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CONTENTS

EFFECTS OF UNDERDEVELOPED EQUITY MARKET ON INVESTMENT

Mark L. Muzere*

Abstract

This paper uses a variant of the Allen, Bernardo, and Welch (2000) model in an open market economy to analyze the effects of equity market development on investment. A country's underdeveloped equity market may discourage investors from investing in the country. Consequently, an underdeveloped equity market may contribute to home equity bias. Asset prices in a less developed equity market tend to be lower. The results suggest that a government may need to facilitate the development of its equity market to attract investment.

Keywords: asset prices, deadweight costs, home equity bias

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1. Introduction

Government policies, market demand and business practices largely fuel the growth in emerging capital markets. Reforms in government policies, the labor market and banking and corporate sectors are seen as necessary. Bakaert and Urias (1996) report a 300 percent increase in mutual fund assets invested in emerging equity markets from 1991 through 1993. Dahlquist and Robertsson (2001) report an increase in foreign investment in Sweden, which is a developed country, from 126 billion Swedish Krona 1991 to 280 billion Swedish Krona in 1997. We seek to provide theoretical insights about the effects of equity market development on investment. We base our analysis on deadweight costs associated with equity market development. We use a variant of the Allen, Bernardo, and Welch (2000) model in an open market to perform our analysis. Our investors are institutional investors such as mutual funds, pension funds, and insurance companies. Small investors may invest in the equity markets through mutual funds. There is one bond market which facilitates lending and borrowing among investors. We subsume currency risk in the risk on returns in the equity markets. We denominate monetary returns in terms of the United States dollar. There is one composite good for consumption. Investors use the United States dollar to purchase units of the consumption good. Investors invest in the equity markets and in the bond market to maximize their expected utility of consumption. We determine equilibrium shareholdings in firms and equilibrium asset prices from first order conditions associated with investors' utility maximization problems and the market clearing conditions for the equity markets and the bond market.

We show that if domestic investors and foreign investors face equal deadweight costs in the equity markets, then investors' equilibrium shareholdings in the firms depend on their risk aversion and diversification needs. If foreign investors face higher deadweight costs in the domestic equity market than domestic investors do, then foreign investors hold a lower fraction of shares of the domestic firms than domestic investors hold, all other things being constant. Consequently, domestic investors hold a higher fraction of shares of the domestic firms. These equilibrium shareholdings may manifest home equity bias. This is a phenomenon where investors tend to invest more in the home equity market than is implied by the benefits of diversification in the international equity markets.

We show that deadweight costs tend to contribute to low asset prices. The reason is that deadweight costs make it costly for investors to acquire shares of firms. Investors who face higher deadweight costs in an equity market may decrease their fraction of shares of firms in the equity market. These investors may increase their supply of funds

to an equity market with lower deadweight costs. The investors may also increase the supply of funds to the bond market. An increased supply of funds to the bond market may cause interest rates to fall. This behavior asset prices in the capital markets is consistent with the evidence that stocks and bonds are substitutes.

The results suggest that a government may need to facilitate the development of its equity market to attract investment. For instance, the government may reduce bureaucratic red tape to reduce the cost of entry by investors to the country's equity market. The government may establish regulatory requirements for participants in the equity market. These regulatory requirements include, among others, the prohibition of insider trading and the protection of minority shareholders. A large volume of investment in the equity market would facilitate the growth of the country's economy. A liquid equity market would enable investors to smooth their consumption.

We provide numerical examples in the appendix to illustrate the insights derived from the model. We choose plausible range of parameter values. For example, the deadweight costs in the equity markets range from zero percent to five percent.

We provide examples to illustrate the effects of deadweight costs on investors' shareholdings in firms and on asset prices. As deadweight costs in a country's equity market increase, investors who face higher deadweight costs decrease their fraction of shareholdings in the firms.

Consequently, investors who face lower deadweight costs hold a higher fraction of shares of the firms. For certain parameter values investors' shareholdings may exhibit home equity bias. As deadweight costs in a country's equity market increase, asset prices tend to fall. This is because deadweight costs make it costly for investors to acquire shares of firms. The fall in share prices compensates investors for the risk they bear by investing in the equity market. This enables investors to earn high returns which are commensurate with their risky investment. We provide examples to illustrate the effects of risk on investors' shareholdings in firms and on asset prices. As risk in a country's equity market increases, domestic investors decrease their fraction of shares of the domestic firms. The reason is that domestic investors seek to lower their risk exposure by diversifying their investments. Foreign investors increase their shareholdings in the domestic firms partly due to diversification needs. We find that share prices of the domestic firms tend to fall. This is due to a decrease in demand for shares of the domestic firms. Interest rates fall because investors may increase the supply of funds the to the bond market to diversify their investments.

We provide examples to illustrate the effects of risk aversion on investors' shareholdings in firms and on asset prices. As domestic investors' risk aversion increases, domestic investors decrease the fraction of their shareholdings in domestic firms. Consequently, they decrease the fraction of their funds allocated to domestic firms. On other hand, foreign investors increase their fraction of shareholdings in domestic firms. Consequently, they increase the fraction of their funds allocated to domestic firms. Similar reasoning applies to the case where we vary foreign investors' risk aversion.

The remainder of the paper is organized as follows. Section 2 contains literature review and descries our contribution to the financial economics literature. Section 3 describes the mode and our results. Section 4 concludes the paper.

2. Literature Review

The financial economics literature emphasizes the benefits of diversification in the international equity markets. But investors tend to invest more of the funds in home equity markets than would seem to be implied by diversification in the international equity markets. This phenomenon is called home equity bias. Empirical evidence suggests that home equity bias is widespread across developed and developing countries (Chan, Covrig, and Ng, 2005). Our primary contribution is to provide theoretical insights about the effects of equity market development on investment. One measure of equity market development is the turnover ratio, which is the ratio of total value of stocks traded to the average market capitalization in a country. A second measure of equity market development is the market capitalization as a percentage of a country's gross domestic product (GDP). For example, in China the capital market has grown at a very high speed after its economic reform. The total market capitalization reached some three trillion Chinese Yuan in 2000, but the liquid market capitalization is about a third of the total market capitalization. This is because two thirds of the shares of the 649 companies listed on these exchanges are unlisted and may not be traded. Compared to G-10 countries, the market capitalization as a percentage of the country's GDP is much smaller (Neoh, Anthony, 2000).

Foreign investors face liquidity constraint and high discount rate of investment (Chen and Xiong, 2001). A third measure of equity market development is transaction costs (bid-ask spreads) associated with trading securities.

We base our theoretical analysis on deadweight costs associated with equity market development. We make three contributions to the financial economics literature. First, we find that a country's underdeveloped equity market may discourage investors from investing in the country. If foreign

investors face higher deadweight costs in the domestic equity market than domestic investors do, then foreign investors tend to hold a smaller fraction of shares of the domestic firms than domestic investors hold. Consequently, investors' equilibrium shareholdings in firms may exhibit home equity bias.

Second, we determine equilibrium asset prices and find that asset prices in less developed equity markets tend to be lower, all other things being constant. Specifically, we find that as deadweight costs increase, asset prices tend to fall. The reason is that higher deadweight costs make it more costly for investors to acquire shares of firms. Interest rates decrease because investors may increase the supply of funds to the bond market to diversify their investments. This behavior in the capital markets is consistent with evidence that stocks and bonds are (imperfect) substitutes.

Third, the results imply that a government may need to facilitate the development of its equity market to attract investment. For instance, the government may reduce bureaucratic red tape to reduce the cost of entry to its equity market. The government may establish regulatory requirements for market participants. These regulatory requirements include, among others, the prohibition of insider trading and the protection of minority shareholders. Scholars provide several non-mutually exclusive explanations for home equity bias. Some scholars argue that a country's equity market may be a good hedge against inflation and non-traded goods (Adler and Dumas, 1983; Stockman and Dumas, 1998; Tsar, 1993). Some scholars argue that Taxes, costs of cross border trade may contribute to home equity bias (Black, 1974; Cole and Obstfeld, 1991). Some scholars argue that information asymmetry may contribute to home equity bias (Merton, 1989; Brennan and Cao, 1997).

3. The Economy

We use a variant of the Allen, Bernardo, and Welch (2000) model in an open market economy to analyze the effects of equity market development on investment. For simplicity, we assume a two-country open market economy. We assume that one country is developed, for example the United States. The other country is a developing country, which has a less developed equity market.

There is a bond market which facilitates lending and borrowing among investors. Transactions in the bond market are denominated in the United States dollar. The lending and borrowing interests are equal. We shall determine the equilibrium interest rate in the model. Investors are institutional investors such as mutual funds, pension funds, and insurance companies. Small investors may invest in the equity markets through mutual funds. Empirical evidence suggests that institutional investors have similar investment strategies. They prefer large and liquid stocks (Gompers and Merrick, 2001; He, Ng, and Wang, 2004).

We assume a continuum of investors in the open market economy. The investors are uniformly distributed over the unit interval [0,1]. Thus investors have mass equal to one. The proportions of investors are given by

$$\theta_i \in (0,1), \text{ where } \theta_1 + \theta_2 = 1.$$

We assume that one unit of currency can be exchanged for one unit of consumption. This is the same as saying that the price of consumption has been normalized to one. Thus an investor's wealth enters directly into the utility function. We assume that investors' preferences are represented by a negative exponential utility function of the form

$$u(W) = -\exp(-\gamma W).$$

The variable W denotes an investor's wealth and the parameter γ denotes the investor's coefficient of absolute risk aversion. This type of utility function is common in the financial economics literature. Grossman (1976) and Allen, Bernardo and Welch (2000), among others, use a negative exponential utility function in their models.

This negative exponential utility function is bounded from above by zero if consumption grows arbitrarily large. The constant coefficient of absolute risk aversion means that there is no change to an investor's demand for risky assets with respect to changes in the investor's initial wealth. Instead, changes in an investor's initial wealth are absorbed by risk-free lending or borrowing in the bond market.

The open market economy is indexed by dates 0 and 1. We assume that the end-of-period returns V_j are normally distributed with mean μ_j and volatility σ_j. Grossman (1976) and Allen Bernardo, and Welch (2000) make a similar assumption in their models. We subsume currency risk in the risk of returns in a country's equity market. We express this multivariate normal distribution in vector form as:

$$V \sim n(\mu, \Sigma) \tag{1}$$

where

$$V = \begin{pmatrix} V_1 \\ V_2 \end{pmatrix}, \ \mu = \begin{pmatrix} \mu_1 \\ \mu_2 \end{pmatrix}, \ \Sigma = \begin{pmatrix} \sigma_1^2 & \rho\sigma_1\sigma_2 \\ \rho\sigma_1\sigma_2 & \sigma_2^2 \end{pmatrix}.$$

The matrix Σ is a covariance matrix whose diagonal elements represent variances of the returns and whose off diagonal elements represent the covariance between the returns. We assume that the determinant of the covariance matrix is positive. The joint probability density of the returns is of the form

$$g(y,z) = \frac{1}{2\pi\sigma_1\sigma_2\sqrt{1-\rho^2}} \exp\left(-\frac{1}{2(1-\rho^2)} \left(\left(\frac{y-\mu_1}{\sigma_1}\right)^2 - 2\rho\left(\frac{y-\mu_1}{\sigma_1}\right)\left(\frac{z-\mu_2}{\sigma_2}\right) + \left(\frac{z-\mu_2}{\sigma_2}\right)^2 \right) \right),$$

where $-\infty < y,\ z < \infty,\ \sigma_1 > 0,\ \sigma_2 > 0,\ -1 < \rho < 1$.
The variables *y* and *z* represent realized values of the end-of-period returns. With a multivariate normal distribution, the associated variables are uncorrelated if and only if they are independent, since the joint probability density function only factors when the correlation coefficients are zero $(\rho = 0)$ We only consider this case in our paper. The other cases do not provide further economic insights in our analysis.

They would contribute to diversification in investment. When there is a positive correlation between the returns then investing in both firms offers less diversification than the case of zero correlation. Similarly, when there is negative correlation then there is more diversification benefit. We assume 100 percent equity in the capital structure of firms in our model. Allen, Bernardo, and Welch (2000) make a similar assumption in their model. We assume this for simplicity because our focus is on shareholders.
We state an investor's utility maximization problem.

Problem Investor *i* makes investment allocations *x ji* to firms $j \in \{1, 2\}$, to maximize the investor's expected utility of wealth

$$E\left[-\exp\left(-\gamma_i W_i\right)\right] = -\exp\left(-\gamma_i E\left[W_i\right] + \frac{\gamma_i^2}{2} Var\left(W_i\right)\right)$$

where

$$W_i = \sum_{j=1}^{2} x_{ji}\left(V_j - c_{ji}\right) + \left(\omega_i - \sum_{j=1}^{2} x_{ji} p_j\right)(1+r). \tag{2}$$

We let *E* denote the expectation operator. We let *Var* denote the variance operator. We let ω_i denote date 0 cash endowment for investor *i*. We let c_{ji} denote the deadweight costs investor *i* incurs by investing in firm j. We let p_j denote date 0 share price for firm *j*. We let *r* denote the borrowing and lending interest rate. The end-of-period wealth W_i for investor *i* is the total return on investment in the stock and bond markets. The return on investment in the bond market is positive for a lender but negative for a borrower. From a standard result in probability theory the investor's end-of-period wealth is normally distributed (Muirhead, 1982). We complete squares in the integral associated with expected utility. Consequently, we obtain the right hand side of the investor's expected utility function. We record equilibrium shareholdings and asset prices in the following proposition.

Proposition Equilibrium shareholdings of firm $j \in \{1, 2\}$ are given by

$$\theta_1 x_{j1} = \frac{\theta_1\gamma_2}{\theta_1\gamma_2 + \theta_2\gamma_1} + \frac{\theta_1\theta_2\left(c_{j2} - c_{j1}\right)}{\left(\theta_1\gamma_2 + \theta_2\gamma_1\right)\sigma_j^2}$$

$$\theta_2 x_{j2} = \frac{\theta_2\gamma_1}{\theta_1\gamma_2 + \theta_2\gamma_1} + \frac{\theta_1\theta_2\left(c_{j1} - c_{j2}\right)}{\left(\theta_1\gamma_2 + \theta_2\gamma_1\right)\sigma_j^2}. \tag{3}$$

Equilibrium asset prices are given by

$$p_1 = \frac{\left(\theta_1\omega_1 + \theta_2\omega_2\right)\left(\theta_1\gamma_2 + \theta_2\gamma_1\right)\mu_1}{\left(\theta_1\gamma_2 + \theta_2\gamma_1\right)\left(\mu_1 + \mu_2\right) - B - \gamma_1\gamma_2\left(\sigma_1^2 + \sigma_2^2\right)}$$

$$- \frac{\left(\theta_1\omega_1 + \theta_2\omega_2\right)\left(\theta_1\gamma_2 c_{11} + \theta_2\gamma_1 c_{12} + \gamma_1\gamma_2\sigma_1^2\right)}{\left(\theta_1\gamma_2 + \theta_2\gamma_1\right)\left(\mu_1 + \mu_2\right) - B - \gamma_1\gamma_2\left(\sigma_1^2 + \sigma_2^2\right)}$$

$$p_2 = \frac{\left(\theta_1\omega_1 + \theta_2\omega_2\right)\left(\theta_1\gamma_2 + \theta_2\gamma_1\right)\mu_2}{\left(\theta_1\gamma_2 + \theta_2\gamma_1\right)\left(\mu_1 + \mu_2\right) - B - \gamma_1\gamma_2\left(\sigma_1^2 + \sigma_2^2\right)} \tag{4}$$

$$- \frac{\left(\theta_1\omega_1 + \theta_2\omega_2\right)\left(\theta_1\gamma_2 c_{21} + \theta_2\gamma_1 c_{22} + \gamma_1\gamma_2\sigma_2^2\right)}{\left(\theta_1\gamma_2 + \theta_2\gamma_1\right)\left(\mu_1 + \mu_2\right) - B - \gamma_1\gamma_2\left(\sigma_1^2 + \sigma_2^2\right)}$$

$$1 + r = \frac{\left(\theta_1\gamma_2 + \theta_2\gamma_1\right)\left(\mu_1 + \mu_2\right) - B - \gamma_1\gamma_2\left(\sigma_1^2 + \sigma_2^2\right)}{\left(\theta_1\gamma_2 + \theta_2\gamma_{12}\right)\left(\theta_1\omega_1 + \theta_2\omega_2\right)}$$

where

$$B = \theta_1\gamma_2\left(c_{11} + c_{21}\right) + \theta_2\gamma_1\left(c_{12} + c_{22}\right).$$

From (3) we see that if foreign investors incur higher deadweight costs in the domestic equity market than domestic investors do, then they tend to hold lower fraction of shares of the domestic firms than domestic investors hold. Indeed, if the deadweight costs that domestic investors and foreign investors incur are equal, then investors' shareholdings in firms are determined by their risk aversion and diversification needs. To see this, we substitute $c_{j1} = c_{j2} = c_j$ into the shareholdings in (3). Then investors' equilibrium shareholdings for firm $j \in \{1, 2\}$ are given by

$$\theta_1 x_{j1} = \frac{\theta_1\gamma_2}{\theta_1\gamma_2 + \theta_2\gamma_1}$$

$$\theta_2 x_{j2} = \frac{\theta_2\gamma_1}{\theta_1\gamma_2 + \theta_2\gamma_1}.$$

Deadweight costs induce low share prices for firms because these costs make it costly for investors to acquire shares of firms. Investors seek price discount to compensate them for the risk they bear by investing in these firms. The low share prices enable investors to earn high expected returns from their investments. Equilibrium share prices are dependent on investors' cash endowment in the open market economy. If investors' cash endowment is small, then share prices tend to be low. This is because low cash endowment implies that the demand for shares of firms may be low. Interest rates tend to be high to induce investors to supply funds to the bond market. This is because investors may not have large quantities of funds to supply to the bond market.

