sias, SnamReteGas) we discovered a double condition of significance of the idiosyncratic information risk on the total information risk and of the correlation among DIR and negotiation volumes. For thesecompanies,therefore, the link betweenvoluntarydisclosurestrategies

5. CONCLUSIONS AND LIMITATIONS

The present study had as its first objective to recognize the strategic choices regarding the voluntary disclosure of the business model adopted by non-financial blue chips listed on the Italian Stock Exchange in 2003 and their determinants. To do this, we have identified and then coded the information with strategic content contained in the Annual Report, investor relations and press releases published on the websites. Then we estimated the importance given by each individual company to each topic by identifying both the number of words dedicated to them, and the number of connections with other themes to capture their importance in the description. We then proceeded to clustering the voluntary disclosure strategies adopted by the companies on the basis of the number of words devoted to each individual topic, and of their importance score, and then we crossed the results obtained. This led to identify four different approaches to voluntary disclosure:

- *Group A*: very well described but little interrelated themes;
- *Group B*: very well described and very much interrelated themes;
- *Group C*: bad described and little interrelated themes;
- *Group D*: bad described but very much interrelated themes.

In particular, we found that what mostly differentiates the voluntary disclosure strategies of firms belonging to groups A and B (very detailed issues) compared to firms belonging to groups C and D (low-deepened topics) is a deeper discussion of the most strategically sensitive issues, i.e. those aimed at explaining the competitive position of the company and its sources, both in terms of competitive specificities and of business processes that create these specificities.

We also found that the greater importance of these issues is also what mostly distinguishes the voluntary disclosure strategies of firms belonging to groups B and to a lesser extent, D (very inter-related issues) compared to firms belonging to groups A and C (little interrelated themes). In addition to these themes, we discovered that also themes regarding the environment, both general (its evolution) and specific, the processes aimed at recognizing latent potential to generate value through both the entry into new markets, the development of new products and processes also thanks to the contribution arising from new technologies, especially if they allow to better meet stakeholder expectations, help in differentiating the voluntary disclosure strategies.

The fact that the most important themes taken from the list do not correspond to a greater depth may depend on their fear to provide information strategically sensitive to the competitors or, more simply, on a lack of availability of more detailed information. Mavrinac and Eccles (1995) found that only 9% of U.S. companies has an explicit disclosure strategy. Trying to understand the causes of this result, the authors concluded: "Senior managers' ignorance of the policy's Significance is one potential reason. A second reason May Be That Does Not Understand the firm ITS current strategic position and has little time for improving "(Eccles and Mavrinac, 1995: 14). For sure, firms belonging to groups A and especially B have a significantly higher average size than those belonging to groups C and D. The size seems to explain at least the average number of

words devoted by companies belonging to the first two groups mentioned in the description of their business models and the specific topics.

The second objective of this study was to recognize if and how the strategic choices regarding voluntary disclosure of the business model have an impact on the information risk of the firms belonging to the sample.

To this end, we first collect the time series of stock prices and their related trading volumes. Then we proceeded with the calculation of proxies for estimating the level of information risk embedded in the dynamics of market prices of shares, dividing it into the two classes of systematic information risk (that is linked to how the company communicates with the market "given" the existing regulatory framework) and idiosyncratic information risk (i.e. related to specific business risks which cannot be reproduced through alternative investments, albeit similar).

Then we made comparisons between the results obtained and the actual investors' behavior (i.e. considering the dynamics of the trading volume of each security) to understand the effect of market sensitivity to the phenomenon, namely the possible impacts on the cost of capital. We found that none of the 10 companies having a high correlation between idiosyncratic information risk and average trading volumes, belong to Group B.

This allows us to say that the financial market is really sensitive to the voluntary disclosure strategies and that it will select investments designed to favor those with greater information transparency. If, however, the idiosyncratic information risk is greater, financial exchanges are determined, among other things, by the need to leave the investments with higher information risk in the hands of information traders or investors with a greater ability to interpret the (limited?) information available to the benefit of the entire market and thus paid with returns comprehensive of adequate risk premia.

This study has some limitations. The first is that it focuses on the Italian context. The central role still played by banks in Italy, which reduces the dependence of firms from the capital market, the strong presence of family-owned listed companies, characterized by a small shareholder base and the still limited efficiency of the financial market to appreciate the demands of financing and the legal system of investors' protection require caution on the possibility to generalize the findings to other contexts. The second limitation relates to the samples analyzed, which is clearly shifted to large companies⁸. The third limitation concerns the use of the number of words devoted to a strategic issue and the number of its connections with other themes as estimators of the level of importance of the theme itself.

To solve the last limit, although increasing the subjectivity of the analysis, we could enter into the content of information provided by assessing the level of significance. The fourth limitation is the limited time period considered. The goal to be achieved by future studies is therefore to extend the analysis of strategic information contained in the Annual Report, investor relations and press releases published on websites, considering a higher number of companies of different dimension,

⁸The efficiency of the financial market and legal system of investor protection aspects are interrelated: "Countries with weaker investor protection also tend to have financial systems that are relatively more bank-based precisely because broad-based equity markets are two relatively unattractive to the weak investor protection environment (Francis et al., 2005: 1126).

also belonging to national contexts other than Italy, in order to discover also the evolutionary disclosure strategies adopted by listed firms and their impact on the information risk.

Annex 1: The Sample

<i>Nr</i>	<i>Company</i>	<i>Sector</i>	<i>Nr</i>	<i>Company</i>	<i>Sector</i>
1	Acea	Utilities	21	Hera	Utilities
2	Aem	Utilities	22	Italcementi	Construction
3	Alitalia	Travel, Tourism	23	Lottomatica	Other Services
4	Arnoldo Mondadori Ed.	Media	24	Luxtistica	Apparel, Accessories
5	Asm Brescia	Utilities	25	Mediaset	Media
6	Autogrill	Transport, Tourism	26	Merloni Elett.	Electronic Equipment
7	Autostrada To-Mi	Transport, Tourism	27	Rcs Mediagroup	Media
8	Autostrade per l'Italia	Transport, Tourism	28	Recordati	Pharmaceuticals
9	Bayer	Pharmaceuticals	29	Saipem	Oil&Gas
10	Benetton Group	Apparel	30	Seat Pagine Gialle	Media
11	Bulgari	Apparel, Accessories	31	Sias	Other Services
12	Buzzi Unicem	Construction	32	Snam Rete Gas	Utilities
13	Caltagirone Ed.	Media	33	Snia	Holding, chemicals
14	Davide Campari	Food and Beverage	34	St. Microelettronics	Electronic Components
15	Edison	Utilities	35	Telecom	Utilities, telecommunication
16	Enel	Utilities	36	Telecom Italia Media	Utilities, telecommunication
17	Eni	Oil&Gas	37	Tenaris	Holding
18	Fiat	Automobile and Parts	38	Tim	Telecommunication
19	Finmeccanica	Industrial Machinery	39	Tod's	Apparel
20	Gruppo Ed. l'Espresso	Media	40	Volkswagen	Automobile and Parts

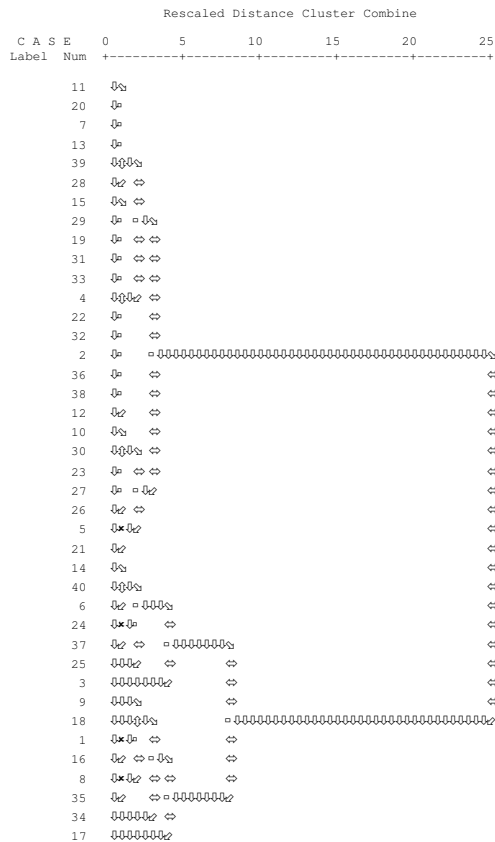
Annex 2: The Matrix of the Analysis

Ve	Economic Value	D	Processes System
A	General Environment	Da	Processes for defining the business
Aa	Economic-Financial Environment	Db	Processes for seeking opportunities
Ab	Natural-Infrastructural Environment	Dc	Processes for broadening value
Ac	Political-Institutional Environment	De	Processes for value creation
Ad	Scientific-Technological	De1	Logistics in
Ae	Socio-cultural Environment	De2	Transformation
B	Specific Environment	De3	Logistics out
Ba	Attractiveness of a specific Environment	De4	Marketing
Bb	Firm's relative position	De5	Services
Bc	Variability of the Specific Environment	De6	Supplying Management
C	Competitive Specificities	De7	Human Resource Management
Ca	External Integration	De8	Technology Management
Ca1	Extent of the external relationships	De9	Backup Activity
Ca2	Depth of the external relationships	E	Exploitable Competencies
Cb	Internal Integration	Ea	Orientation to stakeholders's expectations
Cb1	Effectiveness of the inside operations	Eb	Orientation to incremental improvement
Cb2	Efficiency of the inside operations	Ec	Orientation to radical innovation
Cc	Flexibility	Ed	Risk Orientation
Cc1	Adaptability in a context of continuity	Ef	Orientation to the management of knowledge
		Ef1	Acquisition of knowledge <i>Acquisizione di conoscenza</i>
Cc2	Adaptability in a context of discontinuity	Ef2	Condivision of knowledge
		Ef3	Generation of knowledge
		Ef4	Exteriorization of knowledge

Annex 3: The agglomeration coefficient and the tree-chart for the cluster analysis based on the “number of words”

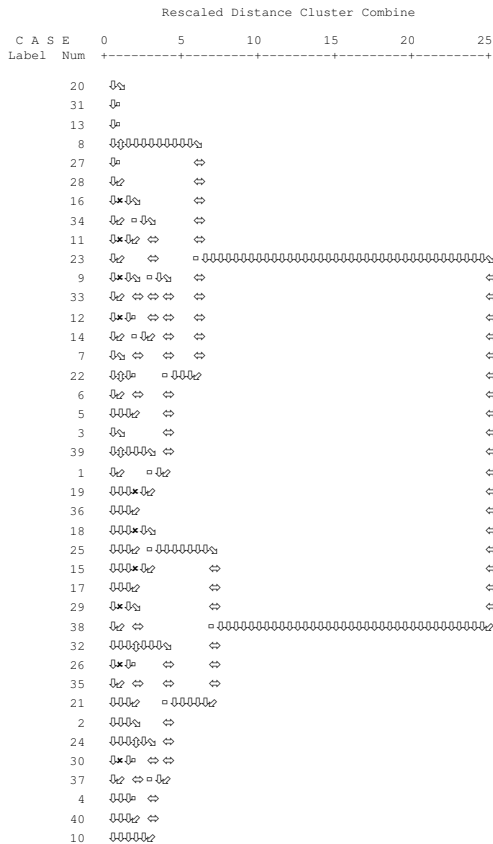
Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	11	20	310310,000	0	0	2
2	7	11	987684,667	0	1	3
3	7	13	1702140,00	2	0	4
4	7	39	3101791,20	3	0	11
5	19	31	5003351,20	0	0	13
6	23	27	7037774,70	0	0	12
7	15	29	9609775,20	0	0	18
8	22	32	12260342,7	0	0	10
9	10	30	15040253,2	0	0	20
10	2	22	17906627,7	0	8	19
11	7	28	21222952,7	4	0	27
12	23	26	24733313,8	6	0	20
13	19	33	28455109,2	5	0	17
14	1	16	32497119,7	0	0	29
15	36	38	37486804,2	0	0	19
16	24	37	43031432,7	0	0	30
17	4	19	48730244,1	0	13	18
18	4	15	55805256,8	17	7	24
19	2	36	63480613,9	10	15	21
20	10	23	73884760,4	9	12	33
21	2	12	84826443,4	19	0	24
22	8	35	96891948,9	0	0	29
23	14	40	109668138	0	0	26
24	2	4	123084995	21	18	27
25	5	21	137653441	0	0	33
26	6	14	153355272	0	23	31
27	2	7	173901411	24	11	35
28	9	18	195987133	0	0	32
29	1	8	220863219	14	22	32
30	24	25	245794360	16	0	31
31	6	24	275748244	26	30	36
32	1	9	308210231	29	28	34
33	5	10	340860207	25	20	35
34	1	34	396035657	32	0	37
35	2	5	453354105	27	33	39
36	3	6	521337874	0	31	38
37	1	17	598650231	34	0	38
38	1	3	749254903	37	36	39
39	1	2	1,23E+009	38	35	0



Annex 4: The Agglomeration Coefficient and the Tree-Chart for the Cluster Analysis Based on the “Number of Connections”

Agglomeration Schedule						
Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	11	20	310310,000	0	0	2
2	7	11	987684,667	0	1	3
3	7	13	1702140,00	2	0	4
4	7	39	3101791,20	3	0	11
5	19	31	5003351,20	0	0	13
6	23	27	7037774,70	0	0	12
7	15	29	9609775,20	0	0	18
8	22	32	12260342,7	0	0	10
9	10	30	15040253,2	0	0	20
10	2	22	17906627,7	0	8	19
11	7	28	21222952,7	4	0	27
12	23	26	24733313,8	6	0	20
13	19	33	28455109,2	5	0	17
14	1	16	32497119,7	0	0	29
15	36	38	37486804,2	0	0	19
16	24	37	43031432,7	0	0	30
17	4	19	48730244,1	0	13	18
18	4	15	55805256,8	17	7	24
19	2	36	63480613,9	10	15	21
20	10	23	73884760,4	9	12	33
21	2	12	84826443,4	19	0	24
22	8	35	96891948,9	0	0	29
23	14	40	109668138	0	0	26
24	2	4	123084995	21	18	27
25	5	21	137653441	0	0	33
26	6	14	153355272	0	23	31
27	2	7	173901411	24	11	35
28	9	18	195987133	0	0	32
29	1	8	220683219	14	22	32
30	24	25	245794360	16	0	31
31	6	24	275748244	26	30	36
32	1	9	308210231	29	28	34
33	5	10	340860207	25	20	35
34	1	34	396035657	32	0	37
35	2	5	453354105	27	33	39
36	3	6	521337874	0	31	38
37	1	17	598650231	34	0	38
38	1	3	749254903	37	36	39
39	1	2	1,23E+009	38	35	0



Annex5: The Characterizing Topics in Terms of Space

Cod	Gr.	μ	σ	Min	Max	Anova	
						F	Sig
Tot.	A	36.511	8.713	25.845	51.481	32,426	0,000
	B	32.941	10.504	18.197	48.501		
	C	9.320	5.762	2.907	22.927		
	D	15.426	5.684	9.679	28.891		
VE	A	426	813	0	2.354	0,638	0,595
	B	234	468	0	1.290		
	C	381	412	0	1.413		
Aa	D	158	148	0	415	2,255	0,099
	A	446	529	12	1.605		
	B	318	287	56	805		
Ab	C	155	207	0	753	1,259	0,303
	D	119	187	0	547		
Ab	A	74	126	0	342		

	B	21	36	0	94		
	C	26	92	0	356		
	D	0	1	0	4		
Ac	A	795	1113	0	3.153	0,488	0,693
	B	684	910	0	2.590		
	C	385	819	0	3.230		
	D	491	543	0	1.776		
Ad	A	0	0	0	0	0,814	0,494
	B	4	12	0	31		
	C	9	24	0	85		
	D	0	0	0	0		
Ae	A	43	120	0	340	0,343	0,795
	B	45	102	0	274		
	C	33	51	0	149		
	D	104	330	0	1.043		
Ba	A	409	418	0	1.291	2,484	0,076
	B	455	378	15	927		
	C	181	316	0	1.101		
	D	112	138	0	469		
Bb	A	566	380	49	1.048	4,119	0,013
	B	781	616	143	1.920		
	C	212	253	0	922		
	D	362	325	63	1.070		
Bc	A	1.399	978	156	3.388	7,082	0,001
	B	833	818	203	2.118		
	C	214	230	0	769		
	D	450	469	0	1.456		
Ca1	A	3.121	1574	978	4.686	13,199	0,000
	B	4.955	2951	704	10.336		
	C	881	890	0	3.341		
	D	1.289	740	306	2.409		
Ca2	A	3.747	1821	438	6.545	7,053	0,001
	B	2.170	794	806	3.024		
	C	975	1208	0	3.921		
	D	1.904	1542	375	5.936		
Cb1	A	3.112	2466	492	7.033	8,340	0,000
	B	2.102	1231	783	4.480		
	C	487	532	0	1.869		
	D	986	625	147	1.888		
Cb2	A	2.209	1740	233	5.388	3,763	0,019
	B	1.726	1455	441	3.952		
	C	641	555	50	2.001		
	D	1.114	978	112	2.849		
Cc1	A	2.815	1747	1.034	5.990	18,143	0,000
	B	3.057	1104	753	4.077		
	C	427	524	0	1.604		
	D	822	503	50	1.460		

Cc2	A	61	160	0	456	2,050	0,124
	B	2	5	0	14		
	C	3	9	0	31		
	D	72	84	0	250		
Da	A	499	446	0	1.245	1,079	0,370
	B	335	500	0	1.401		
	C	240	261	0	936		
	D	247	266	0	871		
Db	A	448	215	231	867	2,236	0,101
	B	209	167	45	546		
	C	189	337	0	1.150		
	D	184	143	0	377		
Dc	A	4.095	1285	2.416	5.619	12,684	0,000
	B	2.063	1659	697	4.911		
	C	1.119	780	185	2.964		
	D	1.594	1012	280	3.295		
De1	A	12	23	0	60	0,529	0,665
	B	14	36	0	96		
	C	8	22	0	79		
	D	34	95	0	304		
De2	A	565	769	0	1.899	0,794	0,505
	B	431	580	0	1.567		
	C	358	731	0	2.753		
	D	127	146	0	366		
De3	A	151	183	0	506	1,177	0,332
	B	207	200	21	574		
	C	69	110	0	297		
	D	127	199	0	610		
De4	A	6.068	3159	2.190	9.796	17,749	0,000
	B	6.272	2807	3.080	10.374		
	C	949	764	85	2.809		
	D	2.001	1664	0	4.157		
De5	A	618	946	0	2.231	1,566	0,214
	B	170	116	0	280		
	C	110	229	0	805		
	D	355	692	0	2.299		
De6	A	246	253	0	709	1,834	0,159
	B	929	1945	0	5.315		
	C	74	138	0	391		
	D	181	293	0	889		
De7	A	440	399	0	1.166	4,759	0,007
	B	354	240	60	789		
	C	63	96	0	311		
	D	281	272	0	728		
De8	A	1.179	1925	0	5.622	3,231	0,034
	B	1.440	1125	163	2.872		
	C	201	297	0	1.187		

De9	D	486	448	24	1.327	3,651	0,021
	A	818	729	29	1.926		
	B	520	186	240	761		
	C	235	224	0	605		
Ea	D	588	439	139	1.553	1,543	0,220
	A	468	624	25	1.555		
	B	803	663	102	1.883		
	C	252	592	0	2.329		
Eb	D	364	395	0	1.265	3,519	0,025
	A	440	344	0	925		
	B	651	553	101	1.837		
	C	201	276	0	1.067		
Ec	D	219	192	50	680	1,574	0,213
	A	90	172	0	495		
	B	102	189	0	507		
	C	9	29	0	111		
Ed	D	101	125	0	365	2,533	0,072
	A	190	250	0	544		
	B	159	306	0	824		
	C	14	44	0	167		
Ef1	D	38	61	0	198	2,014	0,129
	A	131	159	0	451		
	B	114	159	0	430		
	C	12	30	0	110		
Ef2	D	110	183	0	551	0,614	0,610
	A	217	276	0	731		
	B	122	114	0	289		
	C	126	203	0	565		
Ef3	D	102	115	0	286	6,070	0,002
	A	565	531	0	1.314		
	B	612	568	0	1.346		
	C	62	105	0	328		
Ef4	D	204	171	0	509	0,625	0,604
	A	50	75	0	167		
	B	46	51	0	125		
	C	18	52	0	187		
	D	103	289	0	923		

Annex 6: The Characterizing Topics in Terms of Importance

Cod	Gr.	μ	σ	Min	Max	Anova	
						F	Sig
Tot.	A	177	46,61	84	216	25,071	0,000
	B	354	71,73	269	440		
	C	158	61,68	50	244		
	D	300	50,32	242	413		
VE	A	7	5,66	0	13	0,721	0,546
	B	10	7,34	0	18		
	C	6	4,36	0	13		
	D	8	5,76	0	14		
Aa	A	4	4,21	0	10	6,976	0,001
	B	13	2,23	9	16		
	C	5	3,86	0	12		
	D	6	5,25	0	13		
Ab	A	3	2,83	0	7	0,111	0,953
	B	3	4,72	0	11		
	C	2	2,80	0	7		
	D	2	4,43	0	12		
Ac	A	7	5,29	0	14	4,058	0,014
	B	11	3,45	6	17		
	C	5	3,94	0	11		
	D	5	4,38	0	13		
Ad	A	0	0,00	0	0	0,928	0,437
	B	1	3,78	0	10		
	C	1	2,29	0	7		
	D	0	0,00	0	0		
Ae	A	0	0,00	0	0	1,458	0,242
	B	3	4,43	0	10		
	C	3	3,68	0	11		
	D	3	4,50	0	11		
Ba	A	2	4,02	0	10	5,661	0,003
	B	10	4,14	5	16		
	C	4	4,32	0	13		
	D	8	4,83	0	13		
Bb	A	7	4,80	0	14	10,045	0,000
	B	15	3,51	9	18		
	C	4	5,03	0	13		
	D	11	4,19	3	19		
Bc	A	8	4,19	0	13	3,222	0,034
	B	11	3,13	7	17		
	C	6	3,77	0	14		
	D	6	4,85	0	12		
Ca1	A	8	3,80	0	12	9,531	0,000
	B	15	3,63	10	19		