Conversely, if investors have large cash endowment in the open market economy, then share prices tend to be high. The reason is that investors

have large quantities of funds to invest in the equity markets. The increased demand for shares of firms causes their share prices to go up. Interest rates tend to be low because investors have large quantities of funds to invest in the bond market.

4. Conclusion

We use a variant of the Allen, Bernardo, Welch (2000) model in an open market economy to analyze the effects of a country's equity market development on investment. We base our analysis on deadweight costs associated with a country's equity market development.

We show that a country's underdeveloped equity market may discourage investors from investing in the country. Consequently, investors' equilibrium shareholdings may manifest home equity bias. We find that asset prices in a less developed equity market tend to be lower, all other things being constant. The results suggest that a government may need to facilitate the development of its equity market to attract investment. Our numerical examples in the appendix illustrate the insights derived from our model.

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Appendix A: Proofs

Proof of Proposition. An investor's utility maximization problem is equivalent to the following problem. Investor *i* makes the portfolio allocations *ji x* to minimize

$$-\gamma_i E[W_i]+\frac{\gamma_i^2}{2}Var(W_i)=-\gamma_i\left(x_{1i}(\mu_1-c_{1i})+x_{2i}(\mu_2-c_{2i})\right)$$
$$-\gamma_i(\omega_i-x_{1i}p_1-x_{2i}p_2)(1+r)+\frac{\gamma_i^2}{2}\left(x_{1i}^2\sigma_1^2+x_{2i}^2\sigma_2^2\right). \quad (5)$$

The left hand side of this problem is equivalent to the right hand side because we assume that the returns for the firms are uncorrelated. Investors are price takers because individual investors are too small to affect asset prices. But their aggregate demand for assets does affect asset prices. Thus the partial derivates of share prices and interest rate with respect to portfolio allocations are zero. From the first order conditions associated with the problem defined by (5) we obtain investors' shareholdings in the equity market of country $i\in\{1,2\}$These are given by

$$x_{1i} = \frac{\mu_1 - c_{1i} - (1+r)p_1}{\gamma_i \sigma_1^2}$$

$$x_{2i} = \frac{\mu_2 - c_{2i} - (1+r)p_2}{\gamma_i \sigma_2^2}. \quad (6)$$

From the second order conditions we conclude that these shareholdings yield a minimum value to the problem defined by (5). This implies that the corresponding solution to the utility maximization problem yields maximum utility. The fraction of investors in country *i* is given by ϑ_i. Therefore multiplying an investor's allocations by ϑ_i yields the aggregate allocations for investors in country *i*. Multiplying an investor's wealth by ϑ_i yields the aggregate wealth for this country's investors. We determine the equilibrium shareholdings and share prices. The market clearing condition for firm $j \in \{1,2\}$ is given by

$$\theta_1 x_{j1} + \theta_2 x_{j2} = 1. \quad (7)$$

Thus we have

$$\frac{\theta_1 \left(\mu_j - c_{j1} - (1+r)p_j\right)}{\gamma_1 \sigma_j^2} + \frac{\theta_2 \left(\mu_j - c_{j2} - (1+r)p_j\right)}{\gamma_2 \sigma_j^2} = 1.$$

The product of the gross risk-free return and this firm's share price is given by

$$(1+r)p_j = \mu_j - \frac{\theta_1 \gamma_2 c_{j1} + \theta_2 \gamma_1 c_{j2} + \gamma_1 \gamma_2 \sigma_j^2}{\theta_1 \gamma_2 + \theta_2 \gamma_1}. \quad (8)$$

We substitute the relation in (8) into the investors' shareholdings given by (6). Thus the investors' shareholdings in firm $j \in \{1,2,3\}$ are given by

$$\theta_1 x_{j1} = \frac{\theta_1 \gamma_2}{\theta_1 \gamma_2 + \theta_2 \gamma_1} + \frac{\theta_1 \theta_2 \left(c_{j2} - c_{j1}\right)}{(\theta_1 \gamma_2 + \theta_2 \gamma_1)\sigma_j^2}$$

$$\theta_2 x_{j2} = \frac{\theta_2 \gamma_1}{\theta_1 \gamma_2 + \theta_2 \gamma_1} + \frac{\theta_1 \theta_2 \left(c_{j1} - c_{j2}\right)}{(\theta_1 \gamma_2 + \theta_2 \gamma_1)\sigma_j^2}. \quad (9)$$

We determine the relations in (8) from the bond market clearing condition

$$\left(\theta_1 \omega_1 - \sum_{j=1}^{2} \theta_1 x_{j1} p_j\right) + \left(\theta_2 \omega_2 - \sum_{j=1}^{2} \theta_2 x_{j2} p_j\right) = 0. \quad (10)$$

The bond market clearing condition says that short (negative) positions held by borrowers are equal to long (positive) positions held by lenders. That is, bonds are held in zero net supply. We then substitute the equity market clearing conditions by (7) into the bond market clearing condition given by (10). We obtain the relation

$$\theta_1 \omega_1 + \theta_2 \omega_2 = \left(\theta_1 x_{11} + \theta_2 x_{12}\right) p_1 + \left(\theta_1 x_{21} + \theta_2 x_{22}\right) p_2 = p_1 + p_2. \quad (11)$$

From (8) we can express the share price for firm 2 in terms of the share price for firm 1. We have

$$p_2 = \left(\frac{(\theta_1 \gamma_2 + \theta_2 \gamma_1)\mu_2 - (\theta_1 \gamma_2 c_{21} + \theta_2 \gamma_1 c_{22}) - \gamma_1 \gamma_2 \sigma_2^2}{(\theta_1 \gamma_2 + \theta_2 \gamma_1)\mu_1 - (\theta_1 \gamma_2 c_{11} + \theta_2 \gamma_1 c_{12}) - \gamma_1 \gamma_2 \sigma_1^2} \right) p_1. \quad (12)$$

We substitute the relation in (11) into (12). Thus we obtain the equilibrium share prices

$$p_1 = \frac{(\theta_1 \omega_1 + \theta_2 \omega_2)(\theta_1 \gamma_2 + \theta_2 \gamma_1)\mu_1}{(\theta_1 \gamma_2 + \theta_2 \gamma_1)(\mu_1 + \mu_2) - B - \gamma_1 \gamma_2 \left(\sigma_1^2 + \sigma_2^2\right)}$$

$$- \frac{(\theta_1 \omega_1 + \theta_2 \omega_2)\left(\theta_1 \gamma_2 c_{11} + \theta_2 \gamma_1 c_{12} + \gamma_1 \gamma_2 \sigma_1^2\right)}{(\theta_1 \gamma_2 + \theta_2 \gamma_1)(\mu_1 + \mu_2) - B - \gamma_1 \gamma_2 \left(\sigma_1^2 + \sigma_2^2\right)}$$

$$p_2 = \frac{(\theta_1 \omega_1 + \theta_2 \omega_2)(\theta_1 \gamma_2 + \theta_2 \gamma_1)\mu_2}{(\theta_1 \gamma_2 + \theta_2 \gamma_1)(\mu_1 + \mu_2) - B - \gamma_1 \gamma_2 \left(\sigma_1^2 + \sigma_2^2\right)}$$

$$- \frac{(\theta_1 \omega_1 + \theta_2 \omega_2)\left(\theta_1 \gamma_2 c_{21} + \theta_2 \gamma_1 c_{22} + \gamma_1 \gamma_2 \sigma_2^2\right)}{(\theta_1 \gamma_2 + \theta_2 \gamma_1)(\mu_1 + \mu_2) - B - \gamma_1 \gamma_2 \left(\sigma_1^2 + \sigma_2^2\right)}, \quad (13)$$

where

$$B = \theta_1 \gamma_2 \left(c_{11} + c_{21}\right) + \theta_2 \gamma_1 \left(c_{12} + c_{22}\right).$$

We substitute (13) into (8) and obtain the equilibrium interest rate

$$1 + r = \frac{(\theta_1 \gamma_2 + \theta_2 \gamma_1)(\mu_1 + \mu_2) - B - \gamma_1 \gamma_2 \left(\sigma_1^2 + \sigma_2^2\right)}{(\theta_1 \gamma_2 + \theta_2 \gamma_1)(\theta_1 \omega_1 + \theta_2 \omega_2)}.$$

Appendix B: Numerical Examples

We provide numerical examples to illustrate the insights derived from our model. We use plausible range of parameter values. First, we illustrate the effects of deadweight costs on investment allocations and asset prices. Second, we illustrate the effect of volatility of returns on investment allocations and asset prices. Third, we illustrate the effect of risk aversion on investment allocations and asset prices.

Definitions of variables

c_{ji} = deadweight costs that investor i incurs in firm j

x^{ji} = investors of country i's shareholdings in firm j

ω^{ji} = investors of country i's allocation of funds in firm j

b^i = investors of country i's investment in the bond market.

Effect of deadweight costs on allocation of investment funds

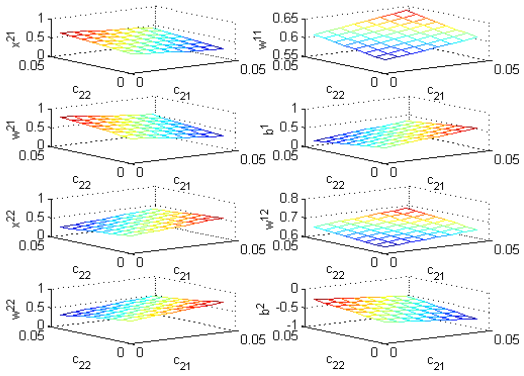

Figure 1: surfaces for shareholdings and investment allocations. The parameters are $\theta_1 = 0.52,\ \theta_2 = 0.48,\ \omega_1 = 3.235,\ \omega_2 = 1.735,\ \gamma_1 = 1.0135,\ \gamma_2 = 1.0125,$ $\mu_1 = 0.30,\ \mu_2 = 0.30,\ \sigma_1 = 0.25,\ \sigma_2 = 0.25,\ c_{11} = 0.0126,\ c_{12} = 0.0125.$

As deadweight costs that foreign investors incur in the domestic firm (c_{21}) increase, foreign investors decrease the fraction of their shareholdings in the domestic firm. Consequently, domestic investors increase the shares they hold in the domestic firm. Foreign investors increase their fraction of shareholdings in the home equity market and increase the supply funds to the bond market. That is, foreign investors are lenders ($b^1 > 0$) and domestic investors are borrowers ($b^2 < 0$). For some parameter values we observe that investors' allocation of funds exhibit home equity bias. That is, investors invest more of their funds in the home equity market than is implied by the benefits of diversification in the equity markets.

Effect of deadweight costs on asset prices

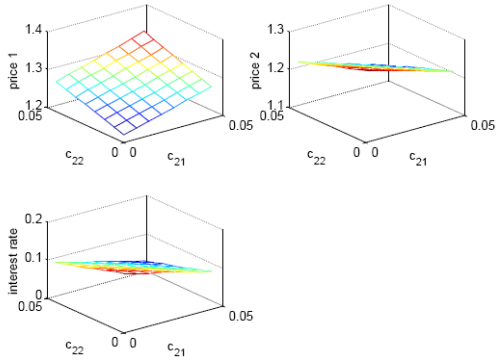

Figure 2: surfaces for asset prices. The parameters are $\theta_1 = 0.52,\ \theta_2 = 0.48,$ $\omega_1 = 3.235,\ \omega_2 = 1.735,\ \gamma_1 = 1.0135,\ \gamma_2 = 1.0125,\ \mu_1 = 0.30,\ \mu_2 = 0.30,$ $\sigma_1 = 0.25,\ \sigma_2 = 0.25,\ c_{11} = 0.0126,\ c_{12} = 0.0125.$

As deadweight costs that foreign investors incur in the domestic firm (c_{21}) increase, investors put less value on shares of the domestic firm. This is because deadweight costs make acquiring shares of the domestic firm costly. As deadweight

costs in the domestic firm increase, the share price of firm 2 decreases. Because the deadweight costs of firms 1 are held constant, investors may put more value on the shares of foreign firm. Consequently, the share price for firm 1 goes up due to increased demand for the shares of this firm. Interest rates fall because foreign investors increase the supply of funds ($b^1 > 0$) to the bond market.

Effect of variance on allocation of investment funds

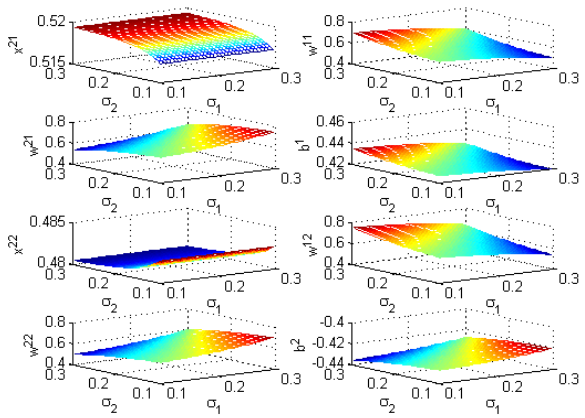

Figure 3: surfaces for shareholdings for firms 2. The parameters are $\theta_1 = 0.52,\ \theta_2 = 0.48,$
$\omega_1 = 3.235,\ \omega_2 = 1.725,\ \gamma_1 = 1.0135,\ \gamma_2 = 1.0125,\ \mu_1 = 0.30,\ \mu_2 = 0.30,$
$c_{11} = 0.0125,\ c_{12} = 0.0126,\ c_{21} = 0.0126,\ c_{22} = 0.0125.$

As the variance of returns of firm 2 (σ_2) increases, domestic investors decrease their fraction of shares of firm 2. Consequently, they decrease the funds they invest in domestic firm and increase the funds they invest in the foreign firm. They borrow in the bond market ($b^2 < 0$) to facilitate the purchase of shares of firm 1. On other hand, foreign investors increase their fraction of shares of firm 2. Thus they increase the funds they invest in the domestic firm and increase the supply of funds to the bond market. We have similar reasoning if we vary the variance of returns for firm 1.

Effect of variance on asset prices

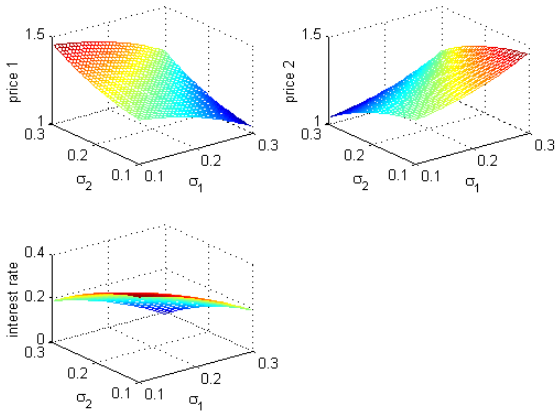

Figure 4: surfaces for asset prices. The parameters are $\theta_1 = 0.52,\ \theta_2 = 0.48,$
$\omega_1 = 3.235,\ \omega_2 = 1.725,\ \gamma_1 = 1.0125,\ \gamma_2 = 1.0126,\ \mu_1 = 0.30,\ \mu_2 = 0.30,$
$c_{11} = 0.0125,\ c_{12} = 0.0126,\ c_{21} = 0.0126,\ c_{22} = 0.0125.$

As the variance of returns of firm 2 (σ_2) increases, domestic investors decrease their shareholdings in firm 2. The share price for firm 2 falls because of decreased demand. The shares of firm 1 are relatively attractive. Thus the share price of firm 1 increases due to increased demand. The interest rate falls because foreign investors increase the supply funds to the bond market. Similar reasoning applies to the case when we vary the variance of returns of firm 1.

Effect of risk aversion on allocation of investment funds

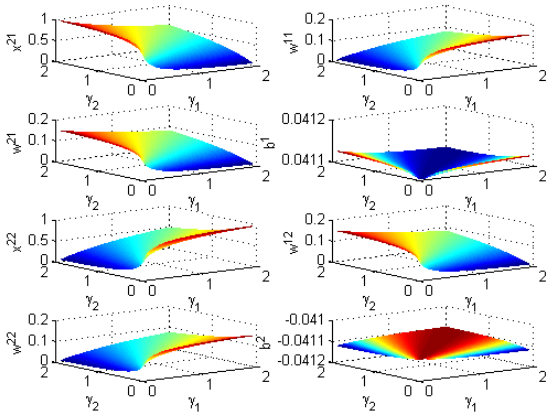

Figure 5: surfaces for shares of firm 2 and allocation of investment funds. The parameters are $\theta_1 = 0.52,\ \theta_2 = 0.48,\ \omega_1 = 0.375,\ \omega_2 = 0.235,\ \mu_1 = 0.30,\ \mu_2 = 0.30,$ $\sigma_1 = 0.25,\ \sigma_2 = 0.25,\ c_{11} = 0.0125,\ c_{12} = 0.0126,\ c_{21} = 0.0126,\ c_{22} = 0.0125.$

As the risk aversion of domestic investors (γ_2) increases, domestic investors decrease the fraction of their shareholdings in the domestic firm. Consequently, they decrease the fraction of their funds allocated to the domestic firm. Foreign investors increase their fraction of shareholdings in the domestic firm. Consequently, they increase the fraction of their funds allocated to the domestic firm. Similar reasoning applies to the case where we vary risk aversion of foreign investors.