	C	9	2,23	5	12		
	D	13	3,82	6	20		
Ca2	A	9	4,42	0	13	8,479	0,000
	B	15	3,06	11	20		
	C	8	3,97	0	14		
	D	14	3,81	10	22		
Cb1	A	9	3,70	0	12	9,766	0,000
	B	15	4,04	9	20		
	C	7	5,07	0	15		
	D	14	2,37	11	18		
Cb2	A	10	3,94	3	15	3,141	0,037
	B	14	6,84	2	23		
	C	9	4,18	0	15		
	D	14	3,84	5	19		
Cc1	A	8	3,56	0	11	8,689	0,000
	B	14	4,08	8	19		
	C	7	4,10	0	12		
	D	13	2,91	9	20		
Cc2	A	4	4,66	0	14	2,393	0,085
	B	1	3,78	0	10		
	C	2	3,37	0	10		
	D	6	5,31	0	13		
Da	A	7	3,16	0	10	2,761	0,056
	B	10	4,96	0	15		
	C	6	3,59	0	12		
	D	9	4,08	0	15		
Db	A	5	3,56	0	9	7,582	0,000
	B	11	2,21	7	13		
	C	6	4,53	0	13		
	D	11	1,91	8	13		
Dc	A	12	2,12	8	14	7,845	0,000
	B	16	2,82	12	21		
	C	11	3,93	0	16		
	D	16	2,28	14	21		
De1	A	2	3,48	0	8	0,263	0,851
	B	2	4,54	0	12		
	C	1	2,14	0	7		
	D	2	3,41	0	9		
De2	A	5	4,30	0	10	2,264	0,098
	B	9	6,44	0	16		
	C	4	3,98	0	12		
	D	6	5,02	0	13		
De3	A	3	3,65	0	8	8,209	0,000
	B	10	5,40	0	16		
	C	2	3,32	0	8		
	D	9	5,47	0	15		
De4	A	11	3,36	5	14	6,895	0,001

	B	16	1,50	14	18		
	C	9	3,61	4	14		
	D	15	5,78	0	19		
	A	3	3,74	0	9		
De5	B	9	5,13	0	14	5,774	0,002
	C	4	4,35	0	11		
	D	9	4,19	0	14		
	A	5	3,89	0	9		
De6	B	9	5,71	0	17	9,770	0,000
	C	1	2,61	0	9		
	D	9	4,90	0	17		
	A	5	4,60	0	11		
De7	B	11	3,34	7	15	5,018	0,005
	C	5	3,79	0	12		
	D	9	5,47	0	15		
	A	4	4,55	0	10		
De8	B	13	5,50	4	19	7,019	0,001
	C	6	5,07	0	13		
	D	12	3,88	7	19		
	A	5	4,10	0	11		
De9	B	12	3,31	9	18	8,425	
	C	6	4,53	0	12		
	D	11	2,51	5	14		
	A	7	4,54	0	12		
Ea	B	13	2,61	8	16	7,210	
	C	6	4,07	0	12		
	D	11	4,49	0	15		
	A	6	4,59	0	13		
Eb	B	14	3,39	9	19	10,139	
	C	5	4,60	0	12		
	D	11	2,71	4	14		
	A	1	1,77	0	5		
Ec	B	7	4,74	0	11	5,528	
	C	2	3,78	0	11		
	D	7	5,36	0	15		
	A	4	4,23	0	10		
Ed	B	7	4,75	0	12	3,303	
	C	1	2,65	0	8		
	D	4	5,32	0	11		
	A	2	2,72	0	6		
Ef1	B	8	5,52	0	15	4,623	
	C	2	3,00	0	8		
	D	6	5,38	0	15		
	A	2	2,56	0	7		
Ef2	B	9	4,41	0	13	10,262	
	C	3	3,69	0	11		
	D	9	3,75	0	13		

Ef3	A	5	3,06	0	8	5,754
	B	9	6,42	0	17	
	C	2	3,44	0	10	
	D	8	4,62	0	14	
Ef4	A	1	2,12	0	6	4,538
	B	6	4,98	0	13	
	C	1	2,09	0	8	
	D	4	5,08	0	12	

Annex 7: The Distribution of the Words Dedicated to the Strategic Topics

	Contenuti	N	μ	σ	Kolmogorov-Smirnov Test	
					Z	Asymp.Sig. (2-tailed)
	Total of the words	40	20.418	13.602	0,993	0,278
Ve	Economic Value	40	308	480	1,645	0,009
Aa	Economic-Financial Environment	40	233	321	1,593	0,013
Ab	Natural-Infrastructural Environment	40	28	82	2,474	0,000
Ac	Political-Institutional Environment	40	546	828	1,630	0,010
Ad	Scientific-Technological	40	4	16	3,327	0,000
Ae	Socio-cultural Environment	40	55	176	2,392	0,000
Ba	Attractiveness of a specific Environment	40	257	336	1,539	0,018
Bb	Firm's relative position	40	420	421	1,064	0,208
Bc	Variability of the specif Environment	40	618	740	1,536	0,018
Ca1	<i>Extent of the external relationships</i>	40	2.144	2.147	1,243	0,091
Ca2	<i>Depth of the external relationships</i>	40	1.971	1.674	0,756	0,617
Cb1	<i>Effectiveness of the inside operations</i>	40	1.420	1.603	1,276	0,077
Cb2	<i>Efficiency of the inside operations</i>	40	1.263	1.256	1,157	0,137
Cc1	<i>Adaptability in a context of continuity</i>	40	1.464	1.497	1,122	0,161
Cc2	<i>Adaptability in a context of discontinuity</i>	40	32	85	2,314	0,000
Da	Processes for defining the activity area	40	310	354	1,205	0,109
Db	Processes for seeking opportunities	40	243	263	1,123	0,160
Dc	Processes for broadening value	40	1.998	1.554	1,235	0,095
De1	<i>Logistics in</i>	40	16	52	2,669	0,000
De2	<i>Transformation</i>	40	354	615	1,888	0,002
De3	<i>Logistics out</i>	40	124	168	1,847	0,002
De4	<i>Marketing</i>	40	3.167	3.090	0,966	0,308
De5	<i>Services</i>	40	283	575	2,115	0,000
De6	<i>Supplying Management</i>	40	285	845	2,328	0,000
De7	<i>Human Resource Management</i>	40	244	284	1,236	0,094
De8	<i>Technology Management</i>	40	685	1.091	1,677	0,007
De9	<i>Backup Activity</i>	40	490	462	0,912	0,376
Ea	Orientation to stakeholders's expectations	40	419	581	1,489	0,024
Eb	Orientation to incremental improvement	40	332	367	1,156	0,138
Ec	Orientation to radical innovation	40	64	129	2,000	0,001
Ed	Risk Orientation	40	81	181	2,345	0,000
Ef1	<i>Acquisition of knowledge Acquisizione di conoscenza</i>	40	78	139	1,965	0,001
Ef2	<i>Condivision of knowledge</i>	40	138	188	1,583	0,013
Ef3	<i>Generation of knowledge</i>	40	294	409	1,491	0,023
Ef4	<i>Exteriorization of knowledge</i>	40	51	151	2,331	0,000

Annex 8: The Distribution of the Importance of the Strategic Topics

	Contents	N	μ	σ	Kolmogorov-Smirnov Test	
					Z	Asymp.Sig. (2-tailed)
	Total of the words	40	231,55	98,36	0,555	0,917
Ve	Economic Value	40	7,48	5,50	1,190	0,118
Aa	Economic-Financial Environment	40	6,40	4,98	0,855	0,457
Ab	Natural-Infrastructural Environment	40	2,28	3,51	2,477	0,000
Ac	Political-Institutional Environment	40	6,38	4,75	0,698	0,715
Ad	Scientific-Technological	40	0,58	2,10	3,371	0,000
Ae	Socio-cultural Environment	40	2,38	3,75	2,445	0,000
Ba	Attractiveness of a specific	40	5,50	5,09	1,487	0,024
Bb	Firm's relative position	40	8,40	5,93	0,913	0,375
Bc	Variability of the specif Environment	40	7,18	4,39	0,625	0,829
Ca1	<i>Extent of the outside relationship</i>	40	10,75	4,19	0,681	0,743
Ca2	<i>Depth of the outside relationship</i>	40	10,90	4,88	0,644	0,801
Cb1	<i>Effectiveness of the inside operations</i>	40	10,18	5,30	0,890	0,406
Cb2	<i>Efficiency of the inside operations</i>	40	11,43	4,98	0,765	0,602
Cc1	<i>Adaptability in a context of continuity</i>	40	9,95	4,70	0,685	0,737
Cc2	<i>Adaptability in a context of discontinuity</i>	40	3,13	4,47	2,262	0,000
Da	Processes for defining the activity area	40	7,70	4,16	0,695	0,719
Db	Processes for seeking opportunities	40	7,78	4,28	0,969	0,305
Dc	Processes for broadening value	40	13,43	3,81	0,826	0,503
De1	<i>Logistics in</i>	40	1,38	3,14	3,125	0,000
De2	<i>Transformation</i>	40	5,53	5,02	1,357	0,050
De3	<i>Logistics out</i>	40	5,50	5,47	1,693	0,006
De4	<i>Marketing</i>	40	12,13	4,82	0,883	0,416
De5	<i>Services</i>	40	5,90	5,08	1,438	0,032
De6	<i>Supplying Management</i>	40	5,15	5,34	1,628	0,010
De7	<i>Human Resource Management</i>	40	6,83	4,99	0,781	0,575
De8	<i>Technology Management</i>	40	8,50	5,78	0,818	0,515
De9	<i>Backup Activity</i>	40	8,15	4,80	1,424	0,035
Ea	Orientation to stakeholders's expectations	40	8,60	4,96	0,845	0,472
Eb	Orientation to incremental improvement	40	8,43	5,23	0,925	0,359
Ec	Orientation to radical innovation	40	3,65	4,80	2,381	0,000
Ed	Risk Orientation	40	3,33	4,48	2,505	0,000
Ef1	<i>Acquisition of knowledge Acquisizione di conoscenza</i>	40	3,98	4,70	1,747	0,004
Ef2	<i>Condivision of knowledge</i>	40	5,08	4,78	1,460	0,028
Ef3	<i>Generation of knowledge</i>	40	5,30	5,04	1,128	0,157
Ef4	<i>Exteriorization of knowledge</i>	40	2,38	4,09	2,651	0,000

Annex 9: The Distribution of the Corporate Characteristics

Contenuti	N	μ	σ	Kolmogorov-Smirnov Test	
				Z	Asymp.Sig. (2-tailed)
<i>Dimension</i> - Employees	40	30.311	60.638	1,985	0,001
<i>Dimension</i> – Invested Capital	40	15.032.564	26.827.040	2,024	0,001
<i>Dimension</i> - Equity	40	1.174.068	1.889.918	1,840	0,002
<i>Dimension</i> - Sales	40	8.909.717	17.699.554	2,312	0,000
<i>Profitability</i> - ROE	40	7%	14%	1,343	0,054

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ENJOYMENT OF E-GOVERNMENT SERVICES BY DIFFERENT SOCIO-DEMOGRAPHIC GROUPS: THE CASE OF ESKISEHIR/TURKEY¹

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E-government, the efficiency of the use of e-government services and information and communication technologies, data envelopment analysis.

ABSTRACT

This study was carried out to investigate vocational, social and economic characteristics of different socio-demographic groups in Eskisehir, the patterns of use of information and communication technologies and the internet, enjoyment of e-government services, use of e-government services and the share of e-government services among the use of information and communication technologies and the internet. The efficiency of the use of e-government services by different socio-demographic groups in Eskisehir province has been examined through data envelopment analysis. Efficiency scores of individuals from groups that are covered by the study with respect to the use of the internet and efficiency scores for each group with respect to the average use of the internet have been calculated.

1. INTRODUCTION

Economies are increasingly transformed into “e-economies” through economic and social impacts of information and communication technologies which shorten social and cultural distances on a global scale and provide opportunities for political participation, democratic governance, fast and effective connection between individual units and participatory governance. A “cyber culture” has emerged with respect to life styles, social relations and leisure time preferences, from the social perspective. The use of information and communication technologies is important for improving the social aspect of information economy, but using such technologies effectively is more important. This study examines the efficiency of the use of e-government services that are provided by the public sector, require significant infrastructure expenditures and consume public resources. The fact that advances in information and communication technologies are made in developed countries that have better physical and technological infrastructure capabilities create opportunity gaps for developing countries. Everyone living in the world is required to have access to information and communication technologies and use these technologies effectively in order to eliminate such opportunity gaps. This is because access to information gives significant competitive edge (OECD, 2003).

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E-government services representing one of the most common fields of application of Information and communication technologies and the internet, which is the concrete embodiment of these technologies, may be summarized as use of information and communication technologies in government services and use of new technologies by public servants. Information and communication technologies and the internet have a wide range of application with respect to e-government services as they have in all other fields (Jansen, 2005). In this study, the e-government concept is examined with respect to the link between the citizens and the government. As a matter of fact, this study analyses the e-government services used by the citizens rather than the information and communication technologies that are actually provided, in other words current and potential users are analyzed. There are numerous studies analyzing the e-government services that are provided through various public web sites. However, there is relatively less number of studies addressing the target audience of these services. Moreover, it is a known fact that socio-economic and cultural differences have a close impact on the use of information and communication technologies. This study aims at analyzing the e-citizen concept by examining enjoyment of e-government services by different socio-demographic groups in Eskisehir province.

Since enjoyment of e-government, e-health and e-education services by all segments of the society effectively with respect to advances regarding information and communication technologies as well as e-commerce and e-business opportunities requires physical and human infrastructure, possession of such technologies is analyzed in the first place.

Secondly, effective use of the e-government services, which has become widespread today, by individuals, is analyzed. Effective use that is expressed by the level of education and computer literacy of citizens is analyzed at this stage. Thirdly, the level of use by different socio-demographic groups is analyzed.

2. DEVELOPMENTS IN TURKEY IN THE FIELD OF E-GOVERNMENT

Previous research has demonstrated that the level of enjoyment from e-government services was low (Arifoğlu et al., 2002: 12). It is beyond doubt that the most important reason for this is the internet which continues to be the most significant technological invention in the 21st Century with different types of digital divide for different population groups. In other words, it is the inequality in accessibility to information and communication technologies. Numerous factors such as online skills, socio-economic status, education, culture, age and area of residence also play an important role in having these different types of digital divide, as well as internet access (Latimer, 2009: 1025).

Studies were initiated in Turkey in the early 1990s for the effective use of information and communication technologies in the public administration. The computer and internet infrastructure was started to be established in public institutions and computer aided training programs were more emphasized. The Lisbon Summit held by the European Union in 2000 was a milestone also for Turkey. Steps were taken at the Lisbon Summit to establish an information based economy at the European Union Level. Important steps were also taken in Turkey from the year 2000 onwards, with respect to e-Turkey Action Plan, e-Transformation Turkey Project and Information Society Strategy, E-government (SPO, 2005). The Information Society Strategy published in 2006 comprises 111 actions. Large-scale e-government projects were implemented such as MERNİS, National Judicial Network (UYAP), e-Customs, SOYBİS and e-Health.

When the information and communication infrastructure provided by the public sector, utility services supplied by various public institutions and the personnel used for generating these services are taken into account, it is seen that a significant amount of service is supplied in the aggregate. Since this structure is very strong with respect to supply of information and communication technologies, the demand for information and communication technologies is also very important. Citizens who are going to use the services that are provided should be e-citizens in order to enter into transactions with the e-government, creating an effective demand for information and communication services. Citizens are obliged to obtain passwords to use various e-government services. However obtaining passwords alone is not enough, because in order to be defined as an e-citizen, an individual is required to follow up on his/her e-government transactions and to use the technology effectively. There is 12,237,805 individuals registered with the e-government system at "Türkiye.gov.tr" as of the year 2012. However, the actual number of e-citizens is well below this figure (www.turkiye.gov.tr)³.

3 ENJOYMENT OF E-GOVERNMENT SERVICES BY DIFFERENT SOCIO DEMOGRAPHIC GROUPS IN ESKİŞEHİR PROVINCE

In this study, different socio-demographic groups are defined as women, seniors, youth and disabled people who represent social segments facing difficulties in accessing labor markets, working and seeking jobs, as well as the risk of social exclusion.

3.1. The Objective of the Study

The overall objective of this study is to assess the efficiency of the use of e-government services through the questionnaire that was developed for this purpose and to determine the level of use of the e-government services by the disabled, seniors, youth and women as well as the efficiency of such use. The questionnaire that was developed for this overall objective seeks the answers to the following questions:

- What are the vocational, social and economic characteristics of the disabled, seniors, youth and women in Eskisehir province?
- What are the patterns of use of information and communication technologies and the internet by the disabled, seniors, youth and women in Eskisehir province?
- Is there any difference between the disabled, seniors, youth and women in Eskisehir province with respect to the level of enjoyment of e-government services by these groups?
- Is there any difference between the disabled, seniors, youth and women in Eskisehir province with respect to the level of use of e-government services by these groups?
- What is the share of e-government services among the use of information and communication technologies and the internet by the disabled, seniors, youth and women in Eskisehir province?
- What is the level of efficiency of the use of information and communication technologies and the internet by the disabled, seniors, youth and women in Eskisehir province?

²<http://www.turkiye.gov.tr>

³<http://www.turkiye.gov.tr>

3.2. Assumptions and Limitations of the Study

This study is based on the following assumptions;

- There are differences among citizens in Eskisehir province with respect to accessibility to information and communication technologies,
- The differences among citizens in Eskisehir province with respect to accessibility to information and communication technologies is more significant between the disabled, seniors, youth and women,
- The disabled, seniors, youth and women who are included in the study will be highly motivated to respond to the survey questionnaire.

The limitations of the study are as follows:

- This study is limited to the disabled, seniors, youth and women who are included in the study,
- This study is limited to the statements included in the questionnaire developed for the purpose of assessing the efficiency of the use of e-government services and the efficiency of the use of information and communication technologies and the internet by the disabled, seniors, youth and women in Eskisehir province,
- This study is limited to the answers given to the questionnaire by the disabled, seniors, youth and women who are included in the scope of the study.

3.3. Definition of Different Socio-Demographic Groups for the Purposes of This Study

Due to the difficulty in segregating different socio-demographic groups, the primary group to which the individual belongs is taken as the basis. For example, a disabled and senior woman is included in the disabled category for the purposes of this study.

3.3.1. The Disabled

Persons who are deprived of the possibility to participate in the social life or to find and keep a job in part or in whole compared to other individuals in the same community are referred to as the handicapped and the segment of the society comprising these persons are called handicapped groups. Immigrants, homosexuals, unmarried parents, those with different ethnic backgrounds and the disabled are included in the handicapped group as individuals who face serious integration problems in all areas of social life, compared to other individuals, for the purposes of this study. "Disabled" on the other hand is a concept used to describe persons whose capabilities are reduced to a certain extent due to their handicaps.

3.3.2. Seniors

Seniors are classified under three groups as generally accepted in the literature. The first group comprises economically active “senior workers” between the ages of 55 and 64 and the second group comprises economically non-active “elderly persons” between the ages of 65 and 74. The third group comprises “very old persons” at the age of 80 or over (Özgüler, 2006: 72). Individuals at or over the age of 50 are considered as senior workers for the purposes of this study. This is because, persons at or over the age of 50 are considered as senior workers under the labor legislation in Turkey. Consequently, although the above-mentioned classification also applies for Turkey, it is seen that the lower age limit for the senior workers group has been reduced from 55 to 50.

3.3.3. Youth

Individuals complete their education and seek regular employment opportunities and the possibility to start a family during the period of transition to adulthood. The period between 16-19 years of age is defined as youth and the period between 25-29 years of age is defined as older youth. Individuals at or under 25 years of age are considered as youth for the purposes of this study.

3.3.4. Women

Women are generally employed for jobs requiring a low level of skills such as operating word processors or entering data with respect to new gender related tasks that are generated through information and communication technologies. Women are required to be educated in order to be employed for jobs paying more and requiring higher technical knowledge and creativeness (Technology, 2003: 9). This study has also revealed that the efficiency of women in using information and communication technologies and e-government services is low.

3.4. Method and Materials

In the present study conducted by using a comparative relational screening model, the study group was selected from Eskisehir province where internet access is highly available, for convenience purposes. Data were collected through “Attitude Scale for E-government Services” (ASEGS). 33 items were created when developing the scale and total correlation coefficients were calculated for these items (Lee and Comrey, 1979). SPSS 15.00 statistical package program was used for analyzing the data collected from the disabled, seniors, youth and women.

The major efficiency criterion in Data Envelopment Analysis (DEA) is the figure obtained by dividing weighted total of outputs by the weighted total of inputs. The main distinctive feature of Data Envelopment Analysis compared to other methods that are used for similar purposes is that it allows for assessment in cases with a multiple inputs and outputs (Cooper, 2000).

It is possible to create numerous Data Envelopment Analysis models depending on the fields of use and assumptions. The model to be selected or created depends on whether the inputs and outputs are controllable or not. If there is limited (or no) control on the inputs then an output-oriented model must be created; and if there is limited control on the outputs then an input-oriented model must be created. If no orientation can be made under the circumstances, it will be a good idea to use additive models.

An input-oriented model is used for the efficiency analysis that is carried out to determine whether the disabled, senior, youth and women groups use information technologies efficiently. The input variables for individuals constituting the decision-making units in the model are age and income, and the output variable is the number of years of internet use.

The efficiency score for each decision-making unit in the input-oriented DEA that is used in the present study is calculated by using the following mathematical model:

$$\max \theta_j(u, v) = \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}}$$

$$\max \theta_j(u, v) = \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} \leq 1, \quad j = 1, 2, \dots, n$$

$$u_r \geq 0, r = 1, 2, \dots, s$$

$$v_i \geq 0, i = 1, 2, \dots, m$$

In this model;

x_{ij} = input i used by decision-making unit j ($i = 1, 2, \dots, m$ and $j = 1, 2, \dots, n$) and

y_{rj} = output r used by decision-making unit j ($r = 1, 2, \dots, s$ and $j = 1, 2, \dots, n$).

Efficiency coefficient Θ shall always be equal to or less than one. If the efficiency coefficient is equal to one, the decision-making unit is relatively efficient; and if it is less than one, the decision-making unit is not efficient.

3.5. Population and Sample

This study conducted to assess the efficiency of the use of e-government services covers the disabled, seniors, women and the youth. The present study was not carried out by defining a population and taking samples from that population. The objective of this survey requires the study to be conducted in a province with high accessibility to the internet. Thus, it was decided to conduct the study in Eskisehir province where accessibility to the internet is high. Convenience of application was also decisive in selecting the study group from Eskisehir province, in addition to high accessibility to the internet. The study group comprises 801 individuals from the disabled, senior, women and youth groups, between the ages of 16 and 74, who were actually living in Eskisehir province in 2010, in accordance with the age group classification of the samples used for the "Household Use of Information Technology Survey" prepared by the Turkish Statistical Institute (TUIK) regardless of the group they are in, and the number of individuals in each group is

provided here below (TÜİK, 2009). There were 101 individuals in the disabled group, 91 individuals in the seniors group, 304 individuals in the women's group and 305 individuals in the youth group in Eskisehir province, all between the ages of 16 and 74. 23 questionnaires were not taken into evaluation since they were not completed in accordance with the instructions. 2 of the 23 questionnaires which were not taken into evaluation were completed by disabled persons, 2 were completed by seniors, 13 were completed by women and 6 were completed by young individuals. Accordingly, data collected from 778 of a total of 801 questionnaires were included in the analysis. Data collected from 584 individuals, who provided full data regarding age, income and the number of years of internet use were used for calculating efficiency scores in data envelopment analysis. 42 of these 584 individuals are disabled, 89 are seniors, 243 are young individuals and 210 are women.