Effect of risk aversion on asset prices

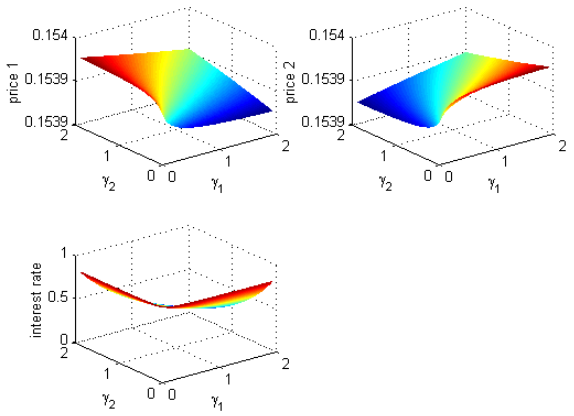

Figure 6: surfaces for asset prices. The parameters are $\theta_1 = 0.52,\ \theta_2 = 0.48,$ $\omega_1 = 0.375,\ \omega_2 = 0.235,\ \mu_1 = 0.30,\ \mu_2 = 0.30,\ \sigma_1 = 0.25,\ \sigma_2 = 0.25,$ $c_{11} = 0.0125,\ c_{12} = 0.0126,\ c_{21} = 0.0126,\ c_{22} = 0.0125.$

As the risk aversion of domestic investors (γ_2) increases, domestic investors decrease the fraction of their shareholdings in the domestic firm. The decrease in demand causes the share price of firm 2 to fall. The increase demand for shares of firm 1 causes the share price of firm 1 to rise. Consequently, they decrease the fraction of their funds allocated to the domestic firm. Foreign investors increase their fraction of shareholdings in the domestic firm. Consequently, they increase the fraction of their funds allocated to the domestic firm. Interest rates may fall due to supply of funds to the bond market. Similar reasoning applies to the case where we vary risk aversion of foreign investors.

DO FAMILY FIRMS PERFORM BETTER: A BELGIAN SURVEY

Christiane Bughin*, Olivier Colot**, Karin Comblé***

Abstract

A large conceptual economic literature presents assumptions that family owned and controlled firms perform better than others, essentially on the basis of agency theory, ownership structure, cultural specificities and particular management practices. Large empirical evidence has been supplied by various studies, even if there are still contradictory debates. This paper uses the paired samples methodology to compare operational, economic and financial profitabilities of Belgian family firms. Evidence is given that they perform better, and this significantly for economic profitability. Discussion is engaged about the contribution of family values and practices to their results.

Keywords: agency theory, Belgian family firms, ownership structure

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Introduction

The family firms play a considerable part in the economy of most countries and represent between 50 and 90% of gross domestic product of all the market economies (KENYON-ROUVINIEZ and WARD, 2004).

It is the most common type of firm in the private sector (LA PORTA et al., 1999; IFERA, 2003; MORCK and YEUNG, 2003). However, the family firm is not clearly defined. There are many different definitions of this concept, often including qualitative elements. Choosing among the possible criteria is arbitrary but the literature generally focuses on three principal characteristics: a family owns a major part of shares, the family actually takes part into daily management, the wish to transmit the firm to a following generation does exist. According to the economic literature, family firms defined as such seem to produce better performances than non-family firms, because of their own characteristics.

First of all, this article gives a summary of the former empirical studies confirming this assumption. Then, we present three major theoretical thrusts which make it possible to explain differences in performance between family and non-family firms: the agency theory, the structure of property, as well as the cultural identities and managerial characteristics of family businesses. In addition, the existence of inhibitors of performance within the family firms is also considered. Finally, this study tries to give empirical evidence of this main assumption detected within literature that family firms generally present better performances. Applied to a sample of Belgian firms, the methodology of statistical paired data allows to compare operational, economic and financial profitability of Belgian family firms to those of their non-family counterparts.

1. Higher performance of family firms

In the Sixties, MONSEN et al. (1968) compared the performance of family entities with those of firms under managerial control. The obtained results show that the investments profitability is 75% higher in the family firms. MONSEN (1969) confirms this result by showing that the family firms are characterized by more profitable investments, a more effective resources allocation and a capital structure closely controlled. In the same way, MOURGUES (1987) concludes with an economic performance significantly higher for the firms held by their managers, and this, on the basis of accounting data. CHARREAUX (1991) also shows that the property structure of the family firms significantly influences their economic performance (Tobin's Q) even if the relationship with the equity's profitability is not significantly established.

The DAILY and DOLLINGER's paper (1992) also highlighted a better performance of the family firms in regard to sales growth rates and evolution of gross and net profit margins. Thereafter, ALLOUCHE and AMANN (1995) studied the differences in economic, financial and social performances between family and non-family firms. This study, based on two paired samples, showed that the average profitability of the family firms is higher than those of the other firms, as well in terms of shareholder's satisfaction as for other aspects of profitability. Let us also quote GALLO and VILASECA (1996) who concluded with a higher financial performance level of the Spanish family firms. GANDERRIO (1999) concludes in the same way for the Swedish family firms, even if he also showed that for several financial criteria, differences were not significant. COLEMAN and CARSKY (1999) as well as JORISSEN et al. (2002), showed that the family firms present higher returns on assets and returns on equity than the non-family firms. ANDERSON and REEB (2003) concluded that the American family firms are significantly more profitable (in terms of ROA) than the non-family firms, which in addition present a smaller market value (Tobin's Q). The profitability of the family firms is furthermore presented as reinforced by the inclusion of family members in the Board of directors. MAURY (2005) also gives similar evidence on the basis of an empirical research about family firms established in Western Europe. It is thus evident that many studies relating to the performance of family firms agree to recognize that they generate higher financial results (in terms of market value, accounting profitability, growth, etc.), and this, whatever the definitions selected to identify the familial character of a firm.

2. Explanatory factors

How could we explain those results? This research field is at the present time marked by the absence of an unifying theory, even by the multiplication of contradictory theories (ALLOUCHE and AMANN, 2000; CHUA et al., 2003). However, three major theoretical thrusts seem to be useful: the agency theory, the property's structure and specific cultural aspects of the family firms.

2.1. Agency theory and family firm

Let us remind that the agency theory evolves from the separation between ownership and control (JENSEN and MECKLING, 1976; FAMA, 1980; FAMA and JENSEN, 1983a and b): shareholders have little control over the managers' actions and decisions, whereas managers have divergent interests (CHARREAUX, 1997). As a reaction, shareholders try to protect their investments by setting up various controlling and monitoring mechanisms drawing agency costs.

However, family firms precisely differ from the others in the fact that owners and managers are often the same people or are members of a same family: they thus present convergent objectives and interests in general. The agency costs are consequently minimized or even nil (SCHULZE et al., 2001; MARKIN, 2004; MAURY, 2005). This "natural" advantage of family firms is thus used to explain the origin of their competitive advantage (DAILY and DOLLINGER, 1992) and of their higher financial results (GELINIER, 1996).

2.2. Family firm ownership structure

A large number of papers tested the assumption that ownership structure influences firm's performance (DEMSETZ and LEHN, 1985; MORCK et al., 1988; HOLDERNESS and SHEEHAN, 1988; HILL and SNELL, 1989; CHARREAUX, 1991; ALLOUCHE and AMANN, 1995), but their results diverge. However the majority of them observed higher performances for firms managed by their owners, even if the difference seldom is statistically significant. Nevertheless, CHARREAUX (1991) shows that the presence of external administrators has a positive and significant influence over performance. However, this relation does not seem to be significant for family firms. The author moreover suggests three concepts.

2.2.1. Convergence of interests thesis

This thesis is supported by BERLE and MEANS (1932) as well as by JENSEN and MECKLING (1976): the higher the part of equity held by manager is, the less conflicts are important, the weaker the difference with the objective of firm value maximization is and thus the larger the performance is. BARNHART and ROSENSTEIN (1998) like BHAGAT et al. (1999) effectively showed a positive relation between the part of equity held by managers and performance of the firm. Thereafter, GORTON and SCHMID (2000) confirmed that the more the concentration of capital increases, the more the value of German firms improves. CHEN (2001) validated these results for China.

2.2.2. Neutrality thesis

According to this, all ownership structures are equivalent. Indeed, separation between property and decision presents the advantage of less important private expenses by managers. Consequently, one cannot conclude with a better performance for firms with concentrated capital compared to firms with widely split capital, as empirically validated by DEMSETZ and LEHN (1985), HOLDERNESS and

SHEEHAN (1988), as well as by DEMSETZ and VILLALONGA (2001).

2.2.3. Entrenched management thesis

Managers who are also main shareholders escape from any control. This can induce a misleading management, in contradiction with the classical objective of market value maximisation. Thus, MORCK et al. (1988) just like HAN and SUK (1998) showed that, according to the percentage of capital held by managers, one can conclude either with the convergence of interests, either with the disadvantages of an entrenched management.

Other studies in addition reveal a positive relation between equity's performance and the relative part of external directors within the board (ROSENSTEIN and WYATT, 1990; PEARCE and ZAHRA, 1992). In short, many papers are based on the starting assumption that firm under non-family control is pursuing the managers own interests and is thus globally less efficient than family controlled firms. A large part of the economic literature dealing with the relation between ownership structure and performance mainly gives empirical evidence consistent with the theory of convergent interests, sometimes with that of neutrality. But the thesis of an effect due to entrenchment of managers is seldom validated. Beyond agency theory and various considerations related to ownership structure, cultural identity and specific practices of "owner-manager" can be mentionned to support the higher performance of family firms.

2.3. Social, cultural, and managerial specific aspects of family business

According to several authors, the success of family firms, whatever their size is, would be primarily due to their social and cultural characteristics and specific management practices of owner-manager. Relevant theoretical developments concern social capital theory, concept of confidence, cultural aspects and human resources management practices encountered within family firms.

2.3.1. Social capital theory (based on RBV approach)

For BARON and MARKMAN (2000), social capital is made of resources acquired by individuals meeting and getting knowledge from other individuals, either while belonging to their social network, or while being recognized and being appreciated by them. According to ARREGLE et al. (2004), this theory could explain the existence of special resources and competitive advantages in favour of family firms (willing members of family, better access to information, etc.). This could be called the "familiness", resulting from the positive embedding of two different kinds of social capital in family firm: on the one hand, interactions between members of family, and on the other hand, relations between suppliers, customers and workers (ARREGLE et al., 2004; HABBERSHON and WILLIAMS, 1999). However, it should be noted that family is also sensitive to economic logic. The familial asset can be a source of tied links as well as a source of division. It is thus necessary that family imposes codes of conduct to maintain cohesion: "the family impregnates her members of a collective knowledge which represents the whole of the statutory values and the standards of behaviour carried by the family group" (ARREGLE et al., 2004). Thus, employees of the firm also members of the family should act according to received education.

2.3.2. Confidence

According to several authors (CHAMI, 1997; ALLOUCHE and AMANN, 1998), the concept of confidence could provide an explanation for higher performance of family firms. It would be based on the naturally long term schedule of the relations between members of family, without any risk of conflict between the principal and the agent. ALLOUCHE and AMANN (1998) in addition proposed three degrees of confidence within family firms: confidence between managers (or personal trust): it evolves from family institutional logic. Managers, members of family or not, do agree with the logic of the family firm, multiplying and exchanging the responsibilities between people, conveying a common history, a shared identity, an emotional implication, a symbolic image of the family system, etc.; intra confidence: i.e. between managers and workers of the firm; inter confidence: i.e. between the firm and its environment.

2.3.3. Inherent values of family

It is also commonly accepted that one of the major differences between family firms and others consists of a particular atmosphere creating a community spirit (GANDERRIO, 1999). MORCK et al. (1988) suggested that founder brings the innovation and expertise able to increase value of the firm.

ANDERSON et al. (2003) showed that presence of a family in a firm has a positive influence on its reputation. In addition, according to CASSON (1999) and CHAMI (1997), founder regards his firm as an asset to be transferred to his descendants rather than like a short term revenue source. Many elements can also favourably influence the performance of family firm: quality of relations between members of an united family, culture more clearly defined, better shared and of better quality information, presence of a long-term

prospect. This is the result of optimal investment decisions and of more efficient use of assets, which increase in addition the confidence of suppliers and financial partners (ANDERSON and REEB, 2003; MARKIN, 2004). The consequence can be a lower cost of capital.

2.3.4. Human resources management

McCONAUGHY (1999) showed that managers, members of family, receive lower average wages than managers of non-family firms. The analysis of SRAER and THESMAR (2004) attests that operational performance of family firms exceeds those of firms with dispersed shareholding, and explains this difference with the levels of wages and a weaker sensibility to economic activity. Either family firms allow, on average, weaker wages to workers (MARKIN, 2004), either less qualified workers are recruited and then trained so that they reach a similar productivity level than higher qualified employees.

3. Debates

Some papers related to performance of family firms do not conclude with the superiority of family firms. The analysis conducted by WESTHEAD and COWLING (1998) as well as by WESTHEAD et al. (1997) did not highlight significant differences on a range of economic performance measurements. MARKIN (2004) like KLEIN et al. (2004) also show that the familial character of Canadian firms do not significantly influence their value (measured by Tobin's Q) or their profitability (ROA). Family firms thus seem to present characteristics neutralizing the elements contributing to their performance. These inhibitors of performance can be related to problems of altruism, of entrenchment or to certain familial values.

3.1. Family agency problems and altruism

Agency theory presents some limits in its application to family firms. Indeed, the assumptions of efficient capital and labour markets could be questioned in the case of family firms. Actually, their financing modalities or contract terms are not always in accordance with commonly agreed management practices (GOMEZ-MEJIA et al., 2001; ARREGLE et al., 2004).

Thus, it is not because managers and owners are the same people or are members of the close family that firm avoids all agency costs.

First of all, certain studies show that members of family are sometimes motivated only by their own interest and not by the family interests (MORCK et al., 1988; MORCK & YEUNG, 2003). Phenomena of nepotism and opportunism are likely to emerge: the manager's behaviour is then in favour of his own utility function, without respect for the firm's wellness or the interest of the minority shareholders (MARKIN, 2004). ANDERSON and REEB (2003) as MAURY (2005) give empirical evidence that family concentrated ownership initially improves the value of the firm, but that this one decreases starting from a certain level of family property (approximately 30%).

Then, without control, manager could be tempted to satisfy all the needs and desires of his family without consideration to a long term going concern. In addition, owner-manager could recruit members of family at positions they are not qualified for, installing so barriers for the entry of external managers however able to induce economic or technological positive changes.

Family firm may thus face a problem of altruism, defined as an utility function in which the wellness of the individuals is positively correlated with those of the others, inducing harmful consequences for the firm (SCHULZE et al., 2003). Consequently, the costs due to the altruism can be considered as an alternative to agency costs encountered in a managerial firm.

3.2. Entrenchment problems

In family firms, manager (founder) is often characterized by a strong personality and invests himself on a purely personal basis in his firm. Manager thus entrenched at the end of the career: he can use his powerful position for his own interest, for example by increasing his wages and/or his other advantages. GOMEZ-MEJIA et al. (2001) showed that the costs caused by this phenomenon of entrenchment can be more negative for family firms than for non-family ones. GALLO and VILASECA (1998) noted similar results: when manager is able to influence the future strategy of the firm, the fact that this one is not member of family makes it possible to ensure a higher performance. Moreover, according to AMAN (2003), control is definitely more difficult in a family firm because the nature of family relations is likely to skew the family perceptions of manager's competences.

3.3. Negative influence of family firm values

Cultural identity of family firms and their management practices also include aspects likely to harm their performance, such as resistance to change and a slower internationalization (GANDERRIO, 1999). In addition, whereas a family focused on the objective of firm value maximization can improve its performances, at the contrary, a divided family risks to harm the value of the firm (McCONAUGHY, 1999; MARKIN, 2004). Moreover, owners of family firms are likely to do

strategic choices and investments which minimize the risk, and thus the profitability of the firm (ANDERSON and REEB, 2003). Lastly, the network of family relations presents some disadvantages: limitation at the entrance of the social network, requests for excessive assistance between members of the group, limitation of the personal freedom, standards to be respected which slow down the members progress (ARREGLE et al., 2004). In conclusion and in spite of the debates that we have just presented, as well conceptual arguments as empirical validations that the literature provides relating to the performance of family firms, mainly seem to support the assumption of their superiority.

4. Methodological choices

The major objective of our paper is to find empirical evidence supporting the assumption of the superiority of the family business on the Belgian market. It should be noted that the case of Belgium remains marginal in terms of studies carried out. The Belgian market proposes financial information for almost all firms, collected, compiled and published by the Belgian central bank. Unfortunately, there is no information about the family character of ownership. This is the reason why we proceeded with an inquiry to collect necessary information to attest this characteristic.

4.1. A population of SME's

In order to reach a large number of family firms, the inquiry concerned Belgian SME's, which are proved to be very often of family nature (WTTERWULGHE et al., 1994; VAN GILS et al., 2004). Moreover, willing to identify firms managed by the owner(s), the choice of SME's asserted itself.

We chose our sample among Belgian SME's created before December 31, 1990 so that the family character or not is quite impregnated in the firm. In addition, SME's occupying less than two workers were excluded. A random sample of 2.000 firms has been extracted of our 8.917 firms, and were addressed a written questionnaire.

4.2. The sample

Our usebal sample finally included 391 answered questionnaires, presenting a statistical representativeness on the Belgian SME's population based on three criteria: geographical dispersion, the branch of industry and the size (based on the number of workers).

4.3. Criteria for familial character

We considered that the firm is a family business when it satisfies at least two of the three following criteria: a family holds at least 50 % of capital; a family has a decisive influence on firm strategy and succession (the majority of managers belong to the family); the majority of the board of directors is made up of members of a family. This definition of family SME presents the advantage to use clear and measurable criteria, in opposition to qualitative definitions which are more subjective and arbitrary.

Moreover, this definition of the family firm is in accordance with most recent studies (FLOREN 2002; ANDERSON and REEB, 2003). We thus observed that among the 391 firms of our sample, 318 can be regarded as family ones (table 1).

Table 1. Family and non-family SME's (significant at 1%)

Total SME's	*Family SME's*		*Non-family SME's*	
391	318	81,33 %	73	18,67 %

The result (81,33 % of family SME's) illustrates a large majority of family firms and is consistent with former papers related to the importance of family SME's in Belgium (WTTERWULGHE et al., 1994; JORISSEN et al., 2002). This percentage is in addition very close to the results obtained by ASTRACHAN and KOLENKO (1994) for the United States (90 %), by REIDEL (1994) for Germany (80 %), and by CROUZET (1995) who shows that the percentage of family SME's in the European Union varies from 75 % to 99 % according to countries.