3.6. Findings of the Study

Findings regarding vocational, social and economic characteristics of different socio-demographic groups, the patterns of use of information and communication technologies and the internet, enjoyment of e-government services, use of e-government services and the share of e-government services among the use of information and communication technologies and the internet, their attitude towards e-government services and the group to which this attitude belongs, level of education, perceived economic well-being, internet accessibility, the mode of enjoyment of e-government services and whether the mode of enjoyment of e-government services differ depending on their habit of visiting web sites of public institutions are provided in this section.

Table 1: Group and Gender Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
1) Female	50	56.2	17	17.2	291	100	103	34.4	459	59
2) Male	39	43.8	82	82.8	-	-	196	65.6	319	41
Total	89	100	99	100	291	100	299	100	778	100

The gender distribution of the disabled, seniors, youth and women who are included in the study is provided in Table 1. The age distribution of the disabled, seniors, youth and women who are included in the study is provided in Table 2.

Table 2:Age Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
1) Under 25 years	47	52.8	-	-	158	54.0	299	100	504	64.7
2) Between 26 and 35 years	21	23.5	-	-	59	20.2	-	-	80	10.2
3) Between 36 and 45 years	17	19.1	-	-	54	18.5	-	-	71	9.1
4) Between 46 and 49 years	3	3.3	-	-	19	6.5	-	-	22	2.8
5) 50 years or older	-	-	99	100	-	-	-	-	99	12.7
6) No reply	1	1.1	-	-	1	0.3	-	-	2	0.2
Total	89	100	99	100	291	100	299	100	778	100

Vocational distribution of the disabled, seniors, youth and women who are included in the study is provided in Table 3.

Table 3: Vocational Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
1) Worker	18	20.2	5	5.0	21	5.4	14	4.5	58	7.2
2) Public servant	8	9.0	4.6	46.4	24	8.2	11	3.7	89	11.4
3) Self employed	1	1.1	10	10.1	163	56.0	13	4.3	187	24.0
4) Artisan	1	1.1	18	18.2	1	0.3	60	20.0	80	10.2
5) Student	41	46.1	-	-	57	19.6	188	62.9	286	36.8
6) Housewife	8	9.0	1	1.0	23	7.8	-	-	32	4.1
7) Unemployed	8	9.0	-	-	-	-	-	-	8	1.0
8) Pensioner	2	2.2	19	19.2	-	-	-	-	21	2.7
9) No reply	2	2.2	-	-	2	0.7	13	4.3	17	2.2
Total	89	100	99	100	291	100	299	100	778	100

The distribution of the disabled, seniors, youth and women who are included in the study with respect to their educational level is provided in Table 4.

Table 4: The Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study with respect to their Educational Level

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
1) Primary school	9	10.1	2	2.0	9	3.1	11	3.7	31	4.0
2) Secondary school	9	10.1	6	6.1	170	58.4	39	13.0	224	28.8
3) High school	44	49.4	33	33.3	7	2.4	207	69.2	291	37.4
4) University/College	24	27.0	49	49.5	92	31.6	30	10.0	105	13.5
5) Master Degree/Doctor's Degree	1	1.1	8	8.1	11	3.8	5	1.7	18	2.3
6) No Reply	2	2.2	1	1.0	2	0.7	7	2.3	12	1.5
Total	89	100	99	100	291	100	299	100	778	100

The distribution of the disabled, seniors, youth and women who are included in the study with respect to their perceived economic well-being is provided in Table 5.

Table 5: The Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study with respect to their Perceived Economic Well Being

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
1) Very good	4	4.5	3	3.0	6	2.1	9	3.0	22	2.8
2) Good	26	29.2	39	39.4	87	29.9	102	34.1	254	32.6
3) Neither good nor poor	35	39.3	43	43.4	140	48.1	145	48.5	363	46.7
4) Poor	14	15.7	8	8.1	30	10.3	25	8.4	77	9.9
5) Very poor	5	5.6	3	3.0	20	6.9	12	4.0	40	5.1
6) No idea	2	2.2	-	-	4	1.4	4	1.3	10	1.3
7) No reply	3	3.4	3	3.0	4	1.4	2	0.7	12	1.5
Total	89	100	99	100	291	100	299	100	778	100

The distribution of the disabled, seniors, youth and women who are included in the study with respect to their experience with computers is provided in Table 6.

Table 6: The Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study with respect to their Experience with Computers

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
<i>Experience with computers</i>										
1) 1 year or less	4	4.5	-	-	1	0.3	1	0.3	6	0.7
2) 1-5 years	16	17.9	14	14.1	55	18.9	88	29.4	173	22.2
3) 6-10 years	44	49.4	45	45.4	148	50.8	145	48.4	382	49.1
4) 11-15 years	7	7.8	25	25.2	51	17.5	45	15.0	128	16.4
5) 16 years or more	3	3.3	9	9.1	13	4.4	4	1.3	29	3.7
6) No reply	15	16.8	6	6.0	23	7.9	16	5.3	60	7.7
Total	89	100	99	100	291	100	299	100	778	100

When the distribution of the disabled, seniors, youth and women who are included in the study with respect to their experience with computers is examined, it is seen that almost all of them (97.03%) have been using computers for more than "1" year and that the seniors are more experienced with computers compared to women and the youth in particular. The distribution of the disabled, seniors, youth and women who are included in the study with respect to their opinion on the necessity of using information and communication technologies and the internet is provided in Table 7.

Table 7: The Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study with respect to Their Opinion on the Necessity of Using Information and Communication Technologies and the Internet

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
<i>Opinion on the necessity of using information and communication technologies and the internet</i>										
1) Using information and communication technologies and the internet makes life easier.	88	98.9	96	97.0	282	96.9	282	94.3	748	96.1
2) Using Information and communication technologies and the internet does not make life easier.	-	-	1	1.0	5	1.7	15	5.0	21	2.7
3) No reply	1	1.1	2	2.0	4	1.4	2	0.7	9	1.2
Total	89	100	99	100	291	100	299	100	778	100

All groups that are included in the study believe that using information and communication technologies and the internet is highly necessary. However, it can be said that, in comparison to the women and the youth, the disabled and the senior groups believe that using information and communication technologies and the internet is highly necessary. This attitude can be explained with the fact that the women and the youth have other possibilities to carry out their affairs apart from information and communication technologies and the internet compared to the disabled and seniors.

The distribution of the disabled, seniors, youth and women who are included in the study with respect to their accessibility to information and communication technologies and the internet is provided in Table 8.

Table 8: The Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study with respect to their Accessibility to Information and Communication Technologies and the Internet

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
<i>Accessibility to information and communication technologies and the internet</i>										
1) Yes	14	15.7	95	96.0	228	78.4	221	73.9	619	79.6
2) No	75	84.3	3	3.0	59	20.3	77	25.8	153	19.7
Total	89	100	99	100	291	100	299	100	778	100

It is seen that the seniors have the highest accessibility to information and communication technologies and the internet compared to the other groups that are included in the study and the disabled have a dramatically low level of accessibility to information and communication technologies and the internet. This result suggests that policies to increase the accessibility of the disabled to information and communication technologies and the internet, in particular, should be implemented as soon as possible.

The distribution of the disabled, seniors, youth and women who are included in the study with respect to their place of access to the internet is provided in Table 9.

Table 9: The Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study with respect to Their Place of Access to the Internet

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
1) Home	75	84.3	96	97	232	79.7	222	74.2	625	80.3
2) Cyber cafe	2	2.2	-	-	23	7.9	34	11.4	59	7.6
3) School library	-	-	-	-	10	3.4	5	1.7	15	1.9
4) Business office	2	2.2	-	-	5	1.6	4	1.3	11	1.5
5) Friend's house	10	11.3	3	3.0	20	6.8	31	10.4	64	8.2
7) Neighbor's house	-	-	-	-	1	0.3	3	1	4	0.5
Total	89	100	99	100	291	100	299	100	778	100

The distribution of the disabled, seniors, youth and women who are included in the study with respect to their mode of enjoyment of e-government services is provided in Table 10.

Table 10: The Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study with respect to Their Mode of Enjoyment of E-government Services

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
1) Personally	47	52.8	90	90.9	194	66.7	219	73.2	550	70.7
2) Through others	36	40.4	7	7.1	73	25.1	64	21.4	180	23.1
3) No reply	6	6.7	2	2.0	24	8.2	16	5.4	48	6.2
Total	89	100	99	100	291	100	299	100	778	100

In order to determine how the disabled, seniors, youth and women who are included in the study carry out their affairs with public institutions, first of all, it has been checked whether they visit the web sites of public institutions. To this end, the distribution of these groups with respect to visiting or not visiting the web sites of public institutions is provided in Table 11.

Table 11: The Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study with respect to Visiting or Not Visiting Web Sites of Public Institutions

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
<i>Visiting or not visiting Web Sites of Public Institutions</i>										
1) Yes	55	61.8	91	91.9	217	74.6	218	72.9	581	74.7
2) No	31	34.8	7	7.1	67	23.0	78	26.1	183	23.5
3) No reply	3	3.4	1	1.0	7	2.4	3	1.0	14	1.8
Total	89	100	99	100	291	100	299	100	778	100

The results of the survey indicate that seniors visit the web sites of public institutions more frequently compared to other groups. The results of the survey also indicate that the disabled visit the web sites of public institutions less frequently compared to other groups.

The distribution of the groups that are included in the study with respect to their mode of carrying out their affairs with public institutions is provided in Table 12.

Table 12: The Distribution of the Disabled, Seniors, Youth and Women who are Included in the Study with respect to Their Mode of Carrying out Their Affairs with Public Institutions

Variable	Disabled		Seniors		Women		Youth		Total	
	N	%	N	%	N	%	N	%	N	%
<i>Mode of Carrying out Affairs with Public Institutions</i>										
1) I visit the related Public Institution personally.	58	65.2	26	26.3	199	68.4	209	69.9	492	63.2
2) I carry out my affairs through the internet.	28	31.5	16	16.2	65	22.3	75	25.1	184	23.7
3) Other (both of the above)	3	3.4	53	53.5	17	5.8	12	4.0	83	10.5
4) No reply	-	-	4	4.0	10	3.4	3	1.0	20	2.6
Total	89	100	99	100	291	100	299	100	778	100

The public institutions whose web sites are visited by the disabled, seniors, youth and women who are included in the study are provided in Table 13.

Table 13: Public Institutions whose Web Sites are Visited by the Disabled, Seniors, Youth and Women who are Included in the Study

Public Institutions Whose Web Sites are Visited	
1) Ministry of National Education	9) General Directorate of State Meteorological Services
2) OSYM (Measurement, Selection and Placement Center)	10) State Owned Banks
3) Social Security Institution	11) Ministry of the Interior
4) General Directorate of Civil Registration and Nationality	12) Security Directorate
5) Ministry of Finance	13) Grand National Assembly of Turkey
6) Turkish Airlines	14) Turkish State Railways
7) General Directorate of Highways	15) Grand National Assembly of Turkey
8) Prime Ministry	16) Ministry of Labor and Social Security

The purposes of the disabled, seniors, youth and women who are included in the study for visiting web sites of public institutions are provided in Table 14.

Table 14: The Purposes of the Disabled, Seniors, Youth and Women who are Included in the Study for Visiting Web Sites of Public Institutions

Purposes for Visiting Web sites of Public Institutions
1) Following news and announcements
2) E-mail services
3) Seeking employment through employment agencies
4) Accessing the Constitution, Laws, Decree Laws etc.
5) Following the Official Gazette
6) Tax returns and assessments
7) Information services
8) Applying for examinations and inquiring results
9) Exercising citizenship rights under the Right to Information Act
10) Inquiring address-telephone information
11) Complaints and communicating problems
12) Making reservations and appointments
13) Exchanging information
14) Accessing art and culture activities such as movies, music etc.
15) Participating in debates and votings
16) Inquiring taxes or utilities payable
17) Inquiring information regarding tender requirements etc.
18) Paying taxes or utilities
19) Inquiring information regarding social security such as social security premiums
20) Paying social security premiums or carrying out other affairs related to social security
21) Inquiring demerit points
22) Paying traffic tickets
23) Inquiring motor vehicle data
24) Inquiring identity information and Republic of Turkey I.D. No. etc.
25) Inquiring addresses of the web sites or telephone numbers of central public offices
26) Enrolling in higher education institutions
27) Applying for passports
28) Applying for military service
29) Filing patent and trademark applications
30) Applying for education and tuition fee loans
31) Benefiting from other online services

It has been found out that the disabled, seniors, youth and women who are included in the study enjoy news, announcements and e-mail services the most among the above-mentioned services provided by public intuitions.

The factors affecting the use of e-government services by the disabled, seniors, youth and women who are included in the study are provided in Table 15.

Table 15: The Factors Affecting the Use of E-Government Services by the Disabled, Seniors, Youth and Women who are Included in the Study

The Factors Affecting the Use of E-Government Services
1) The content of the web site is not easily comprehensible
2) Related forms and instructions cannot be easily downloaded
3) No clear guidance to the web sites where the required services are provided
4) The links in the web site are dead or out of date
5) The web site does not provide the required information
6) Lack of trust in payment services in particular

The results of the survey indicate that elimination of the factors affecting the use of e-government services will lead to an increase in the rate of use of e-government services. Consequently, public institutions should exercise more care and attention to make sure that the content of the web sites are comprehensible and that the required information is communicated to the users, in order to increase the efficiency of the use of e-government services.

4. EFFICIENCY OF THE USE OF E-GOVERNMENT SERVICES

The efficiency of the use of e-government services by the disabled, seniors, youth and women who are included in the study is determined by Data envelopment Analysis (DEA).

Efficiency scores of the members of each group and the average efficiency score for each group regarding the use of the internet were calculated. Data collected from 584 individuals, who provided full data regarding age, income and the number of years of internet use, were used for calculating efficiency scores. 42 of these 584 individuals are disabled, 89 are seniors, 243 are young individuals and 210 are women. Table 16 provides the efficiency scores of the disabled who are included in the study regarding the use of the internet. 11 individuals from a total of 42 disabled individuals who have participated in the survey use the internet efficiently. The average efficiency score of the disabled group regarding the use of the internet is 78%.

Table 16: Efficiency Scores of the Disabled Regarding the Use of the Internet

Efficiency Scores of the Disabled Regarding the Use of the Internet				
1.00	1.00	0.53	0.48	0.63
1.00	0.98	0.74	1.00	0.70
1.00	0.81	0.38	0.44	
1.00	0.56	0.95	0.50	
0.52	0.73	1.00	0.43	
0.91	0.55	0.79	0.60	
0.87	0.77	0.73	1.00	
0.69	1.00	0.92	0.59	
0.99	0.95	1.00	1.00	
0.90	0.49	0.83	0.85	

Table 17 provides the efficiency scores of the seniors regarding the use of the internet. The average efficiency score of the senior group regarding the use of the internet is 92%.

Table 17: Efficiency Scores of the Seniors Regarding the Use of the Internet

Efficiency Scores of the Seniors Regarding the Use of the Internet				
0.89	0.93	0.75	0.97	0.87
0.92	0.92	0.97	0.91	0.87
0.89	0.97	0.99	0.87	0.84
0.94	0.96	0.92	0.98	0.92
0.83	0.96	0.93	1.00	0.88
0.86	0.96	1.00	0.92	0.96
0.95	1.00	1.00	0.98	0.90
0.97	0.96	0.99	0.92	0.92
0.99	1.00	0.89	0.93	0.87
0.94	0.99	0.90	0.90	1.00
0.85	0.89	0.89	0.94	0.88
1.00	0.97	0.73	0.92	0.86
0.94	0.96	0.95	0.89	0.87
0.88	0.97	0.95	0.86	0.88
0.99	0.86	0.95	0.90	0.89
0.97	0.90	0.81	0.90	0.89
0.98	0.90	0.99	0.87	0.94
0.91	0.80	0.91	0.87	

Table 18 provides the efficiency scores of the youth regarding the use of the internet. The average efficiency score of the youth group regarding the use of the internet is 83%.

Table 18: Efficiency Scores of the Youth Regarding the Use of the Internet

Efficiency Scores of the Youth Regarding the Use of the Internet							
1.00	0.86	0.95	0.67	0.62	0.43	0.95	0.75
0.95	0.86	0.86	0.86	0.62	0.42	0.78	0.98
0.86	0.82	0.82	0.95	1.00	0.43	1.00	1.00
0.95	0.92	0.64	1.00	0.78	0.57	0.86	0.93
0.88	0.78	0.75	0.63	0.72	0.58	0.88	0.72
0.78	0.82	0.85	0.95	0.82	0.61	0.75	0.93
0.88	0.93	0.75	0.78	0.82	0.45	0.90	0.90
0.86	0.88	0.91	0.75	1.00	0.45	1.00	0.90
0.90	0.87	0.69	0.86	0.90	0.45	0.80	0.90
0.75	0.95	0.93	0.64	0.78	0.47	0.90	0.90
0.75	0.91	0.78	0.78	0.78	0.58	0.91	0.78
0.86	1.00	0.82	0.64	0.78	0.55	0.94	0.95
0.86	0.82	0.82	0.90	0.75	0.46	0.91	0.90
0.90	0.90	0.95	0.90	0.98	0.47	0.90	0.93
1.00	0.80	0.68	0.95	0.82	0.75	0.86	0.86
1.00	0.82	1.00	0.90	0.75	0.97	0.95	0.75
0.82	0.84	0.72	0.83	0.95	0.78	0.95	0.83
0.92	0.95	0.78	0.72	0.86	0.72	0.90	0.86
0.82	0.88	0.90	0.72	0.78	0.72	0.90	0.88
0.90	0.72	0.90	0.86	1.00	0.90	1.00	0.88
0.81	0.86	0.62	1.00	0.95	0.95	0.72	0.91
0.95	0.95	0.78	0.82	0.90	0.95	0.90	0.88
0.90	0.78	0.75	0.78	0.90	0.75	0.90	0.83
0.90	0.92	0.62	0.69	0.82	0.90	0.98	0.94
0.86	0.82	0.78	1.00	0.60	0.75	0.84	0.74
0.86	0.90	1.00	1.00	0.55	0.97	0.95	0.72
0.86	0.94	1.00	0.90	0.56	0.90	0.74	
0.86	0.90	1.00	0.72	0.60	0.95	0.82	
0.86	0.90	0.95	0.78	0.55	0.94	0.78	
0.94	0.82	0.95	0.78	0.58	0.90	0.85	
0.95	0.72	0.78	0.67	0.42	0.95	0.75	

Table 19 provides the efficiency scores of women from different ages and income levels regarding the use of the internet. The efficiency scores of women are much lower compared to other groups. The average efficiency score of this group regarding the use of the internet is 61%.

Table 19:Efficiency Scores of Women Regarding the Use of the Internet

Efficiency Scores of Women Regarding the Use of the Internet						
0.62	0.60	0.56	0.90	0.94	0.86	0.86
0.55	0.53	0.62	0.90	0.91	0.86	0.97
0.49	0.58	0.40	1.00	0.89	0.89	0.94
0.60	0.43	0.43	0.92	0.88	0.90	1.00
0.51	0.62	0.60	0.97	0.97	0.86	0.91
0.50	0.37	0.39	0.97	0.89	0.83	1.00
0.67	0.38	0.55	0.62	0.95	0.90	0.85
0.49	0.41	0.51	0.75	0.75	1.00	0.88
0.49	0.59	0.47	0.78	0.95	0.95	0.82
0.55	0.69	0.45	0.55	0.96	0.88	0.81
0.50	0.42	0.69	0.77	0.86	0.92	0.78
0.49	0.67	0.56	0.58	1.00	0.97	0.90
0.74	0.47	0.49	0.80	0.86	0.94	0.77
0.51	0.50	0.46	0.45	0.96	0.83	0.90
0.53	0.58	0.62	0.47	0.88	0.90	0.86
0.64	0.64	0.75	0.51	0.86	0.90	0.92
0.52	0.38	0.64	0.47	0.83	0.88	0.97
0.60	0.44	0.50	0.53	0.95	0.98	0.82
0.53	0.33	0.49	0.43	0.94	0.93	0.92
0.55	0.53	0.90	0.38	0.90	0.86	0.90
0.37	0.58	0.95	0.48	0.97	1.00	0.86
0.45	0.44	0.95	0.46	1.00	0.91	0.82
0.71	0.49	0.86	0.51	0.97	0.84	0.90
0.59	0.90	0.92	0.43	0.89	0.92	0.82
0.47	0.62	0.92	0.39	0.91	0.98	0.92
0.44	0.63	0.94	0.56	0.95	0.89	0.82
0.59	0.62	0.90	0.55	1.00	0.68	0.93
0.61	0.67	0.90	0.79	0.91	1.00	0.86
0.58	0.72	0.95	0.77	0.91	1.00	0.86
0.50	0.69	1.00	0.86	0.91	0.78	0.78

When we analyze the efficiency scores of these four different groups comprising the disabled, seniors, youth and women regarding the use of the internet, we see that the senior group has the highest average efficiency score. This result indicates that individuals tend to use the internet more efficiently when they get older and their income level increases. The women’s group has the lower average efficiency score.

5. CONCLUSION

Assessment of the efficiency of the use of e-government services is of critical importance for increasing the efficiency of the use of e-government services by different socio-demographic groups and for the government to provide better services to its citizens.

The level of education is a critical variable for all groups that were included in the study. The rate of the use of the internet and consequently the rate of enjoyment of e-government services increases with an increase in the level of education. As a matter of fact, as demonstrated by numerous studies, there is a linear relationship between the level of education and the level of enjoyment of e-government services and perception of e-government services. The results of the study reveal that the majority of all the individuals, whether disabled, senior, youth or woman, who are included in the study, perceive their economic well-being as “neither good nor poor”. Thus, it can be said that the individuals constituting the study group display similar characteristics with respect to their perceived economic well-being regardless of the group they are included in. When the distribution of the disabled, seniors, youth and women who are included in the study with respect to their experience with computers is examined, it is seen that almost all of them (97.03%) have been using computers for more than “1” year and that the seniors are more experienced with computers compared to women and the youth in particular.

The results of the study indicate that all groups that are included in the study believe that using information and communication technologies and the internet is highly necessary. However, it can be said that, in comparison to the women and the youth, the disabled and the senior groups believe that using information and communication technologies and the internet is highly necessary. This attitude can be explained with the fact that the women and the youth have other possibilities to carry out their affairs apart from information and communication technologies and the internet compared to the disabled and seniors. It is seen that the seniors have the highest accessibility to information and communication technologies and the internet compared to the other groups that are included in the study and the disabled have a dramatically low level of accessibility to information and communication technologies and the internet. This result suggests that policies to increase the accessibility of the disabled to information and communication technologies and the internet, in particular, should be implemented as soon as possible.

Results of the study indicate that almost all seniors access the internet from their homes and only 3% of them access the internet from their friends’ homes. This result indicates that a majority of the seniors have computers at their homes. It has also been found out that a majority of the disabled (84.3%), as well as the seniors, access the internet from their homes. Accordingly, it can be said that the rate of computer ownership of the disabled is higher than the women and the youth.