4.4. Accounting measurements of performance

As the analysed firms are not listed, accounting measurements of performance are used. Moreover, as previously said, several former studies are also based on such data. More precisely, the ratios used to evaluate and compare financial performance of family and non-family firms, are the following : gross and net profit margins [operational income before non cash expenses/sales] , [operational income /sales]; the global sales return [net income/sales]; the added value by worker; ROA, before or after non cash expenses; ROE, before or after non cash expenses. Those relatively traditional indicators of profitability made it possible to carry out a multidimensional analysis of performance of the considered firms (family or non-family) through several years (2000 to 2003) in order to be able to assert the stability of the results.

4.5. Statistical paired data

The technique of the statistical paired samples was privileged to compare family SME's with SME's as similar as possible except they have no familial character. This procedure allows isolating the

demographic data (localization, size, age, sector, etc). Indeed, according to JORISSEN et al. (2002), comparative studies of family and non-family firms are generally ignoring this type of variables which can however skew the results highlighting differences of management practices or performance between these two types of firms. In the same way, for WESTHEAD and COWLING (1998), studies which do not control these variables do not make it possible to identify variations related to family character of firms but rather related to dissimilarities due to demographic data of the sample. To build the paired samples, it is necessary to choose criteria considered to be relevant, so as to make sure that the measured effect is due to studied variables and not to differences in composition of samples (THIETART, 1999, p. 198). Other empirical studies using this method (CABY, 1994; SAPUSEK, 1998; HELDENBERG, 1999) indicate indeed that various accounting measurements of performance are sensitive to the sectoral membership and the size of the firm considered (OOGHE and VAN WYMEERSCH, 1990, p. 395). With regard to the choice of the criterion of size, the total asset was privileged (it is also one of the three references to the size of firms according to the Belgian accounting law, with manpower and sales turnover). Thus, firms of the control sample, compound of non-family entities, were selected on the basis of following parameters the branch of industry; the size: total assets +/- 20 %.

4.6. Test used

The two samples were compared thanks to a statistical test which compares paired observations and identifies significant results. For each ratio, we systematically withdrawed the value of the control firm from the corresponding value for the family firm. The test of comparison is in fact practised on the average of the differences between paired values: the assumption to be tested is that these differences are null while the alternative assumption affirms the existence of differences. In our case, the rejection of the null assumption would make it possible to conclude that the famuly firms show, on an average basis, higher levels of performance than those of the control group. This method does not suppose the normality of the distributions (AFNOR, 1988, p. 366), what is particularly interesting insofar as many ratios are not normally distributed (OOGHE and VAN WYMEERSCH, 1990, p. 392).

5.1. Observations on the sample

Examination of average differences calculated for operational and commercial performance of the year 2003 shows that their sign is positive in all cases, what implies that family firms of the sample are on average more successful than non-family firms with which they are paired. In addition, this observation is maintained in time (years 2002, 2001 and 2000), except for the added value, indicator for which the sign is negative for the years 2002 and 2001. On the other hand, margins present, on average, a long term higher profile for family firms of the sample (the only negative average was observed for the year 2002 in the case of gross margin). In the same way, global sales return of family firms is higher for each year considered, except for one (2001). As for economic profitability of family firms of the sample, it appears also higher than those of non-family firms insofar as the average of differences calculated for the ROA, before and after non cash expenses, is positive in both cases. The stability of this observation does not seem particularly fragile since the sign of this difference for each of these indicators is negative for only one year.

Finally, the superiority of financial performance of family firms is also confirmed on the sample for the year 2003 since the ROE, with our without non cash expenses, presents a positive average difference. Again, this observation is generally stable in time since the average of differences calculated for this ratio is negative only for the year 2001 concerning the net ROE, and only for year 2000 for the gross ROE. Moreover, it can be specified that superiority of family firms in terms of financial profitability can be partially explained by their higher debt degree. Indeed, a higher debt ratio underlies less important equity and a higher leverage in the family firms, which, "ceteris paribus", leads mechanically to higher financial returns. It is also to notice that, as these observations on the sample have been established on both gross and net indicators of profitability, they make it possible to specify that depreciation policies of family firms do not seem basically different from those of non-family firms. On a general basis, we can thus conclude that family firms from the sample are more successful than non-family control firms, and this at operational, economic and financial levels. This is consistent with a broad literature, as well conceptual as empirical, supporting the superiority of family firms.

Thus, in terms of agency theory and of ownership structure, observations on the sample make it possible to confirm the thesis of interests convergence.

Table 2. Observations on the sample and results of the test of comparison [1]

	Differences between paired firms					T	df	Sig. (2-tailed)
	Mean	Standard deviation	Sandard mean error	Confidence interval 95% of difference				
				Lower	Upper			
Gross profit margin n	2,26714	11,56532	3,09096	-4,41047	8,94476	,733	13	,476
Gross profit margin n-1	-,50000	14,21613	3,55403	-8,07524	7,07524	-,141	15	,890
Gross profit margin n-2	4,18688	11,70126	2,92531	-2,04829	10,42204	1,431	15	,173
Gross profit margin n-3	3,11438	8,77218	2,19305	-1,55999	7,78874	1,420	15	,176
Net profit margin n	2,31438	11,82645	2,95661	-3,98749	8,61624	,783	15	,446
Net profit margin n-1	,99389	14,60280	3,44191	-6,26791	8,25569	,289	17	,776
Net profit margin n-2	3,82235	11,38981	2,76243	-2,03375	9,67845	1,384	16	,185
Net profit margin n-3	1,34176	8,74141	2,12010	-3,15265	5,83618	,633	16	,536
Added value n	3,296	20,402	2,776	-2,272	8,865	1,187	53	,240
Added value n-1	-1,544	25,233	3,342	-8,239	5,151	-,462	56	,646
Added value n-2	-2,724	23,628	3,102	-8,937	3,488	-,878	57	,384
Added value n-3	1,667	23,423	3,102	-4,548	7,882	,537	56	,593
Return n	1,38400	9,41316	2,43047	-3,82884	6,59684	,569	14	,578
Return n-1	2,53500	9,03033	2,25758	-2,27692	7,34692	1,123	15	,279
Return n-2	-,18214	6,10491	1,63161	-3,70701	3,34273	-,112	13	,913
Return n-3	,00250	4,27962	1,06990	-2,27795	2,28295	,002	15	,998
Gross ROA n	3,48538	15,48792	1,92104	-,35233	7,32310	1,814	64	,074
Gross ROA n-1	-,20185	16,98362	2,10656	-4,41018	4,00649	-,096	64	,924
Gross ROA n-2	1,56955	13,85164	1,70502	-1,83561	4,97470	,921	65	,361
Gross ROA n-3	,75394	13,97490	1,72019	-2,68152	4,18940	,438	65	,663
Net ROA n	2,96831	13,94734	1,72995	-,48767	6,42429	1,716	64	,091
Net ROA n-1	,03348	15,02731	1,84973	-3,66069	3,72766	,018	65	,986
Net ROA n-2	,65652	13,54324	1,66706	-2,67283	3,98586	,394	65	,695
Net ROA n-3	-,40061	12,34483	1,51954	-3,43534	2,63413	-,264	65	,793
Net ROE n	6,26291	53,08040	7,15736	-8,08673	20,61255	,875	54	,385
Net ROE n-1	1,45815	31,83317	4,33195	-7,23063	10,14693	,337	53	,738
Net ROE n-2	-,18702	26,38924	3,49534	-7,18902	6,81499	-,054	56	,958
Net ROE n-3	,94466	32,40236	4,25464	-7,57511	9,46442	,222	57	,825
Gross ROE n	12,01655	64,14703	8,64958	-5,32483	29,35792	1,389	54	,170
Gross ROE n-1	3,02340	44,82252	6,15685	-9,33122	15,37801	,491	52	,625
Gross ROE n-2	1,45411	42,23456	5,64383	-9,85638	12,76460	,258	55	,798
Gross ROE n-3	-2,2573	73,9489	9,6273	-21,5285	17,0139	-,234	58	,815
Global debt ratio n	,61155	27,05873	3,55299	-6,50318	7,72628	,172	57	,864
Global debt ratio n-1	-,74719	27,86191	3,69040	-8,13995	6,64557	-,202	56	,840
Global debt ratio n-2	4,14018	22,23570	2,94519	-1,75975	10,04010	1,406	56	,165
Global debt ratio n-3	4,91276	21,42765	2,81359	-,72136	10,54687	1,746	57	,086

[1] In this table, mean is the mean difference, for each ratio, between family and control firms; n is 2003.

5.2. Results of the comparison test

The significance of observed results on the sample is not acquired, except for ROA (gross and net) for the year 2003 (at the 10% level). Only economic performance of the activity of family firms thus seems to be significantly higher than those of non-family firms. This confirms that a certain number of inherent values to the family (quality of the relations between members of a united family, stronger defined culture, better shared information, better quality of information, presence of a long-term prospect) can lead to profitable management practices, especially by the means of optimal investment decisions and of a more efficient use of assets (ANDERSON and REEB, 2003; MARKIN, 2004). Nevertheless, this study significantly does not attest the superiority of the productivity and of the operational performance of family firms. We thus cannot give evidence of a lower cost of wages (MARKIN, 2004). However this could be the proof of deviances related to altruism of family managers recruiting members of the family at operational positions they are not qualified for.

Lastly, absence of significant results concerning the financial return (ROE) do not allow us to conclude with the existence of practices evolving personal enrichment for owners-managers, or with specific leverage due to a higher debt degree of family firms.

Conclusions and development tracks

In general, our results enable us to confirm, for our sample, that Belgian family SME's are more successful than their non-family counterparts. Studied indicators of operational, economic and financial profitability present indeed, on average, positive differences between the two groups of firms.

Nevertheless, results' significance could not be established, except for economic profitability (ROA), which indicates a particular aptitude of family firms to optimize the profitability of their assets thanks to specific family values and management practices (division of information, quality of relations, long-term prospect, etc).

In addition, this study also made it possible to highlight the higher debt level of family firms. This is consistent with the existence of a close and confident relation between financial partners and family firms, based on their long-term vision, their optimal investment decision and their more efficient use of the assets, what is corroborated by our results through a significantly higher economic profitability.

To conclude, certain tracks for future research can be advanced. It would be indeed useful to further analyse those data under a specific topic for family firms: succession problems.

The way this succession can be organised (donation, sale, management buy out, etc.) can indeed influence the levels of performance of transmitted family firms. Moreover, it would be interesting to study further the question of the influence of family ownership level on performances, insofar as former work already showed that, according to the percentage of the capital held by managers, one can conclude with convergence of interests (positive effect on performance) or with entrenchment (negative influence).

Lastly, the link between performance of family firms and their social, cultural and managerial specificities should also be better identified.

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ARE CONVERTIBLE BOND CALLS HARBINGERS OF BAD NEWS?

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Abstract

Two decades after Harris and Raviv's (1985) article, a definitive answer to the question of whether convertible bond calls signal bad news remains elusive. Our study overcomes the limitations of previous studies by examining the operating performance of calling firms. We find strong evidence that firms calling their convertible bonds experience a significant decline in operating performance over the three years subsequent to the announcement of the call. This result is independent of mean reversion and other factors that affect operating performance. Our findings provide a resolution to the current puzzle associated with the information content of convertible bond calls.

Keywords: convertible bond calls; Information content of convertible calls; Long-run post-call underperformance

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Introduction

While the information content of different types of securities issuance has been the focus of much research, a definitive answer to the question of whether convertible bond calls signal bad news remains elusive. Almost two decades since Harris and Raviv's (1985) article and several studies in the interim, there is mixed evidence on the signaling implications of conversion-forcing bond calls. Consistent with Harris and Raviv's prediction, a significant adverse stock price response to call announcements is well established in the literature (see e.g. Mikkelson (1981), Ofer and Natarajan (1987), and Datta and Iskandar-Datta (1996)). Other studies provide mixed evidence on Harris and Raviv's proposition, using different approaches such as the examination of post-call stock price performance and analysts' earnings forecast revisions following the call. By documenting a stock price reversal over a short period following the call, Mazzeo and Moore (1992), Byrd and Moore (1996), and Ederington and Goh (2001) conclude that convertible calls do not convey a negative signal. Puzzled by the post-call price recovery, Byrd and Moore (1996) contend that the adverse market reaction to the call announcement may be due to some short-term phenomenon, such as liquidity demand. The conclusions drawn in these studies are intriguing because they not only challenge the theoretical predictions of Harris and Raviv but also question the underlying notion of market efficiency. Datta, Iskandar-Datta, and Raman (2003) use a longer post-call time horizon and document a significant stock price underperformance following the call and conclude that convertible bond calls convey bad news.

A critical drawback of using post-call stock price performance to test the information content of convertible bond calls, whether one month following the call or a longer post-call horizon, is that it entails a joint test of market efficiency and the underlying model assumed to measure expected returns (See Fama (1998) for an elaborate discussion of the bad model problem).[1] While, these previous studies claim to test Harris and Raviv's signaling model, any post-call stock price performance is really not a prediction of the model. Therefore, any long-horizon post-call price drift that is in the same direction as the announcement effect does not further confirm the prediction of the signaling model, just as any short-horizon post-announcement stock price reversal does not refute the prediction of the signaling model. One way to unambiguously test the information content of

[1] Mazzeo and Moore (1992), Byrd and Moore (1996), and Ederington and Goh (2001) draw their conclusions based on a one month horizon following the call, while, Datta, Iskandar-Datta, and Raman (2003) and Ofer and Natarajan (1987)) examine a longer (five-year) post-call horizon.

convertible bond calls is to examine the post-call operating performance of the calling firms.

The information content of forced conversions has also been examined using analysts' earnings forecast revisions following the convertible call (see Byrd and Moore (1996) and Ederington and Goh (2001)). However, it is well documented that analysts tend to be overoptimistic. Rajan and Servaes (1997) examine a sample of IPOs and conclude that, "firms perform poorly in the long run when analysts are more optimistic about their long run growth projections." La Porta (1996) documents an inverse relation between analysts' predicted growth rates and future stock price performance. A similar pattern is reported by Lewis, Rogalski, and Seward (2001) for convertible debt offerings. Thus, the conclusion based on analysts' forecast revisions is also unreliable. We propose that a more powerful test of the information content of convertible bond calls that is free of the bad-model problem and the well-established bias associated with analysts' forecasts, is to examine the operating performance surrounding the call.

Our methodology overcomes the limitations of previous studies that examine the post-call firm performance to infer information content of conversion-forcing bond calls. Specifically, we follow Barber and Lyon (1996) and choose control firms matched by size, industry, and pre-call operating performance to measure abnormal performance around the call announcement. For completeness, we also analyze post-call stock price performance using the cumulative abnormal returns methodology suggested by Fama (1998) in combination with the control firm approach recommended by Lyon, Barber and Tsai (1999). These methodological improvements enable us to unambiguously determine the information content of conversion forcing bond calls.

Campbell, Ederington, and Vankudre (1991) examine earnings growth rates of calling firms around conversion-forcing calls. Using the industry median as their benchmark they show (in their Table V) that the calling firms significantly outperform their industry benchmark in each of the five years preceding the call as well as the call year. In the post-call period the authors show that the performance of calling firms reverts to the industry levels. Based on this evidence, Campbell et. al. conclude that calls indicate the end of a high growth period and are not harbingers of poor subsequent performance. However, Barber and Lyon (1996) point out that the tendency for mean reversion can lead researchers to draw incorrect inferences about abnormal operating performance. They find that test statistics are misspecified when sample firms exhibit unusual performance prior to the event. In the case of convertible calls, the strong pre-call operating performance is well documented (see Ofer and Natarajan (1987) and Campbell et. al. (1991)). An appropriate methodology should therefore control for the strong pre-call performance.

Campbell, Ederington, and Vankudre (1991) improve on Ofer and Natarajan's (1987) methodology by using industry median performance to control for the pre-call superior performance of calling firms.

However, using only the industry median as the benchmark is subject to potentially serious limitations. First, given that calling firms outperform their respective industries (see e.g. Campbell, et. al.'s Table V), using the industry median as the benchmark does not alleviate the problem arising from mean reversion in the operating performance of calling firms. Second, Fama and French (1995) show that not only does operating performance vary by firm size, but the tendency for mean reversion is greater for small firms.

Therefore, it is crucial to control for variations in firm size among calling firms when drawing inferences on post-call operating performance. Using the industry median does not account for size-related variations in operating performance. Third, if the industry median firm changes each year, then Campbell et. al.'s control firms may not be constant over time. Barber and Lyon (1996) show that time-varying control firms yield less powerful test statistics, which could lead to the failure to detect abnormal post-call performance. Therefore, it is important that the comparison group be held constant over time.

In addition to these benchmark related issues, the use of percentage changes in earnings as a measure of firm performance (as in Ofer and Natarajan (1987) and Campbell et. al. (1991)) further reduces the power of the statistical tests used to detect abnormal performance around convertible calls (see Barber and Lyon (1996)). Hence, we reason that weak statistical tests may have contributed to the puzzling conclusion in some studies that convertible calls do not convey any information about future firm performance.

Following the appropriate methodological framework suggested by Barber and Lyon (1996), we overcome the abovementioned limitations and examine the abnormal operating performance of firms around convertible bond calls. On the important question of whether conversion-forcing bond calls are harbingers of bad news, we provide strong empirical evidence indicating a significant deterioration in operating performance following the call. Consistent with Harris and Raviv's (1985) prediction and the evidence in event studies, we conclude that conversion-forcing bond calls convey bad news. This conclusion is in sharp contrast to recent evidence that challenges the theoretical predictions of signaling models of convertible calls.

The rest of the paper is organized as follows. In the next section, we describe the sample selection process and the data sources. Section II details the research design. Empirical findings are presented in Section III. Section IV concludes the paper.

I. Sample Formation Process and Data Sources

We identify a sample of convertible bond calls made during the period January 1, 1981 to December 31, 1998 from various issues of Standard and Poor's Bond Guide and from announcements documented online in Lexis Universe. Calls of more than one convertible issue on the same day are treated as a single call. We use the following criteria to select the sample. Calls are excluded when they are related to a merger or an acquisition. Because we also investigate common stock price performance, American Depository Receipts (ADRs), closed-end funds, and Real Estate Investment Trusts (REITs) are excluded from the sample. All out-of-the-money calls are also eliminated. To determine if a convertible bond is in-the-money or not, we require that CRSP daily returns be available prior to the call. Using CRSP, we classify a convertible bond as being in-the-money if, following the call protection expiration date, the conversion value exceeds the sum of the call price plus accrued interest. The exact date of the call announcement must be identifiable from the Wall Street Journal Index or Lexis. This process yields an initial sample of 326 call announcements. To be included in the sample, calling firms must have data available on Compustat for the year in which the call is announced (year 0). The final sample is composed of 211 calls with Compustat data available on various operating performance measures. In addition, for some of our analysis, daily common stock returns must be available from the CRSP master tapes for the time period following the call announcement. Therefore, for this part of our analysis we lose an additional 10 firms, leaving us with 201 firms for analyzing the stock price performance. We collect the characteristics of the called issue such as the offer date, call price at conversion, coupon rate, call protection expiration date, shares issued upon conversion, and the conversion value from various issues of Moody's Manuals.

In Table 1, we provide the distribution of asset size and market-to-book ratios for our sample firms. The median (mean) total asset is $680 million ($3,070 million). In comparison, Ederington and Goh (2001) report a mean total assets of $4,359 million for their sample of calling firms. The median (mean) market-to-book asset ratio is 1.48 (1.72), which indicates that convertible bond calls are typically announced by firms with high growth opportunities. These characteristics are comparable to those reported in previous studies.

II. Research Design

A. Control Firms to Measure Abnormal Operating Performance

All calling firms in our sample have data available on Compustat for the fiscal year in which they announce the call (year 0). Matching firms are chosen using the procedure outlined by Barber and Lyon (1996) and followed by Loughran and Ritter (1997) for their sample of equity offerings.[2] Specifically, each calling firm is matched with a firm that has neither issued equity nor called its convertible bonds during the prior three years using the following algorithm: (1) From the pool of non-issuing and non-calling firms, if there is at least one firm with the same two-digit SIC code with end of year 0 assets within 25 percent to 200 percent of the calling firm, the firm with the closest operating income before depreciation, amortization, and taxes (OIBD)/Assets is used as the matching firm; (2) if no matching firm is found in the same two-digit SIC category that meets the asset size criterion, then from among the firms in the same industry classification, the firm with the closest operating income before depreciation, amortization, and taxes (OIBD)/Assets is used as the matching firm; (3) if no non-issuing and non-calling firm meet these criteria, then all firms with year 0 assets between 90 percent and 110 percent of the calling firm are ranked and the firm with the closest OIBD/Assets is used. If a calling firm is delisted from Compustat in a given year, the matching firm is also removed from the analysis in the same year. If a matching firm is delisted from Compustat, then the next closest matching firm (based on year 0 two-digit SIC code, Assets, and OIBD/Assets, or SIC and OIBD/Assets, or Assets and OIBD/Assets, as the case may be) that has not issued equity or called its convertible bonds in the three years prior to the replacement year is spliced in from the replacement year. Fifteen firms (seven percent) require one replacement for their matching firms. The Compustat data items for the variables are: operating income before depreciation/assets (OIBD (item 13)/ Assets (item 6) [our results are similar when we include interest income in OIBD. However we lose many observations due to missing values for interest income. Therefore, our reported results exclude interest income], profit margin (net income excluding extraordinary items (item 172)/sales (item 12), return on assets (net income (item 172)/assets (item 6)), and OIBD/sales (OIBD (item 13)/sales (item 12)).

[2] Our use of Barber and Lyon's methodology follows Loughran and Ritter (1997) as convertible bond calls, being "backdoor" equity offerings, are very similar to seasoned equity offerings.

B. Control Firms for Abnormal Stock Price Performance

For our post-call performance measurement we use a benchmark of control firms matched by size, book-to-market equity ratio, and one-year pre-call stock price run-up. We match by pre-call run-up in addition to size and book-to-market ratio to control for the systematic pre-call stock price run-up documented in previous studies (see Lyon, Barber and Tsai (1999)). For comparability and to be consistent with recent research on post-call stock price performance, we follow the control firm selection process outlined in Datta, Iskandar-Datta, and Raman (2003).

To evaluate the long-run stock price performance of calling firms using cumulative abnormal returns (CARs), as prescribed in Fama (1998), we follow the procedure outlined in Ritter (1991). Fama (1998) argues that the use of buy-and-hold returns compounds the skewness bias in stock returns and that cumulative abnormal return is the appropriate return metric to use in formal tests of abnormal returns.

III. Empirical Findings

A. Operating Performance of Calling Firms and their Matched Controls

In Table 2 we present various operating performance measures of calling firms and their matched (non-calling) firms for a six-year period surrounding the year of the call. As documented in Panel A of Table 2, it is clear that the operating performance of calling firms deteriorates significantly in the post-call period. For instance, the median operating income as a percentage of total assets (OIBD/Assets) for the calling firms is 12.71% in Year –3, peaks in Year 0 at 14.96%, and then drops sharply to 11.92% in Year +3. This pattern of operating performance peaking in the year of the call and subsequently declining sharply is also evident if performance is measured in terms of profit margin, return on assets (ROA), and operating income as a percentage of total sales (OIBD/Sales). It is worth noting that, for all measures of operating performance, the performance in Year +3 does not merely revert back to the pre-call level but drops even below the level in Year –3.

As discussed earlier, following Barber and Lyon (1996), we select matching firms based on operating performance (OIBD/Assets) in order to control for the well-documented superior pre-call performance of calling firms. The median OIBD/Assets of matching firms clearly indicate that the control firms display similar performance to that of calling firms in Years –2, -1, and 0. In Panel B of Table 2, the insignificant Wilcoxon Z-statistics for the difference between the distributions of OIBD/Assets for the calling firms and the control firms indicate that the control firms are appropriate benchmarks to measure post-call abnormal operating performance as prescribed by Barber and Lyon (1996). In sharp contrast, however, the post-call performance of the calling firms and the control firms diverge noticeably. As illustrated in Figure 1, while the median OIBD/Assets for calling firms drops from 14.96% in the year of the call to 11.92% in Year +3, the corresponding ratio for the control firms increases from 14.81% to 16.10% over the same time period. As shown in Panel B of Table 2, the Z-statistic is significant at conventional levels for each year following the call. This evidence indicates that the calling firms significantly underperform their matched counterparts for at least three years following the call. At the end of three years following the call, it is clear that the other measures of operating performance, such as the profit margin (see Figure 2), return on assets (ROA) (see Figure 3), and OIBD /Sales (see Figure 4), confirm the underperformance of calling firms relative to their benchmarks.

These results provide direct and conclusive evidence, consistent with the market's response at the time of the call announcement, that convertible bond calls are harbingers of bad news. In contrast to the studies that reject the hypothesis that convertible bond calls signal bad news, implying that the market's response to convertible calls is puzzling (e.g Mazzeo and Moore (1992), Byrd and Moore (1996), and Ederington and Goh (2001)), our results indicate that the bad news associated with the adverse stock price response at the time of the call is not just short-lived and transitory but is reflected in the long-term operating performance of the calling firms.

B. Is Post-call Underperformance Driven by Firm Size and Growth Prospects?

Convertible bonds are typically issued by smaller firms with higher market-to-book ratios than firms that issue equity or straight debt (Lewis, Rogalski, and Seward (1999)). For a sample of seasoned equity offers (SEOs), Loughran and Ritter (1997) document that post-SEO deterioration in operating performance is more prominent for smaller firms. Moreover, Datta, Iskandar-Datta, and Raman (2003) report that poor post-call stock price performance is more pronounced for high-growth firms. These studies document a relation between firm performance, firm size and growth prospects of firms issuing either common stock or 'backdoor equity' through conversion forcing calls. We check the robustness of our results documented in the previous section by examining the operating performance of calling firms and their matched control firms after partitioning the sample based on

firm size (total assets) and growth prospects (market-to-book assets ratio). The sample is partitioned based on the median asset size of $680 million (in 1998 dollars, using the CPI) and the median market-to-book assets of 1.48 in the year of the call. To measure operating performance we focus on OIBD/Assets and profit margin. The results are presented in Table 3.

As documented in Panel A and Panel B of Table 3, the general pattern of superior pre-call operating performance and deteriorating post-call performance is robust for both small and large firms. For instance, we find that the median OIBD/Assets for small firms increases from 12.83% in Year –3 to a peak level of 15.22 % in Year 0 and then declines substantially to 11.73% in Year +3. When this performance is compared to that of the control firms, the insignificant pre-call abnormal performance is in sharp contrast to the significant post-call underperformance by calling firms. This finding is similar for large firms and when median profit margin is used to measure operating performance. Our results are comparable to the pattern observed by Loughran and Ritter (1997) for small and large firms for their sample of SEOs. For 'backdoor equity' issues, in contrast to the conclusion drawn by Campbell, Ederington, and Vankudre (1991), our results indicate that the poor performance of the calling firms is not attributable to mean reversion in calling firms' performance in the post-call period.

It is expected that high-growth firms typically exhibit a tendency for a more pronounced mean reversion in performance. Since conversion-forcing calls follow a period of high growth, we examine whether there is any difference in post-call operating performance between high-growth and low-growth firms. Campbell et. al. conclude that the poor post-call operating performance is the result of mean reversion to industry level of performance following a period of high growth prior to the call and is not attributable to the call, per se. Their conclusion implies that the underperformance following the call should be more pronounced for high-growth firms. To test this assertion we partition the sample firms by high and low growth opportunities at the call and examine post-call operating performance using appropriately matched control firms. The results are presented in Panel C and Panel D of Table 3. The median OIBD/Assets for low M/B calling firms drops from 12.82% in the year of the call to 10.56% in Year +3, while high M/B calling firms experience a greater decline from 19.06% to 14.25% during the same period. In the post-call period, the difference in performance between calling firms and control firms is economically and statistically significant for both subsamples. It is also important to note that low M/B firms underperform their benchmarks by at least as much as their high M/B counterparts. The results are similar when we use profit margin as a measure of operating performance. The fact that the underperformance of the calling firms is not driven solely by a subset of high-growth firms indicates that it is not just a manifestation of calls occurring at the end of a high growth period. In conjunction with the event-study results in earlier studies, our results provide strong support for Harris and Raviv's (1985) signaling explanation.

C. Stock Price Performance Following Convertible Calls

For completeness and comparability with previous studies, we examine the post-call stock price performance for our sample of calling firms. Following Lyon, Barber, and Tsai (1999), we use control firms matched by size, book-to-market ratio, and pre-call stock price runup to measure cumulative abnormal returns (CARs) for five years following the call. We use CARs because Fama (1998) argues that they are superior to buy-and-hold returns as a measure of abnormal stock price performance. The methodology used to compute CARs and the associated t-statistics is similar to Ritter (1991). The results are presented in Table 4 and illustrated in Figure 5. Similar to the decline in post-call operating performance, we find that calling firms significantly underperform their matched controls by 27.38% over a sixty-month period following the call. In sharp contrast to the conclusions drawn in Mazzeo and Moore (1992), Byrd and Moore (1996) and Ederington and Goh (2001), our results indicate that the post-call stock price underperformance is not transitory and short-lived but sustains over at least a five-year period following the call. If the post-call horizon is restricted to a one-month period, then our results are similar to those reported in previous studies. However, our results diverge significantly when we examine a post-call time horizon longer than one month. For example, Ederington and Goh (2001) report, based on market model parameters, CARs of 9.25% over a one-year period following the call and conclude that the negative effect of the call announcement on the stock price is transitory. Following Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999), we overcome the inherent limitations of using the market model over a long horizon and use control firms based on size, book-to-market, and pre-call stock price performance. In contrast to Campbell, Ederington, and Vankudre (1991) and Ederington and Goh (2001), we document a significant negative abnormal return of 10.52% over the corresponding one-year post-call period for our sample firms. These substantially different results are perhaps because the effects of the bad model problem are more severe over longer intervals (see Fama (1998)). In the context of Daniel, Hirshleifer, and Subrahmanyam (1998), our

results indicate that conversion-forcing bond calls indeed convey bad news. The market's underreaction to convertible bond call announcements is similar to the phenomenon documented for other corporate announcements.

IV. Summary and Conclusion

The information conveyed by convertible bond calls remains an intriguing issue even though two decades have elapsed since Harris and Raviv's (1985) article. While event-studies clearly support Harris and Raviv's prediction that convertible calls convey bad news, some recent studies have questioned the validity of this conclusion. The conclusions drawn in these recent studies not only challenge the theoretical predictions of Harris and Raviv but also question the underlying notion of market efficiency.

This study contributes to the literature by providing a definitive answer to the question of whether convertible bond calls signal bad news. By using a more powerful methodology, as suggested by Barber and Lyon (1996), we avoid the pitfalls associated with the approaches used in prior studies and document that convertible calls are followed by deteriorating operating performance of the calling firms.

Our approach does not rely on analysts' biased forecasts or on the controversies surrounding long-horizon abnormal stock returns to draw inferences.

Moreover, we employ benchmarks that appropriately control for the mean reversion in operating performance of calling firms. In contrast to the conclusions in Campbell, Ederington, and Vankudre (1991), we find that the underperformance following the call is not just a manifestation of calls occurring at the end of a high growth period.

Our results of deteriorating operating performance following convertible calls, which are viewed as 'backdoor' equity offerings, parallel the findings of Loughran and Ritter (1997) for their sample of seasoned equity offerings.

Our study provides a resolution to the current debate on the information content of convertible calls by unambiguously documenting that convertible bond calls are harbingers of bad news.

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Appendices

Table 1. Distribution of Convertible Bond Calls by Firm Characteristics, 1981-1998

The sample consists of 211 firms that call convertible bonds between January 1, 1981 and December 31, 1998. Total assets (Compustat data item 6) are measured in dollars of 1998 purchasing power using the CPI. Market-to-book ratio is measured as [shares (item 54) times price (item 199) + assets (item 6) – book value of equity (item 60)] / [assets (item 6)].

Quantiles	Total assets ($ millions)	Market-to-book ratio
Minimum	33.48	0.78
10%	131.39	1.02
Q1	290.59	1.17
Median	680.34	1.48
Q3	1,870.36	2.17
90%	5,201.40	2.78
Maximum	102,522.90	5.77
Mean	3,070.33	1.72

Table 2. Median (Mean) Operating Performance Measures and Market-to-Book Ratios for Firms Calling Convertible Bonds and their Matching Firms from 1981 to 1998

This table reports median (mean) ratios for 211 firms that call convertible bonds between January 1, 1981 and December 31, 1998. All calling firms have data available on Compustat for their calling year (year 0). Matching firms are chosen using the procedure followed by Loughran and Ritter (1997). Specifically, each calling firm is matched with a firm that has neither issued equity nor called its convertible bonds during the prior three years using the following algorithm: (1) From the pool of non-issuing and non-calling firms, if there is at least one firm with the same two-digit SIC code with end of year 0 assets within 25 percent to 200 percent of the calling firm, the firm with the closest operating income before depreciation, amortization, and taxes (OIBD)/assets is used as the matching firm; (2) if no non-issuing and non-calling firm meets this criteria, then all firms with year 0 assets between 90 percent and 110 percent of the calling firm are ranked and the firm with the closest OIBD/assets is used. If a calling firm is delisted from Compustat in a given year, the matching firm is also removed from the analysis in the same year. If a matching firm is delisted from Compustat, then the next closest matching firm (based on year 0 two-digit SIC code, Assets, and OIBD/assets, or Assets and OIBD/assets as the case may be) that has not issued equity or called its convertible bonds in the three years prior to the replacement year is spliced in from the replacement year. Fifteen firms (seven percent) require one replacement for their matching firms. The Compustat data items for the variables are: operating income before depreciation/assets (OIBD (item 13)/ assets (item 6) [our results are similar when we include interest income in OIBD. However we lose many observations due to missing values for interest income. Therefore, our reported results exclude interest income], profit margin (net income excluding extraordinary items (item 172)/sales (item 12), return on assets (net income (item 172)/assets (item 6)), OIBD/sales (OIBD (item 13)/sales (item 12)), CE/assets (capital expenditures (item 128)/assets (item 6)), market-to-book assets ([shares (item 54) times price (item 199) + assets (item 6) – book value of equity (item 60)]/ assets (item 6)), market-to-book equity (shares (item 54) times price (item 199) / book value of equity (item 60)).