The study has revealed that the percentage of individuals enjoying e-government services by receiving assistance from others is higher among the disabled compared to other groups. However, according to the present study, this percentage is very low among the seniors and the percentage of seniors who enjoy e-government services personally is very high compared to other groups. These results indicate that disabled individuals require assistance from others to enjoy e-government services and that novelties are required to be introduced to allow the disabled to enjoy e-government services personally.

The results of the study indicate that seniors visit the web sites of public institutions more frequently compared to other groups. The results of the study also demonstrate that the disabled visit the web sites of public institutions less frequently compared to other groups.

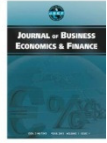
It has been found out that the disabled, seniors, youth and women who are included in the study enjoy news, announcements and e-mail services the most among the above-mentioned services provided by public intuitions.

The results of the study indicate that elimination of the factors affecting the use of e-government services will lead to an increase in the rate of use of e-government services. Consequently, public institutions should exercise more care and attention to make sure that the content of the web sites are comprehensible and that the required information is communicated to the users, in order to increase the efficiency of the use of e-government services.

The average efficiency score of the disabled group regarding the use of the internet is 78%. The average efficiency score of the senior group regarding the use of the internet is 92%. The average efficiency score of the youth group regarding the use of the internet is 83%. The efficiency score of women from different ages and income levels regarding the use of the internet is 61%. This result demonstrates that individuals tend to use the internet more efficiently when they get older and their income level increases. The women's group has the lowest average efficiency score.

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UTILIZING DEBT AS A TAX BENEFIT: THE CAPITALIZATION OF U.S. CORPORATIONS AND OWNER SOPHISTICATION

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Capital structure, taxation, value of tax shields, financial policy, debt versus equity.

ABSTRACT

In the United States, income earned by entities operating in corporate form is taxed twice: once at the corporate level when earned and again at the shareholder level when distributed in the form of a dividend. As a result, shareholders have long sought to mitigate the effect of this double taxation. Using data from the U.S. Federal Reserve's Survey of Small Business Finances for 2003, this study explores the extent to which shareholders of U.S. corporations make use of debt financing to reduce overall tax expense. By looking at firm owners with varying degrees of sophistication operating businesses in both corporate and pass-through form, we demonstrate that more sophisticated owners, particularly those with graduate degrees, make use of this tax planning method more often than others.

1. INTRODUCTION

Under the U.S. tax code, a "C" corporation is a separate and distinct taxpayer from its shareholders. Accordingly, earnings of a C corporation are taxed at the corporate level when earned and may be taxed again at the shareholder level when they are distributed to shareholders in the form of a dividend. This double taxation of the same income is a topic of much debate in the halls of Congress and other political circles. In contrast, income earned by a "pass-through" entity is only taxed once at the shareholder level. Instead of applying a level of tax at the entity level, all items of income and deductions generally pass-through to the owners of the entity ratably in accordance with their ownership interest. The most familiar form of a pass-through entity is the partnership. Thus, a partnership does not generally pay income tax on the income it earns; rather the partners will include it on their personal income tax returns.

From a legal perspective, a corporation is an entity formed under state law as opposed to federal law. Other forms of doing business, such as the Limited Liability Company (LLC) or Limited Partnership, *inter alia*, are also formed under the laws of one of the states. It is important to make a distinction between the form of doing business under state law and how the entity is treated for federal tax purposes. The general rule for corporations is that they are taxed by the U.S. government as described above. However, the shareholders may make an "S" election which effectively taxes the corporation as a pass-through entity. Such an election is not available to all and comes with numerous limitations that may make it unappealing. Likewise, while an LLC is generally treated as a pass-through entity for federal tax purposes, the LLC members may elect to be taxed as a corporation. There are many non-tax reasons for selecting the form of entity to

conduct business. When a business is taxed as a corporation, shareholders often look for strategies to minimize the effect of double taxation.

One common strategy arises when shareholders capitalize corporations. Generally, a shareholder may contribute capital necessary to run the business in exchange for stock (i.e., ownership) in the company or they may loan the corporation money in exchange for an enforceable debt obligation. The benefit of the latter technique is that when the corporation pays interest on the debt, it is allowed a deduction against income. This in turn reduces the tax liability at the corporate level. Under the U.S. tax code, when a corporation pays a dividend to its shareholders there is no deduction against taxable income. In both scenarios, the shareholder will include the amount received on his or her tax return as income. As a result, a shareholder is often better served to capitalize a corporation with debt as a technique to get profits from the corporation and in the hands of the shareholder with only one level of tax. This strategy is so widely employed that Congress and the Treasury Department have instituted limits on the amount of debt a shareholder may use to capitalize a corporation. In addition to the deduction available on interest payments, the repayment of principal is not taxed to the shareholder giving the shareholder yet another method of getting earnings out of the corporation with only one level of tax. The influence of tax law on corporate finance decisions is well established in the literature (Ayers, Cloyd and Robinson, 2000), as well as the benefit of using shareholder debt in corporate finance (DeAngelo and Masulis, 1980) and (Modigliani and Miller, 1963).

This study undertakes to examine the extent shareholders are using debt to capitalize entities taxed as corporations under federal tax law using survey data from the Federal Reserve Board (Fed) for the year 2003. The Fed periodically conducts a voluntary survey of multiple businesses across the nation in a variety of industries. Given the sophistication of such tax planning techniques, one might expect that only those business owners who are themselves sophisticated or have access to tax advisors are more likely to utilize these techniques. Using demographic data from the same survey we examine the relationship between the debt used to capitalize a corporation and the level of sophistication of the business owners.

Historically, the undergraduate degree represented a level of education only a few attained. In today's business environment, having an undergraduate degree is more commonplace. In fact, many professionals have multiple post-secondary degrees. Some argue that having a graduate degree has become the minimal credential for high-skilled employment (Wendler et al, 2010). As a result, this study does not look to an undergraduate degree as a proxy for sophistication. Rather, it focuses on the graduate degree.

Using the graduate degree as a proxy for sophistication, we observe that companies filing federal taxes as a corporation make use of inside debt to a statistically significant degree. Inside debt represents obligations issued by the owner to the corporate entity and thus, an opportunity for owner to distribute earnings from the company in the tax-efficient manner previously described. Specifically, owners with graduate degrees are associated with 2 to 3 times more inside debt than non-graduate degree holders. Thus, if having obtained a graduate degree is a proxy for sophistication, our results indicate the more sophisticated owner utilizes complex tax planning techniques while operating in the corporate form.

One might expect the age of the firm is likewise a proxy for sophistication. However, our results indicate that having acquired business savvy through years of experience does not necessarily translate to being savvy in a tax planning context. This seems to be the case looking at our results with respect to firm age and the degree older firms utilize inside debt to capitalize entities taxed as corporations. In fact, our results show a decrease in the amount of inside debt as firms mature.

This could be explained by financial stability of a firm achieved over time as it developed as a going concern. Moreover, corporate firms with longevity may have paid down inside debt over time as earnings accumulated as the tax planning techniques described above would suggest.

2. LITERATURE REVIEW

The tax benefits of capitalizing a corporation with inside debt have long been accepted in the literature, beginning with the observation by Modigliani and Miller (1963) that in the absence of tax advantageous deductions, the value of a company is unaffected by how it is capitalized. Later, Miller (1977) went on to argue that regardless of any interest deduction for tax purposes, the value of the firm is independent of its capital structure when the market is in equilibrium. It is worth noting that Miller's long-time co-author, Franco Modigliani, did not participate in the latter work.

DeAngelo and Masulis (1980) extend the analysis in Miller (1977) to include the use of corporate tax shields as an alternative to inside debt capitalization. Through the mid-1980s, however, studies failed to empirically show whether the tax status of a firm had an effect on its debt policy, as noted in Myers (1984), which predicts such a study would be "protracted." In fact, not until Mackie-Mason (1990) was a relationship between the issuance of debt by a firm and the tax deductibility of interest shown. Specifically, Mackie-Mason (1990) departs from looking at debt-to-equity ratios, what he defines as the accumulation of historic financing decisions, as was previously the predominant analysis in the literature; and rather focuses on individual marginal financing decisions, termed the "incremental choice approach."

Since that time, further refinement of the issue has been undertaken; first using samples of large publicly traded corporations, e.g., Dhaliwal, Trezevant, and Wang (1992); Graham (1996) and MacKie-Mason (1990). Then, Cloyd, Limberg and Robinson (1997) undertook an analysis of small business operations using the Fed's Survey of Small Business Finances for the years 1988-89. That study found a positive correlation between marginal tax rates and debt utilization in both firms taxed as corporations and firms taxed on a pass-through basis. Interestingly, the authors also take the position that small, closely-held firms are less inclined when compared to large firms to take on debt in spite of the apparent tax benefits citing potential bankruptcy costs as a larger percentage of firm value. On the contrary, at least with respect to inside debt, we would argue that because closely-held corporations have fewer shareholders and thus, a larger portion of corporate income subjected to two levels of tax is ultimately attributable to each shareholder, such shareholders are more inclined to utilize debt as a substitute for equity to mitigate double taxation. Alas, that debate is for another day.

More recently, Ayers, Cloyd and Robinson (2000) use the same Federal Reserve Survey for the years from 1993. This study tests the long-held hypothesis on small firms using a more recent Small Business Survey. While numerous studies in the meantime have sought to examine the use of debt instead of equity as a form of executive compensation, e.g. Edmans and Liu (2011), few recent studies have explored the utilization of inside debt as a tax benefit by small firms.

3. METHODOLOGY

To provide new evidence that education and sophistication contributes meaningfully to the level of inside debt a firm obtains, we first compare the mean leverage ratios between firms that file their taxes as corporations and firms that file their taxes otherwise. Next, we estimate the effects education and sophistication have on the level of inside leverage using ordinary least squares. The first regression we estimate is:

$$\text{lev_inside}_i = \lambda_1 + \lambda_2 \text{college}_i + \lambda_3 \text{graduate}_i + \lambda_4 \text{firm_age}_i + \lambda_5 \text{experience}_i + e_i \quad (1)$$

where: lev_inside_i is inside leverage [(inside debt/firm equity)] for firm i ; college_i is a dummy variable that equals one if the owner of the firm has a college degree; graduate_i is a dummy variable that equals one if the owner of the firm has a graduate degree; firm_age_i is the age of the firm in years, and experience_i is the owner business experience in years. e_i is the error term for firm i . λ 's are coefficients to be estimated. The results from this regression are reported in Table 2.

The next regression we estimate uses the level of outside debt to determine the effects of education and sophistication. The regression we estimate is:

$$\text{lev_outside}_i = \lambda_1 + \lambda_2 \text{college}_i + \lambda_3 \text{graduate}_i + \lambda_4 \text{firm_age}_i + \lambda_5 \text{experience}_i + e_i \quad (2)$$

where: lev_outside_i is outside leverage [(total liabilities – inside debt)/(firm equity)] for firm i and college_i , graduate_i , firm_age_i , experience_i , λ and e_i are defined as above. The results from this regression are reported in Table 2.

We examine a subset of firms in the final set of regressions. Firms that have no loans from their partners or shareholders are removed from the sample so that we can examine more closely the marginal effects that education and sophistication have on the use of inside and outside debt. We repeat the previous regressions (1 and 2) with this subsample and report the findings in Table 3.