Panel A: Performance measures for Calling Firms and their Matched Controls

Fiscal Year relative to Bond Call	N	OIBD/Assets		Profit Margin		ROA		OIBD/Sales	
		Calling Firm	Matched Control	Calling Firm	Matched Control	Calling Firm	Matched Control	Calling Firm	Matched Control
-3	151	12.71 (12.80)	14.91 (15.00)	4.17 (3.57)	4.79 (4.81)	4.74 (4.00)	5.68 (4.23)	12.95 (14.80)	12.36 (18.33)
-2	184	13.22 (12.47)	13.77 (13.97)	4.27 (-6.29)	3.93 (4.00)	4.79 (3.54)	4.51 (4.29)	12.22 (3.70)	12.22 (16.47)
-1	200	14.75 (14.10)	14.44 (14.23)	4.86 (-0.65)	4.05 (4.22)	5.20 (4.30)	5.07 (4.83)	13.71 (14.88)	11.48 (14.91)
0	211	14.96 (15.36)	14.81 (14.54)	5.84 (7.38)	4.24 (4.71)	5.89 (6.36)	5.53 (4.93)	15.16 (18.16)	12.19 (16.39)
+1	203	14.63 (14.83)	15.86 (16.16)	5.80 (8.33)	4.98 (4.91)	5.50 (12.08)	6.21 (5.53)	14.57 (17.03)	12.87 (17.13)
+2	191	14.22 (13.31)	16.72 (17.56)	4.83 (4.70)	5.47 (5.69)	4.91 (4.63)	6.12 (6.10)	13.39 (15.24)	13.24 (17.33)
+3	176	11.92 (11.56)	16.10 (16.58)	3.57 (-0.55)	5.35 (5.73)	3.71 (1.61)	6.17 (6.08)	11.69 (12.24)	13.46 (17.23)

Panel B: Test Statistics for Difference Between the Distribution of Performance measures for Calling Firms and their Matched Controls

Wilcoxon Z-statistics are presented above with t-statistic of difference between means in parentheses.

Fiscal Year relative to Bond Call	*OIBD/Assets*	Profit Margin	ROA	OIBD/ Sales
-3	-2.29 (-2.49)	-0.27 (-0.86)	-1.44 (-0.25)	-0.77 (-1.76)
-2	-1.15 (-1.68)	0.77 (-1.16)	-0.39 (-0.96)	-0.16 (-1.23)
-1	0.28 (-0.18)	1.84 (-1.26)	0.24 (-0.77)	2.81 (-0.01)
0	0.81 (1.21)	3.40 (1.97)	1.83 (2.05)	2.91 (1.19)
+1	-2.05 (-1.68)	1.59 (0.95)	-1.02 (0.94)	1.04 (-0.07)
+2	-4.83 (-5.11)	-0.84 (-0.99)	-2.77 (-2.09)	-1.23 (-1.45)
+3	-5.70 (-5.66)	-3.95 (-2.89)	-5.41 (-4.58)	-2.19 (-2.38)

Table 3. Median Operating Ratios for Calling and Matching Firms: Categorized by Asset Size and Market-to-Book Assets for 211 Convertible Bond Calls from 1981 to 1998

Sample firms are classified as small or large based on the median total assets (Compustat item 6) at the end of fiscal year (year 0) in which the firms called their convertible bonds. To classify firms, assets are measured in dollars of 1998 purchasing power using the CPI. The median total asset size is $680 million in 1998 dollars. Similarly, calling firms are classified as low or high M/B firms based on the median market-to-book assets ratio (M/B). M/B is measured as [shares (item 54) times price (item 199) + assets (item 6) – book value of equity (item 60)]/ assets (item 6).

The median M/B ratio is 1.48. OIBD/TA and Profit Margin are defined in Table 2. The Z-statistic is based on the Wilcoxon Rank-sum test of the equality of distributions of performance measures between the calling firms and their corresponding matching firms.

Panel A: Median OIBD/TA							
	-3	-2	-1	0	+1	+2	+3
Small Firms (Post-call assets less than or equal to $680 million)							
Calling Firm	12.83	13.75	14.92	15.22	13.75	12.77	11.73
Matched Firm	14.40	13.75	14.82	15.08	15.97	17.43	16.37
Z-statistic	-1.93	1.07	0.05	0.43	-2.03	-4.70	-5.12
Large Firms (Post-call assets greater than $680 million)							
Calling Firm	12.55	13.21	14.59	14.54	14.82	14.90	12.70
Matched Firm	15.14	13.80	13.84	14.47	15.78	16.04	16.05
Z-statistic	-1.26	-0.59	0.32	0.67	-0.87	-2.08	-2.95

Panel B: Median Profit Margin							
	-3	-2	-1	0	+1	+2	+3
Small Firms (Post-call assets less than or equal to $680 million)							
Calling Firm	4.21	4.14	4.59	6.22	5.81	3.95	2.70
Matched Firm	5.21	4.31	3.77	4.24	4.75	5.13	5.34
Z-statistic	-0.41	-0.38	1.70	2.78	1.57	-0.52	-3.59
Large Firms (Post-call assets greater than $680 million)							
Calling Firm	4.08	4.30	5.02	5.49	5.80	5.33	4.17
Matched Firm	4.79	3.42	4.23	4.41	5.32	5.48	5.54
Z-statistic	-0.04	0.63	0.90	2.01	0.60	-0.68	-2.01

Panel C: Median OIBD/TA							
	-3	-2	-1	0	+1	+2	+3
Low M/B Firms (Post-call M/B assets less than or equal to 1.48)							
Calling Firm	11.22	11.28	12.20	12.82	12.71	11.20	10.56
Matched Firm	14.04	12.56	12.89	12.95	14.72	15.88	15.35
Z-statistic	-2.80	-1.71	-1.24	-0.16	-2.55	-4.58	-5.29
High M/B Firms (Post-call M/B assets greater than 1.48)							
Calling Firm	14.25	15.59	17.49	19.06	17.44	15.54	14.25
Matched Firm	15.50	14.87	15.79	17.43	17.36	18.72	17.28
Z-statistic	-0.50	0.09	1.49	1.54	0.33	-2.48	-2.95

Panel D: Median Profit Margin							
	-3	-2	-1	0	+1	+2	+3
Low M/B Firms (Post-call M/B assets less than or equal to 1.48)							
Calling Firm	3.44	3.10	3.57	4.95	4.15	3.51	2.51
Matched Firm	5.18	3.75	4.00	3.95	4.85	4.91	4.71
Z-statistic	-2.16	-0.72	-0.49	1.08	-0.72	-2.15	-3.40
High M/B Firms (Post-call M/B assets greater than 1.48)							
Calling Firm	5.42	5.82	6.15	7.79	7.18	6.09	4.00
Matched Firm	4.76	4.39	4.39	4.65	5.09	5.55	5.77
Z-statistic	1.74	1.77	3.01	4.10	3.06	0.93	-2.15

Table 4. Five-Year Post-Call Cumulative Abnormal Stock Returns
Using Size, Book-to-Market, and Pre-Call Stock Return Based Matching Firms

The sample consists of 211 firms that call convertible bonds between 1981 and 1998. To evaluate the long-run performance of calling firms using CARs, we follow the procedure outlined in Ritter (1991). The returns are computed for the five-year period starting the day after the conversion-forcing call announcement. Monthly returns are computed using successive 21-trading-day periods. The matching-firm adjusted return for stock *i* in event month *t* is defined as $ar_{it} = r_{it} - r_{mt}$, where r_{it} is the monthly raw return on stock *i* in month *t*, and r_{mt} is the monthly return on the size, book-to-market, and pre-call runup based matching-firm in month *t*. Size is defined as market value of equity (shares outstanding times price) on the day prior to the call date (from CRSP), book-to-market is defined as book value of equity for the most recent fiscal year as of the month-end preceding the call date (from Compustat) divided by the CRSP market value of equity on the day prior to the call date, pre-call runup is defined as the buy-and-hold stock return during the one-year period immediately preceding the call date. For the month in which a sample firm is delisted, the return on both the sample firm and the matching-firm includes only the days from the start of the month until delisting. The average matching-firm adjusted return on a portfolio of *n* stocks for event month *t* is the equally-weighted arithmetic average of the matching-firm adjusted returns: $AR_t = (1/n)\sum_{i=1}^{n} ar_{it}$. When sample firms are delisted from CRSP, the portfolio return for the next month is an equally-weighted average of the remaining firms in the portfolio. If a matching firm is delisted, CRSP value-weighted index returns are spliced in for the remainder of the 60 month period or until the sample firm is delisted, whichever is earlier. The t-statistic for the average matching-firm adjusted return is computed as: $t = AR_t * \sqrt{n_t}/SD_t$, where AR_t is the average matching-firm adjusted return for month *t*, n_t is the number of observations in month *t*, and SD_t is the cross-sectional standard deviation of the adjusted returns for month *t*. The matching-firm adjusted cumulative average return (CAR) from event month *j* to event month *k* is the summation of the average matching-firm adjusted returns: $CAR_{j,k} = \sum_{t=j}^{k} AR_t$. The t-statistic for the cumulative average return in month *t* is computed as in Ritter (1991). The number of firms changes due to sample firms delisting from CRSP.

Month	N	$CAR_{(1,t)}$	T-stat for CAR
1	201	2.14	1.98
6	201	-0.42	-0.16
12	199	-10.52	-2.80
18	196	-11.95	-2.58
24	193	-14.05	-2.60
30	189	-13.92	-2.28
36	182	-18.07	-2.65
42	176	-16.20	-2.17
48	171	-18.34	-2.26
54	164	-24.24	-2.76
60	161	-27.38	-2.93

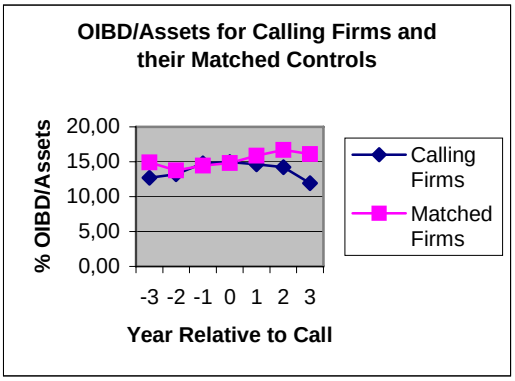

Figure 1

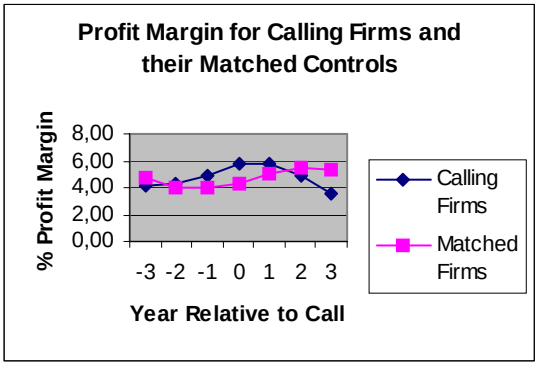

Figure 2

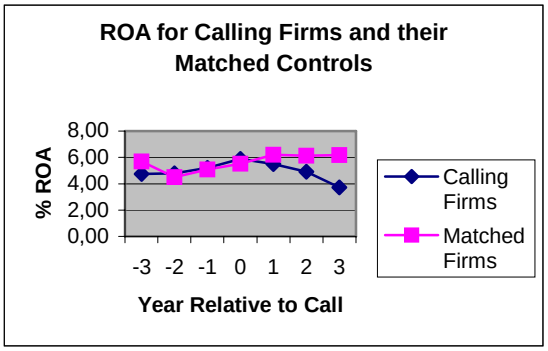

Figure 3

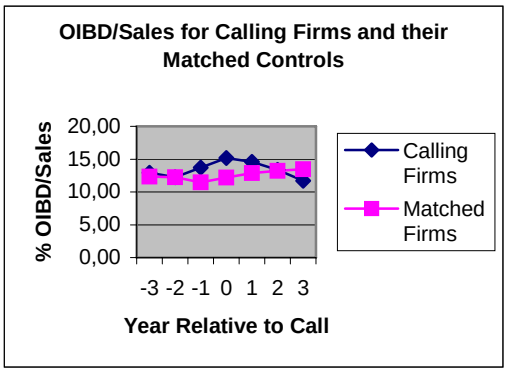

Figure 4

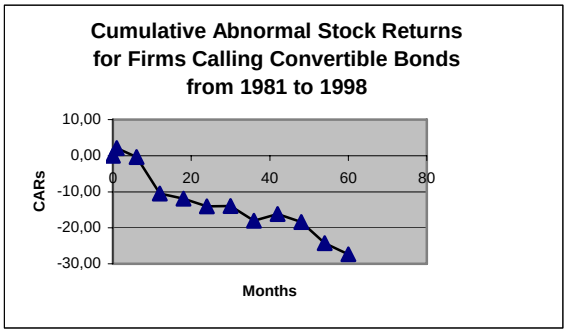

Figure 5

ASYMMETRIC PAY-FOR-PERFORMANCE AND CORPORATE GOVERNANCE IN THE MARKET DOWNTURN

Tung-Hsiao Yang*

Abstract

This paper examines the pay-for-performance, corporate governance, and their connection by analyzing the change of executive compensation when the stock market changes from upturn to downturn. We provide the evidence to support the managerial power explanation for the change in executive compensation. We find the asymmetric pay-for-performance and corporate governance in different market conditions and different firm's market performance. In addition, the outperformed firms reward CEO with more cash-based compensation and less stock-based compensation in the market downturn. Therefore, we conclude that the CEOs of outperformed firms have stronger managerial power than those of underperformed firms. We also find supportive evidence of our conclusion that the firms with lower debt ratio, smaller number of board meetings, and the presence of interlocked relationship have higher probability to be the outperformed firms. This evidence is consistent with the prediction of managerial power approach.

Keywords: asymmetric pay-for-performance, executive compensation, managerial power hypothesis, market downturn

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1. Introduction

Executive compensation is a major area in the research of corporate finance. Due to the changes of market conditions, such as accounting scandals and new regulations, more and more executive compensation issues draw researchers' attention. In this paper, we are interested in the three topics: asymmetric pay-for-performance, corporate governance, and the relationship between these two issues. The former two issues have been discussed extensively in academic research and practical world. However, the change in stock market, from upturn to downturn, provides a good opportunity to look into the relation between pay-for-performance and corporate governance. From the change of executive compensation in the market downturn, we want to test the managerial power hypothesis in determining the executive compensation.

In this paper, we provide evidence to support the managerial power explanation for executive compensation by looking at the change of CEOs' compensation with respect to the change of market condition and firms' market performance. The theoretical optimal contracting model, sometimes named as the arm's-length contracting model, in the earlier research suggests that executive compensation is a sub-optimal resolution for agency problems. However, the model cannot provide a sufficient explanation for the recent pattern of executive compensation, especially the increase of stock-based compensation. The relative research finds that managerial power can significantly affect the design of the executive pay. Bebchuk, Fried, and Walker (2002) summarize the literature and conclude that the role of managerial power plays an important role in the design of executive compensation.

From our empirical result, we find asymmetric pay-for-performance relationship in different market conditions. Observing the trend of stock market, the 1990s is a booming market and the stock market becomes depressed after 2000. We collect the data of CEOs' compensation from 1992 to 2003 to perform all the tests. We find that the cash-based compensations of outperformed firms, which outperform the S&P 500 market index, become sensitive to their market performance when the stock market changes from upturn to downturn. In contrast, their stock-based compensations become insensitive to their market performance in the same change of the stock market. Therefore, we

conclude that the outperformed firms change their compensation packages significantly when the stock market changes from upturn to downturn.

In the tests of determinants of CEOs' compensation, we find that the effect of governance variables, such as firm leverage, the number of board meetings, CEOs' dual position, and interlocked relationship, changes when the stock market changes from upturn to downturn. In addition, we also find that, in the downturn, the outperformed firms reward their CEOs' with more cash-based compensation and less stock-based compensation. However, this is not the case in the market upturn. Therefore, based on this result and previous conclusion, we expect that the executives in the outperformed firms have stronger managerial power than those in the underperformed firms, especially in the market downturn.

The result of probit regression provides evidence to support our expectation. To test whether executives of outperformed firms have stronger managerial power, we construct a probit regression model to regress the dummy variable of outperformed firms on all governance variables. The result shows that, in the downturn, the firms with smaller number of board meetings and the presence of interlocked relationship have higher probability to be an outperformed firm than other firms. Under these two conditions, the executives should have stronger managerial power. Therefore, in sum, we provide the evidence to support that the managerial power can affect the executive compensation.

The remainder of the paper is as follows. We provide the brief description of research background and generate the research hypotheses based on the relative theories in Section 2. In Section 3, we introduce the econometric models we use in the tests and then summarize the statistics of the data. We show the empirical result in Section 4 and conclude in Section 5.

2. Background and hypothesis

In the extensive literature of executive compensation, most researchers explain the observed phenomena from firm-specific perspectives or executive-specific perspectives. These factors are important in either the design of compensation or the efficiency of the pay. However, the whole market condition is also a very important factor that significant affect the executive pay or its components. For example, Hall and Murphy (2003) show that the trend in stock option grants has closely tracked Dow Jones industrial average index over the past three decades. In addition, a ten-year analysis in America shows that only 30% of variation of stock price is driven by corporate performance and 70% is driven by general market conditions[1]. In general, stock-based compensation is more preferred in a booming market than in a depressed market.

Another important reason for the executive compensation is the change of regulation. For example, the Securities and Exchange Commission liberalized Rule 16b-3 in 1996 that changes the required process of granting executive compensation[2]. In addition, Financial Accounting Standards Board released FAS 123 in 1995 that requires all public firms to disclose the estimates of option values in their financial statements. Furthermore, it released FAS 148 in 2002 that provides three methods to help firms to expense their stock option rewards[3]. All of these market shocks may affect the design or the efficiency of executive. Therefore, the analysis of executive compensation from the market-wide viewpoint is very important and helpful in the design of future compensation contracts.

2.1. Research background

The amount of CEO compensation increased dramatically over the past three decades and one major reason is the explosion of granting stock options, especially in the 90s[4]. In addition, we also observe that the stock market is booming in the 90s. From Figure 1, we find that the long term trends of three major stock indices, Dow Jones industrial average, Nasdaq, and S&P 500, all increase in the 90s with small variations. After 2000, the trends go opposite to the previous decade and the variations increase, especially Nasdaq index. The significant market change, from the booming market to the depressed market, provides a good opportunity to look at the change of executive compensation in different market conditions. This is our main contribution in the literature.

There are four major components of executive compensation, salary, bonus, restricted stocks and stock options. They all provide some incentive for executives to achieve better firm performance. However, they have significant different incentive effects. Hall and Liebman (1998) and Murphy (1998) show that there exists strong pay-for-performance relationship of executive

[1] This analysis is given by SCA consulting. Interesting readers can see Simon Patterson and Peter Smith, How to make Top people's pay reflect performance, on Sunday Times at Business section (Aug. 9, 1998).

[2] Ryan and Wiggins (2004) show how the change in director compensation and how it affects the monitoring function of board after the liberalization of Rule 16b-3.

[3] Chance (2004) has a detail survey of the issues of expensing stock options.

[4] Jensen and Murphy (2004) have a brief survey about the history of executive remuneration, which includes the trends of least three decades started from the 1970s.

compensation, but it is generated almost entirely by changes in the value of CEO holdings of stock and stock options. For example, the median pay-for-performance elasticity of CEO total compensation in 1994 is about 30 times larger than that of CEO cash-based compensation. But, we are interested in how the pay-for-performance changes when there is a market-wide change. Does this strong relationship of pay-for-performance in stock-based compensation still hold in the downturn of the stock markets? Before setting our research hypotheses, we observe the general pattern of executive compensation in two different market conditions. From Figure 2, we find that the trend of executive pay increases in the 90s, but starts to decrease after 2000. Therefore, the trend is like that of those stock market indices. In addition, it is also obvious that the proportion of stock options achieves the highest level in 2000 and then decreases. Two main reasons for the change of using stock options are the changes of stock markets and accounting principles. Downturn of stock markets causes stock options out of money and new accounting principles propose expensing stock options. In contrast, some firms increase the use cash-based components, which may use to substitute for stock options. The consequence of these changes of regulation and market condition is not the main issue in this paper, but the common effect of these changes is that grantees change their preference of stock options and prefer other rewards. Even though it is not the major determinant of executive compensation, CEOs' preference may induce CEOs to exercise their managerial power and then affect the pay components. There exists extensive literature shows evidence that managerial power can affect executive compensation, either in the pay level or the proportion of the components. We are interested in whether CEOs exercise their managerial power to affect their compensations in the market downturn and how it is related to the pay-for-performance. Based on the relative theories, we generate our research hypotheses in the following section.

2.2. Theories and hypotheses

2.2.1. Pay-for-performance

The efficiency of executive compensation is an important issue in the relative academic research. Grossman and Hart (1983) show that an optimal incentive scheme exists between the principle and the agent because the principle cannot observe the agent's action. On the one hand, this is an ex ante theoretical analysis under the assumption of maximization of shareholders' wealth. On the other hand, the ex post empirical result of optimal incentive scheme is a sharing rule called pay-for-performance. There are two common measures of performance in the literature, stock-based performance measures and accounting performance measures. Under the optimal contracting approach, if the executive pay follows optimal compensation practices, then the pay-for-performance should significantly exist in the business world.

Our first interest is whether all firms, in general, follow optimal compensation practices in different market conditions. In other word, our first research hypothesis is that firms should have significant pay-for-performance in either the market upturn or the market downturn. There are many empirical results show the evidence of significant pay-for-performance. For example, Jensen and Murphy (1990) show the larger incentive from stock grantees' stock ownership than that from other pay and dismissal incentive. In addition to the significant pay-for-performance relationship, Mertrand and Mullainathan (2001) find that executive compensation reward for luck as much as for general accounting or market performance. Therefore, the significant pay-for-performance may come from the market windfalls. From the result of Mertrand and Mullainathan, we are curious about what happens about the executive compensation in the market downturn.

(H1) *Firms should have significant pay-for performance in different market conditions, such as the market upturn or the market downturn.*

Joskow and Rose (1994) show the significant pay-for-performance from cash-based and total compensation. In addition, they also provide no evidence that board of directors tend to reward good performance and ignore poor performance in setting executive compensation[5]. From their findings, we are interested in whether firms that have different performance have asymmetric pay-for-performance. We classified two different types of firms in the test. If the firm has the market performance better than the market index, then it is an outperformed firm. Otherwise, it is an underperformed firm. The pay-for-performance should independent of firms' market performance, if all firms set their compensation optimally. Therefore, the second hypothesis is that the pay-for-performance should be independent of the firm's market performance.

(H2) *Firms should have significant pay-for-performance no matter what the market performance is.*

2.2.2. Corporate governance

In contrast to the optimal contracting approach, the managerial power approach plays a more important

[5] They test three types of possible asymmetries. First, whether compensation has asymmetric response with respect to accounting losses? Second, whether compensation respond differently between good and bad performance? Third, whether compensation respond differently with large changes in performance? However, they cannot find strong evidence to support any type of asymmetry.

role in the recent research of executive compensation. Bebchuk, Fried, and Walker (2002) conclude that the role managerial power plays in the design of executive compensation is significant and should be taken into account in any examination of executive pay arrangements. From the previous literature, we also find lot of research that provides supportive evidence of managerial power explanation in executive compensation. For example, Bertrand and Mullainathan (2001) find that better governed firms have compensation package that can filter some luck out. Weisbach (1988) shows that the probability that CEO will be fired has a negative relation with the firm's market performance. In addition, the probability is enhanced with the large effect of outside boards. Therefore, the pay-for-performance would have certain relationship with corporate governance.

If the firm has good corporate governance, then the governance should still hold in different market conditions. Therefore, the corporate governance is independent of market conditions. This is our third hypothesis. We are interested in whether the change of market condition can affect the corporate governance in the setting of executive compensation.

(H3) *The corporate governance should be independent of market conditions. Therefore, the effect of corporate governance on setting executive compensation should be the same in different market conditions.*

There may have an endogenous problem between market performance and corporate governance. We discuss the endogenous problem in Section 3.1.3. Jensen and Murphy (2004) mention that the firm's sole governing objective is to create firm value. The detail of corporate governance issue is not the main concern in this paper. However, from the concept of corporate governance, the firm with good governance should have good performance in the long run. Therefore, the final hypothesis is the firm with good governance should have higher probability to outperform the market.

(H4) *The firm with good governance should have higher probability to outperform the market no matter what the market condition is.*

3. Research method and data summary

3.1. Research method

To perform all tests of these four hypotheses, we apply three regression models in the empirical tests. First, we use the Ordinary Least Square, OLS, regression to test the pay-for-performance hypotheses. Second, we test the determinants of executive compensation and corporate governance hypotheses in the Tobit econometric framework. Finally, we get the inference between firms' market performance and corporate governance from the result of the Probit regressions.

3.1.1. OLS regression

There are many different ways to test the pay-for-performance relationship and it also depends on different assumption of the impact of past performance. Joskow and Rose (1994) provide the test result of pay-for-performance under different extreme assumptions[6]. In this paper, we assume that the current pay-for-performance is a function of contemporaneous performance only. Following the setting of empirical models in Bertrand and Mullainathan (2001) and Joskow and Rose (1994), we set our empirical model as follows:

$$\ln(Compensation_i) = C_i + \alpha_1 \times MktPerformance_i + \alpha_2 \times AcctPerformance_i + \sum_{i=3}^{n} \alpha_i \times ControlVariable_i + \varepsilon_i. \quad (1)$$

The current total compensation included cash-based (salary + bonus) and stock-based (restricted stocks + stock options) compensation. We use current stock return as the proxy of the firm's market performance and return on equity as the proxy of its accounting performance[7]. In this and all following models, we control firm size effect by using total asset, and executive-specific effect by using the CEO's tenure[2].

We also control the fixed industry effect and year effect by using dummy variables. The dummy variables of the industry effect are generated by two-digit SIC codes.

We regress the executive compensation on these variables by using OLS regression model. To separate the market conditions into upturn and downturn, we take reference of Figure 1 and find that all three major market indices go down around year 2000. Therefore, we set the booming market is from 1993 to 2000 and the depressed market is from 2001 to 2003[3]. In order to classify firm's market performance, we create a return dummy variable and use the market index (S&P 500 index) return as a standard[4]. The return dummy equal to 1 when the

[6] There are two extreme specifications in Joskow and Rose (1994). First, they assume all coefficients of performance are equal. Second, they assume that all coefficients of performance, except the current performance, are equal to zero. The second assumption implies that the current compensation is a function of contemporaneous performance only.

[7] The annual stock return is calculated by $\sum_{t=1}^{12} \ln(1+R_t)$, where R_t is the monthly return from CRSP. The return on equity is the net income before extraordinary items and discontinued operations divided by total common equity.

[2] Bertrand and Mullainathan (2001) and Ryan and Wiggins (2001) use tenure as a control variables for executive-specific effect.

[3] We use the market conditions from 1993 to 2003, because it just matches our data of executive compensation.

[4] We use the S&P 500 index to calculate the market index return because our data of executive compensation include all firms in S&P 500. Therefore, S&P 500 is more appropriate as a market benchmark in this paper.

firm's market return is higher than the market index return and equal to 0, otherwise. We consider the firm an outperformed firm when the return dummy equal to 1 and an underperformed firm when the return dummy equal to 0.

3.1.2. Tobit econometric framework

To find out the determinants of executive compensation, either cash-based or stock-based components, we follow the previous research and define eight possible factors that affect the executive compensation. These variables result from different perspectives, but we focus on the variables from the perspective of corporate governance.

Market-to-book ratio, MB. We define the market-to-book ratio as (market value of equity + book value of debt) / book value of total asset. Ryan and Wiggins (2001) consider the ratio as a proxy for growth opportunity and expect that the growth opportunity should have a positive relationship with stock-based compensation and a negative relationship with cash-based compensation. In addition, Yermack (1995) mention that the information asymmetry grows with growth opportunity, so the firm with high growth opportunities should use more stock-based compensation[5].

CEO stock ownership, SHP. The variable is defined as the percentage of firm stocks owned by CEO. There are two effects of the variable on executive compensation.

First, higher ownership may have higher managerial power that can affect the executive compensation toward his or her personal preference. Second, higher ownership reduces the incentive of stock-based compensation. Therefore, we expect that the CEO stock ownership has a positive relationship with cash-based compensation and a negative relationship with stock-based compensation. Bryan, Hwang, and Lilien (2000) and Ryan and Wiggins (2001) find that significant negative part of the expectation.

Number of board meeting, NMT. The variable is defined as the number of board meetings held during the indicated fiscal year. Vafeas (1999) mentions that the number of board meetings is a proxy for monitoring and efforts of board of directors. Following Vafeas, We use the variable as a proxy of the magnitude of corporate governance. When the number of board meetings increases, we expect that the monitoring function of board is enforced and that the managerial power is lower. Therefore, the executive compensation may toward the optimal level that predicted by theories, rather than CEOs' preference.

Debt ratio, DR. Debt ratio is defined as the ratio of long term debt divided by market value of equity. Due to the agency cost of debt, John and John (1993) show in their model that it is optimal to lower stock-based compensation when the firm has high leverage ratio. They expect that debt ratio has a negative relationship with stock-based compensation. In addition, Ittner, Lambert, and Larcker (2002) mention that bondholders have incentives to limit managers to transfer wealth from bondholders to shareholders.

Therefore, the firm leverage can be a proxy of monitoring functions provided by bondholders.

Cash ratio, CR. The variable is defined as (cash inflows from operating activities + cash outflows to investing activities) / the market value of equity. We use the variable as a proxy of the firm's liquidity constraints. The more cash on hands on the grant date, the lower liquidity constraint. Firm with higher liquidity may use more stock-based compensation.

Therefore, the variable should negatively relate to stock-based compensation. Bryan, Hwang, and Lilien (2000) show that the negative relationship exists in the case of stock options but does not exist in the case of restricted stocks, even though both of them belong to stock-based compensation.

Dual CEO and director dummy, CDD. This is a dummy variable and equal to 1 when the CEO served as director during the indicated fiscal year and equal to 0, otherwise. Ryan and Wiggins (2001) mention that this dual position has different explanations for executive compensation and has the uncertain effect on executive pay.

However, due to the focus of managerial power of this paper, we expect that the dual position may enforce the managerial power and then align the executive compensation toward CEO's preference.

Interlock dummy, ITD. This is also a dummy variable and equal to 1 when the CEO is involved in a relationship requiring disclosure in the "Compensation Committee Interlocks and Insider Participation" section of the proxy statement and equal to 0, otherwise.

Like dual CEO and director dummy, the interlocked relationship may also increase the managerial power to affect other CEO's compensation or indirectly affect their own compensation. Core and Guay (1999) show that the executive compensation has a positive relationship with the presence of interlocked directors.

Based on these variables, we apply the Tobit econometric framework to perform the test and the functional form is as follows:

$$\begin{aligned}\ln(\%\text{ of cash\_based or stock\_based Compensation}_t) &= C_t + \alpha_1 \times MB_t + \alpha_2 \times SHP_t \\ &+ \alpha_3 \times NMT_t + \alpha_4 \times DR_t + \alpha_5 \times CR_t + \alpha_6 \times CDD_t + \alpha_7 \times ITD_t \\ &+ \alpha_8 \times \text{Return Dummy} + \sum_{i=9}^{n} \alpha_i \times \text{Control Variable}_{it} + \varepsilon_t. \end{aligned} \quad (2)$$

[5] Yermack (1995) uses Tobin's Q as a proxy of growth opportunity. However, the formula of Tobin's Q he used is the same as our market-to-book ratio.

The control variables are the same as (1). We find that many firms do not use stock options or restricted stocks as their instruments of compensation every year. Yermack (1995) mention that Tobit framework is more appropriate for the truncated distribution of stock option award data with its large number of zero-valued observations.

3.1.3. Probit regression

We mention in Section 2.2 that there may have endogenous problem between firm's market performance and corporate governance. Based the research hypothesis H(4), we test the endogenous problem by applying a Probit regression model. We use the return dummy as the dependent variable and regress it on all other variables on the right hand side of (2). The functional form is as follows:

$$\text{ReturnDummy}_t = C_t + \alpha_1 \times MB_t + \alpha_2 \times SHP_t + \alpha_3 \times NMT_t + \alpha_4 \times DR_t + \alpha_5 \times CR_t + \alpha_6 \times CDD_t + \alpha_7 \times ITD_t + \sum_{i=8}^{n} \alpha_i \times \text{ControlVariable}_{it} + \varepsilon_t. \quad (3)$$

In the Probit regression, we apply the maximum likelihood estimation and use the heteroskedasticity-consistent covariance matrix estimator to performance the tests.

3.2. Data summary

3.2.1. Sample selection

There are three main data sources in this research, ExecuComp database, CRSP database and Compustat database. First, we get all the compensation related data from ExecuComp database from 1992 to 2003, which includes the value of each component in the compensation, interlocked relationship, the number of board meetings, and the return on equity. In addition, the tenure data is calculated from the date the individual became CEO. We get the accounting data from Compustat database, which include the firm market value, long term debt, cash and short term investment, and total asset. Finally, the monthly stock returns and market index return are from CRSP database.

We first collect all CEO compensation data in the ExecuComp database from 1992 to 2003, which include all firms in the S&P 500 index, the S&P 400 midcap index and S&P 600 small cap index. There have total 13,887 firm-year observations. Then, we exclude all financial firms and regulated utilities[6]. Finally, we have 10,008 firm-year observations in our sample.

[6] We exclude the data that have SIC code between 6000~6999 and 4900~4999. In addition, we also delete data that have missing value in the number of board meetings and total compensation value less than $1000.

3.2.2. Descriptive statistics

We summarize all components of executive compensation and all other variables in Table 1. From Panel A, we find that the main and median of stock options are $2,175,990 and $607,680 with standard deviation 9534.17. This is the most volatile component in executive compensation during this period. Part of reason is that stock options are broadly used in the 1990s. In Panel B, we find that cash-based compensation, on average, is around 50% of total compensation and stock-based compensation, on average, is around 39% of total compensation.

From Panel C, we find that the mean and median of market return are 5.7% and 6.7%, the difference is not significant. This means that most of companies in the S&P indices do have more stable return than other small companies in other indices. We also find that the tenure have a wide range, from minimum 0 year to maximum 52 years. However, the mean and median of tenure is around 8 and 6 years. As to the CEO stock ownership, we find that there exists significant difference between maximum and minimum. From the results not reported in Table 1, there are 26 observations, including 10 CEOs who hold more than 50% shares of their firms. However, there is an interesting phenomenon that most of CEOs are also one of directors. The dual positions happen in the 99.4% of observations in our sample. Finally, the cases that the CEO presents as interlocked director are about 8.6% of our sample.

To avoid multi-collinear problems in our regression models, we also look at the correlation among these variables. Table 2 presents the correlation matrix. There are only three coefficients of correlation are higher than 0.4. We find that the cash-based and stock-based compensation are highly correlated with total asset. Therefore, we use the total asset to control the effect of firm size in each regression model.

4. Empirical result

We are interested in three issues mentioned in the Section 2, which include four research hypotheses. Before showing the empirical results, we point out two features of this paper that are different from other relative research. First, we look at the executive compensation in two different market conditions, the market upturn and downturn. The market upturn is from 1992 to 2000 and the market downturn is from 2001 to 2003. Second, we also analyze the executive compensation with respect to the firm's market performance, which classified as outperformed firms and underperformed firms. We use the market return of S&P 500 index as a benchmark to classify different types of firms.

4.1. Pay-for-performance

We look at the pay-for-performance from three types of executive compensation. Table 3 shows the pay-for-performance of total compensation. From the result of all firms in the whole range, we find that executive compensation is significantly sensitive to market performance and accounting performance. The coefficient 0.125 and 0.052 are significant different from zero at 1% significant level. However, the significant relationship of pay for market performance does not hold in the market downturn. Therefore, there exists asymmetric pay-for-performance in different market conditions under market performance measure. To find out the reason, we try to look at pay-for-performance with respect to firms' market performance.