4. DATA

The data we use comes from the Federal Reserve's 2003 Survey of Small Business Finances (SSBF), which is representative of the approximately 6.3 million U.S. small businesses.¹ The SSBF is a random sample of 4,240 nonfinancial, nonfarm for-profit business enterprises that have less than 500 employees, including sole proprietors, limited liability partnerships, partnerships, limited liability corporations and C and S Corporations. Since the focus of our study is on corporations and the level of shareholder debt, we exclude firms that file their taxes as sole proprietors, leaving a sample of 2,893 firms. We further reduce the sample by dropping financially constrained firms, including firms that report negative equity, firms that were always denied loans or renewals of lines of credit within the last three years, and firms that were discouraged from applying for loans or renewals of lines of credits within the last three years, leaving a sample of 2,033 firms. Since our primary analysis attempts to explain variation in the levels of inside and outside debt, it is necessary to exclude these firms since they may not be able to choose their desired capital structure, i.e., financially constrained firms may not be able to obtain outside debt and instead be forced to rely on inside debt and or equity. We also drop firms that have missing or erroneous values for total assets or total liabilities. For example, firms that report non-positive values for total assets and firms that have more or less debt than their reported total liabilities are excluded. This leaves a final sample of 1,661 firms, including 598 firms that file their taxes as corporations and 1,063 firms that file their taxes as corporations.

We use two different leverage ratios in this study, including inside debt over firm equity and outside debt over firm equity. Inside debt is the total amount of principal owed to partners or stockholders, and outside debt is equal to the total liabilities of the firm minus inside debt. Firms

¹ The survey was conducted during 2004-2005 and became publicly available in September 2006. Surveyed firms included those that were listed on Dun's Market Identifier file as of May 2004 and met the target population definition.

with higher inside (outside) debt to equity ratios are to be associated with taking more (less) advantage of the tax benefits of inside debt. To explore the effect education has on the leverage ratios, we use dummy variables for college and graduate degrees where degree equals one if the owner of the firm has a college (graduate) degree and zero otherwise.² We use the number of years of business experience the owner has and the age of the firm in years as proxies for sophistication, and scale each by 10. We hypothesize that more educated and more sophisticated firm owners will take greater advantage of inside debt, thus, we predict a positive and statistically significant correlation between inside debt and education, as well as positive relationship between inside debt and sophistication. Conversely, we predict a negative relationship between outside debt and the aforementioned variables.

5. RESULTS

We present descriptive statistics in Table 1. On average, firms that file their taxes as corporations have 6% less inside debt and 44.3% more outside debt than firms that file their taxes by other means. While these figures appear to contradict a primary assumption of our study, the leverage ratios reveal the opposite. The mean inside debt-to-equity ratio for firms that file their taxes as corporations is 0.32 compared to 0.22 for firms that file their taxes as non-corporations, or 45.5% greater on average. Conversely, the mean outside debt-to-equity ratio for corporations is 6% smaller than other firms. These ratios support the notion that non-pass-through firms do, in fact, take advantage of the benefits of inside leverage; whereas, pass-through firms rely more heavily on outside debt, at least as a percentage of total equity in the firm.

Table1 presents summary statistics for 598 firms that file their taxes as corporations and 1,063 firms that file their taxes by other means. Firms that are taxed as corporations include LLPs filing taxes as a corporation, C corporations and LLCs filing taxes as a corporation. Firms that are not taxed as corporations include partnerships, LLPs filing taxes as a partnership, Scorporations and LLCs filing taxes as a partnership. Inside debt is the total amount of principal owed on loans from partners/stockholders. Outside debt is equal to total liabilities of the firm minus inside debt. Total debt is the total dollar amount owed for all debts and liabilities. Firm equity is total amount of firm equity. Inside leverage is equal to inside debt divided by firm equity. Outside leverage is equal to outside debt divided by firm equity.

Table 1: Descriptive Statistics for Corporations and Non-Corporations

		N	MEAN	MIN	MAX	SD
FIRMS TAXED AS CORPORATIONS	Inside debt	598	72,464	0	6,000,000	315,996
	Outside debt	598	3,160,000	202	216,000,000	12,400,000
	Total debt	598	3,230,000	202	216,000,000	12,400,000
	Firm equity	598	2,660,000	0	118,000,000	7,620,000
	Inside leverage	598	0.32	0.00	110.06	4.48
	Outside leverage	598	3.16	0.00	232.57	13.41
FIRMS NOT TAXED AS CORPORATIONS	Inside debt	1,063	77,125	0	7,500,000	405,962
	Outside debt	1,063	2,190,000	29	183,000,000	9,240,000
	Total debt	1,063	2,270,000	29	183,000,000	9,350,000
	Firm equity	1,063	1,840,000	0	60,900,000	4,380,000
	Inside leverage	1,063	0.22	0.00	45.32	1.70
	Outside leverage	1,063	3.36	0.00	458.69	17.16

² To avoid multi-collinearity problems, we orthogonalize the graduate degree dummy variable to the college degree dummy variable.

We present ordinary least squares regression results in Table 2 where the dependent variable is the inside debt-to-equity ratio for columns 1 and 3 and outside debt-to-equity ratio for columns 2 and 4. As the overarching goal of this study is to attribute the use of inside debt to knowledge and sophistication, we begin by focusing on the business experience of the owner and whether or not the owner has a college or graduate degree. As reported in column 1, firms with owners with graduate degrees that file their taxes as corporations have approximately 117% higher inside leverage ratios, a result that is significant at the 5% level. No other significance for graduate degree is observed, including outside leverage for firms that file their taxes as corporations and inside or outside leverage for firms that file by other means. These results support our assertion that more educated owners do indeed take advantage of the benefits of inside debt, and that outside debt is less desirable for more educated firm owners. In contrast, no significant relationship is found for firm owners with college degrees in all of the regressions we report in Table 2. While this may contradict the notion that education is correlated to taking advantage of inside debt, we assert that a college degree is more of a general degree today, whereas a graduate degree tends to be more specialized and associated with more sophisticated and, perhaps, more experienced firm owners.

Table 2 reports regression results of firm leverage ratios (inside and outside debt-to-equity) on education and sophistication variables. Regression results for firms that file their taxes as corporations are displayed in columns 1 and 2; regression results for firms that file their taxes by other means are displayed in columns 3 and 4. Age of firm is age of firm in years divided by 10. College degree and Graduate degree are dummy variables that equal one if the primary owners of the firm have a college (graduate) degree and zero otherwise. College degree and Graduate degree are highly correlated and are thus orthogonalized to each other. Experience is the number of years of business experience of the primary owners divided by 10. *, ** and *** represent significance at the 10%, 5% and 1%, respectively.

Table 2: Inside and outside leverage for corporations and non-corporations

VARIABLES	FIRMS THAT FILE TAXES AS CORPS		FIRMS THAT DON'T FILE AS CORPS	
	Inside Leverage	Outside Leverage	Inside Leverage	Outside Leverage
Age of Firm	-0.029* (0.088)	-0.155*** (0.002)	-0.011** (0.034)	-0.069 (0.186)
College Degree	0.493 (0.204)	0.855 (0.457)	-0.086 (0.421)	-1.743 (0.107)
Graduate Degree	1.167** (0.022)	2.314 (0.123)	0.113 (0.439)	-0.130 (0.930)
Experience	0.041** (0.041)	0.140** (0.017)	0.013** (0.012)	0.017 (0.759)
Constant	-0.368 (0.513)	2.397 (0.150)	0.146 (0.283)	5.188*** (0.000)
Observations	598	598	1,063	1,063
R-squared	0.018	0.021	0.008	0.004

As reported in columns 1 and 2 of Table 2, more business experience is associated with more inside and outside debt. A 10 year increase in business experience for firm owners that file their taxes as corporations corresponds to a 4% to 14% increase in inside and outside leverage, respectively, whereas a 10 year increase in business experience for firm owners that file their taxes as non-corporations corresponds to a 1.3% increase in inside leverage. These results are significant

at the 5% level and are somewhat perplexing. While we expected business experience to be positively correlated with inside leverage, particularly for owners of firms filing their taxes as corporations, we expected to see greater economic significance associated with inside leverage versus outside leverage.

Columns 1 and 3 of Table 2 reveal a negative and statistically significant relationship between inside leverage and the age of the firm, indicating that older firms have less inside debt as a percent of firm equity. We had predicted a positive relationship, assuming that mature firms would more readily take advantage of the benefits of inside debt; however, it is conceivable that these firms have a build of equity and rely less on debt in general over time. This notion is supported by the results reported in Column 2 where a negative and statistically significant (at the 1% level) relationship between outside leverage and the age of the firm is observed. It is interesting to note, however, that no significant relationship is found between outside leverage and firm age for firms that don't file their taxes as corporations.

In Table 3, we report ordinary least squares regressions on subsamples of firms that have inside debt. By omitting firms without inside debt, the subsamples consist of 162 firms that file their taxes as corporations and 249 firms that file their taxes by other means. Similar to the results in Table 2, there is a positive and statistically significant relationship between owners with graduate degrees and inside debt for firms that file their taxes as corporations. On average, these owners have approximately 387% higher inside leverage ratios, a result that is significant at the 5% level. No other significance is observed for graduate degree or college degree. The only other significant results reported in Table 3 are related to business experience, where a 10 year increase in experience corresponds to 10.6% increase in inside leverage for firms that file their taxes as corporations and a 3.6% increase in inside leverage for firms that file their taxes by other means.

Table 3 reports regression results of a subsample of firms for leverage ratios (inside and outside debt-to-equity) on education and sophistication variables. The subsample includes firms that have inside debt. Regression results for firms that file their taxes as corporations are displayed in columns 1 and 2; regression results for firms that file their taxes by other means are displayed in columns 3 and 4. Age of firm, College degree, Graduate degree and Experience are as defined in Table 2. *, ** and *** represent significance at the 10%, 5% and 1%, respectively.

Table 3: Subsample of firms that have inside debt

VARIABLES	FIRMS THAT FILE TAXES AS	FIRMS THAT DON'T FILE	AS FIRMS	
	INSIDE LEVERAGE	OUTSIDE LEVERAGE	INSIDE LEVERAGE	OUTSIDE LEVERAGE
Age of Firm	-0.096 (0.136)	-0.017 (0.585)	-0.024 (0.166)	-0.021 (0.892)
College Degree	1.873 (0.189)	-0.092 (0.893)	-0.365 (0.414)	-5.998 (0.135)
Graduate Degree	3.871** (0.037)	0.809 (0.361)	0.459 (0.450)	-0.793 (0.884)
Experience	0.106* (0.097)	0.017 (0.577)	0.036* (0.094)	-0.011 (0.955)
Constant	-0.555 (0.789)	2.099** (0.037)	0.693 (0.255)	9.238* (0.090)
Observations	162	162	249	249
R-squared	0.058	0.009	0.020	0.009

6. CONCLUSION

Using the graduate degree as a proxy for sophistication, we observe that firms filing federal taxes as a corporation make use of inside debt to a statistically and economically significant degree. Inside debt represents obligations issued by the owner to the corporate entity and thus, an opportunity for owner to distribute earnings from the firm in the tax-efficient manner previously described. Specifically, owners with graduate degrees are associated with 2 to 3 times more inside debt than non-graduate degree holders. Thus, if having obtained a graduate degree is a proxy for sophistication, our results indicate the more sophisticated owner utilizes complex tax planning techniques while operating in the corporate form.

One might expect the age of the firm is likewise a proxy for sophistication. However, our results indicate that having acquired business savvy through years of experience does not necessarily translate to being savvy in a tax planning context. This seems to be the case looking at our results with respect to the age of firm variable and the degree older firms utilize inside debt to capitalize entities taxed as corporations. In fact, our results show a decrease in the amount of inside debt as firms mature. This could be explained by financial stability of a firm achieved over time as it developed a going concern. Moreover, corporate firms with longevity may have paid down inside debt over time as earnings accumulated in accordance with the tax planning techniques described above.

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