In Table 3, the coefficient of the return dummy is significant in the whole range sample and the market upturn but not significant in the market downturn. Two possible explanations are that better than market performance is not significantly rewarded and that the market windfalls are not significant in the market downturn. We find the evidence of other explanation when we look at pay-for-performance for outperformed firms and underperformed firms in the downturn. Both types firms have significant market return coefficients but the sign are different. Therefore, there exists asymmetric pay-for-performance in different market performance. The different responses to market performance between outperformed firms and underperformed firms cause the insignificance of the return dummy. However, we find that total compensation of outperformed firms respond market return positively. The higher the firm's market returns the greater amount the total compensation. The underperformed firms respond in the opposite way. To look at the pay-for-performance of different components of total compensation should be helpful in figuring out the explanations of the different responses.

Tables 4 and 5 show the same analysis but use cash-based and stock-based compensation as dependents variables. From Table 4, in the market upturn, the result of return dummy shows that the better than market performance is significantly rewarded by salary or bonuses, but just for underperformed firms. The outperformed firms do not significantly reward CEO with cash based on the market performance. However, in the market downturn, both outperformed and underperformed firms reward CEO with cash significantly. The cash-based compensation of outperformed firms has significant change in different market conditions. This fact seems to imply that outperformed firms can change their compensation contracts significantly when the market condition changes.

From Table 5, we find the result of stock-based compensation is different from that of cash-based compensation. In the market upturn, outperformed firms significant reward stock-based compensation based on the market performance, but underperformed firms do not. However, in the market downturn, the stock-based compensation of all firms, in general, is negatively related to market performance[7]. Both outperformed and underperformed firms incline not to use stock-based compensation to reward better market performance. To do so, all firms need to change their stock-based compensation to cash-based compensation. From Table 4, we find that outperformed firms adjust their compensation toward cash-based components more significantly than underperformed firms.

4.2. Determinant of executive compensation

To find out the reason of the previous result of the asymmetries of pay-for-performance, we look at the determinants of executive compensation under the Tobit econometric framework. The results are in Tables 6 and 7.

From Tables 6 and 7, the significant determinants of cash-based compensation are consistent with the theoretical expectation and empirical finding in the literature. The firms with more growth opportunities use less cash-based compensation and more stock-based compensation. Smith and Watts (1992) also show that the firms with more growth options use more stock options[8]. In addition, when the CEO has higher stock ownership, they receive more cash-based compensation and less stock-based compensation to limit the firm-specific risk. The effects of the number of board meetings, either on cash-based or stock-based compensation, are significant in the market upturn but not significant in the downturn. One possible reason is that the effect may mix in the market downturn. We come back this effect in the Section 4.3. The effects of debt ratio on either cash-based or stock-based compensation are significant in the market upturn[9], but mix in the market downturn. We find that the monitoring function of bondholders can significantly affect executive compensation during the market upturn, but have no significant effect or have mixed effects on cash-based compensation in the downturn. In addition, in the downturn, the bondholders' monitoring can

[7] Hall and Knox (2003) mention that the pay-for-performance of stock options becomes weaker as options fall underwater. Our result of pay-for-performance does not reflect this effect because we use the current compensation data and do not take previous grants of stock options into account.

[8] Smith and Watts (1992) use the ratio of book value of assets to firm value as the proxy of investment opportunities.

[9] Ryan and Wiggins (2002) find that stock options are negatively related to leverage that has the same definition with our leverage variable. Bryan et al. (2000) find the same negative relation in the cases of restricted stocks and stock options.

significantly affect the stock-based compensation of underperformed firms but cannot affect that of outperformed firms. The result of return dummy is very interesting in the Tables 6 and 7. The coefficient of return dummy is not significant in the market upturn, but significant in the market downturn. The signs of the significant coefficients are also different. This may imply that the outperformed firms reward CEOs with cash for their better than market performance and reduce the stock-based compensation in the market downturn. When we compare the effect of CEOs' dual position and interlocked relationship between outperformed firms and underperformed firms in the market downturn, only coefficient of interlocked relationship for outperformed firms is significant. In addition, it is negatively related with stock-based compensation. Based on the information of the significant effect of the interlocked relationship, it seems easier for outperformed firms than for underperformed firms to change their compensation contracts. In sum, from the result of Tables 3 to 5, we find that cash-based compensation of outperformed firms becomes sensitive to market performance and stock-based compensation of the same firms becomes insensitive to market performance in the market downturn. From Tables 6 and 7, we find outperformed firms reward more cash-based components and less stock-based components in the market downturn. Based on the result of executive compensation, we expect that the CEOs of outperformed firms have stronger managerial power than other CEOs of underperformed firms. However, if the research hypothesis H(4) is true, then our expectation should not be true, because outperformance comes from better corporate governance. To test this hypothesis, we construct the Probit model in the next section.

4.3. Market performance and corporate governance

In Table 8, we regress the return dummy on all other variables we use in (2) for market upturn and downturn. Consistent with theoretical prediction, outperformance comes significantly from the growth opportunities. However, the result of governance variables supports our expectation and does not support H(4). We find that the number of board meetings is significantly negatively related with outperformance. In addition, the debt ratio also has a negative relationship with the probability of being an outperformed firm. This evidence supports our expectation that CEOs of outperformed firms have stronger managerial power to affect their own compensation. Consistent with the result of governance variables in Table 7, the interlocked relationship has significantly positive relation with outperformance in the downturn. The coefficient is significant at 1% level, which provides supportive evidence to our expectation.

5. Conculsion

From our empirical result, we show the evidence to support the managerial power explanation of executive compensation by showing the change of executive compensation in the market downturn. Due to the significant change of stock market, we can conduct the comparative static analysis of pay-for performance and determinant of executive compensation between market upturn and downturn. The result also sheds some light on the connection between pay-for-performance and corporate governance in different market conditions. The result of pay-for-performance shows that there exists asymmetric pay-for-performance with respect to different market conditions and different firms' market performances. We conclude that the market conditions, even though out of manager's control, can affect the pay-for-performance. In addition, firms' market performance also can affect the pay-for-performance. However, the outperformed firms have significant change in the compensation contracts when the stock market changes. The result of determinants of executive compensation shows that governance variables, such as firm leverage, the number of board meetings, CEO's dual position, and interlocked relationship, change when the market conditions or firms' market performances change. Therefore, the evidence does not support the hypotheses that corporate governance is independent of market conditions. The result also shows that the interlocked relationship of outperformed firms can significantly affect the stock-based compensation, which implies that the CEOs in outperformed firms have stronger managerial power. To deal with the endogenous problem between firms' market performance and corporate governance, we find the evidence to support that the CEOs of outperformed firms have stronger managerial power than the CEOs of underperformed firms. In the market downturn, the firms with lower debt ratio, lower number of board meetings and presence of interlocked relationship have higher probability to outperform the market index. Therefore, the fact does not support the hypothesis that the firm with good corporate governance has higher probability to outperform the market index.

Finally, we conclude that firms that their CEOs have higher managerial power have higher probability to outperform the market index. Moreover, these firms can change their compensation contracts in different market conditions. Therefore, the asymmetric pay-for-performance comes from the different managerial power, which is not predicted by optimal contracting approach.

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Appendices

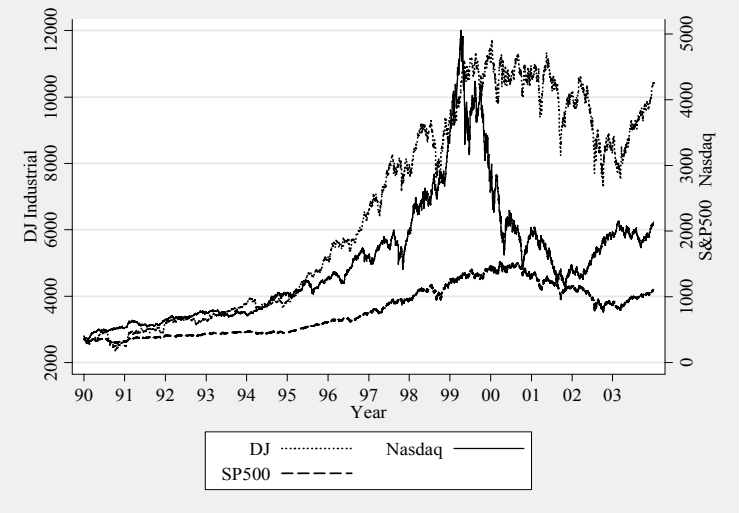

Figure 1. The time trend of Dow Jones Industrial, Nasdaq, and S&P500 index

The trends of these three indices are based on the adjusted daily closing prices from the Yahoo finance website. We show the trends on two different scales, Dow Jones industrial average index on the left hand side axis and S&P500 and Nasdaq indices on the right hand side axis. The data range is from 01/02/1990 to 12/31/2003.

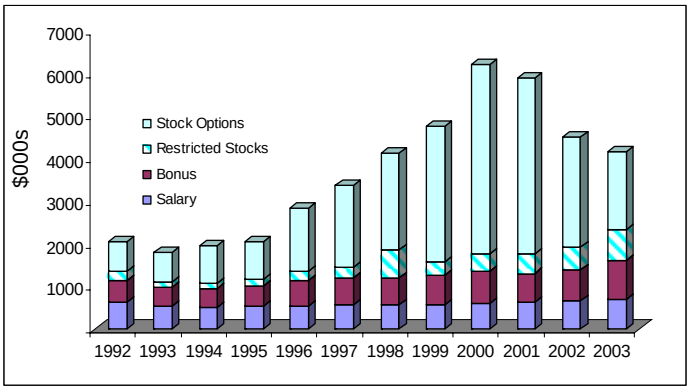

Figure 2. The average of executive compensation during 1992-2003

The amount of average level of executive compensation in each year includes salary, bonus, restricted stocks, and stock options. The stock options are valued by using ExecuComp's modified Black-Scholes formula. All dollar amounts are in 2003-constant dollar. The data include all CEOs pay level for S&P 500, S&P 400 mid cap and S&P 600 small cap companies in ExecuComp databased from 1992 to 2003.

Table 1. Descriptive statistics of data (N=10,008)

The value of stock options granted to the CEO during the year is valued by S&P's Black-Scholes methodology. The other compensation includes all cash or non-cash items that do not belong to salary, bonus, and stock-based compensation. CB includes salary and bonus, SB includes stock options and restricted stocks, SR is the market rate of return of the firm stock, ROE is the net income before extraordinary items and discontinued operations divided by total common equity, TA is log of total assets, MB is equal to (market value of equity + book value of debt) / total asset, SHP is the % of firm stocks holded by CEO, NMT is the number of board meeting in the year, DR is the long term debt divided by the market value of equity, CR is (cash inflows from operating activities plus cash outflows to investing activities) / the market value of equity, CDD is 1 if CEO is also the board of director, and 0 otherwise, ITD is 1 if CEO is involved in a relationship requiring disclosure in the "Compensation Committee Interlocks and Insider Participation" section of the proxy statement, and 0 otherwise.

	Mean	Median	Maximum	Minimum	Standard Deviation
Panel A: CEO compensation summary ($000s)					
Salary & Bonus	1191.79	891.71	43511.54	0	1200.89
Stock options	2175.99	607.68	600347.36	0	9534.17
Restricted stocks	376.17	0.0002	650812.05	0	6729.46
Other compensation	333.96	44.57	96422.87	0	1497.60
Total compensation	4077.90	1995.19	655448.00	2.68	12318.47
Panel B: CEO compensation summary (% of total compensation)					
Cash-based compensation, CB	53.30%	50.89%	100%	0%	28.29%
Stock-based compensation, SB	38.77%	39.24%	100%	0%	29.36%
Other compensation	7.93%	2.32%	100%	0%	13.49%
Panel C: Determinants of CEO compensation and governance variables					
Market rate of return, SR	0.057	0.067	3.303	-3.194	0.446
Return on equity, ROE	0.106	0.120	49.423	-39.380	0.807
Total Assets, TA	7.146	6.966	13.381	2.316	1.486
Tenure	8.561	6.105	52	0	7.666
Market-to-book ratio, MB	2.126	1.609	77.634	0.328	1.897
CEO stock ownership, SHP	0.030	0.004	0.761	0	0.069
Number of meetings, NMT	6.964	6.523	32	1	2.819
Debt ratio, DR	0.370	0.152	66.647	0	1.157
Cash ratio, CR	0.101	0.048	10.712	0	0.251
CEO-Director, CDD	0.994	1	1	0	0.077
Interlock director, ITD	0.086	0.000	1	0	0.281

Table 2. Correlation matrices of CEO compensation and its determinants

CB includes salary and bonus, SB includes stock options and restricted stocks, SR is the market rate of return of the firm stock, ROE is the net income before extraordinary items and discontinued operations divided by total common equity, TA is log of total assets, MB is equal to (market value of equity + book value of debt) / total asset, SHP is the % of firm stocks holded by CEO, NMT is the number of board meeting in the year, DR is the long term debt divided by the market value of equity, CR is (cash inflows from operating activities plus cash outflows to investing activities) / the market value of equity, CDD is 1 if CEO is also the board of director, and 0 otherwise, ITD is 1 if CEO is involved in a relationship requiring disclosure in the "Compensation Committee Interlocks and Insider Participation" section of the proxy statement, and 0 otherwise.

	ln(CB)	ln(SB)	SR	ROE	TA	Tenure	MB	SHP	NMT	DR	CR	CDD	ITD
ln(CB)	1												
Ln(SB)	.391	1											
SR	.119	.017	1										
ROE	.069	.041	.113	1									
TA	.546	.469	-.008	.038	1								
Tenure	.021	-.042	.028	-.009	-.090	1							
MB	.011	.225	.298	.070	-.085	.045	1						
SHP	-.189	-.124	.020	.004	-.228	.392	.061	1					
NMT	.083	.131	-.078	-.050	.236	-.136	-.048	-.159	1				
DR	-.039	-.070	-.203	-.108	.080	-.045	-.154	.016	.053	1			
CR	-.095	-.039	-.167	-.143	-.059	-.007	-.103	.034	.062	.442	1		
CDD	.022	.005	.038	.011	-.020	.038	.028	.026	-.048	-.068	-.080	1	
ITD	-.095	-.031	.013	.001	-.009	.189	.036	.197	-.100	-.013	-.002	.024	1

Table 3. Ordinary least-squares estimates of Pay-for-Performance of total compensation from 1993 to 2003

The total compensation includes salary, bonus, stock options and restricted stocks, SR is the market rate of return of the firm stock, ROE is the net income before extraordinary items and discontinued operations divided by total common equity, TA is log of total assets. The Return dummy is 1 when the firm's market rate of return is greater than the rate of return of S&P 500 index and 0 otherwise. We call a firm is an Outperformed firm when the Return dummy=1 and an Underperformed firm when the Return dummy=0. We control the industry fixed effect by including dummy variables determined by the two-digit SIC code level. Coefficients of year dummies and industry dummies are suppressed for expositional convenience. Numbers in parentheses denote t-statistics.

dependent variable: ln(total compensation)									
Sample	Whole range			1993~2000			2001~2003		
Variable	All firms	Out-performed	Under-performed	All firms	Out-performed	Under-performed	All firms	Out-performed	Under-performed
Intercept	3.733 (54.03)***	3.849 (38.46)***	3.575 (36.26)***	3.802 (49.16)***	3.935 (32.36)***	3.691 (35.19)***	4.213 (32.12)***	4.150 (26.43)***	4.072 (17.41)***
Market return SR	0.125 (4.58)***	0.236 (5.15)***	0.061 (1.60)	0.186 (6.07)***	0.254 (4.46)***	0.141 (3.46)***	-0.078 (-1.30)	0.192 (2.48)**	-0.271 (-2.50)**
ROE	0.052 (4.41)***	0.117 (4.26)***	0.044 (3.38)***	0.050 (3.88)***	0.143 (3.09)***	0.044 (3.36)***	0.064 (2.26)**	0.100 (2.95)***	0.048 (0.97)
Total assets TA	0.437 (75.57)***	0.435 (51.84)***	0.446 (54.10)***	0.424 (63.59)***	0.417 (39.81)***	0.435 (48.14)***	0.466 (40.54)***	0.472 (33.63)***	0.473 (23.5)***
Tenure	-0.003 (-2.60)***	-0.004 (-2.24)**	-0.002 (-1.4)	-0.001 (-0.78)	-0.003 (-1.33)	0.0004 (0.27)	-0.008 (-3.73)***	-0.005 (-2.00)**	-0.015 (-3.58)***
Return dummy	0.058 (2.42)**			0.079 (2.88)***			0.018 (0.36)		
Adjusted R^2	0.42	0.41	0.43	0.41	0.40	0.41	0.42	0.43	0.43
N	9882	4768	5114	7255	3070	4185	2627	1698	929

Table 4. Ordinary least-squares estimates of Pay-for-Performance of cash-based compensation from 1993 to 2003

The cash-based compensation includes salary and bonus, SR is the market rate of return of the firm stock, ROE is the net income before extraordinary items and discontinued operations divided by total common equity, TA is log of total assets. The Return dummy is 1 when the firm's market rate of return is greater than the rate of return of S&P 500 index and 0 otherwise. We call a firm is an Outperformed firm when the Return dummy=1 and an Underperformed firm when the Return dummy=0. We control the industry fixed effect by including dummy variables determined by the two-digit SIC code level. Coefficients of year dummies and industry dummies are suppressed for expositional convenience. Numbers in parentheses denote t-statistics.

dependent variable: ln(Salary and Bonus)									
Sample	Whole range			1993~2000			2001~2003		
Variable	All firms	Out-performed	Under-performed	All firms	Out-performed	Under-performed	All firms	Out-performed	Under-performed
Intercept	3.939 (66.59)***	4.062 (45.92)***	3.995 (48.74)***	3.923 (62.81)***	4.107 (40.70)***	3.990 (48.47)***	4.130 (32.5)***	4.115 (26.08)***	4.256 (18.69)***
Market return SR	0.198 (8.47)***	0.103 (2.54)**	0.308 (9.70)***	0.168 (6.80)***	-0.008 (-0.18)	0.305 (9.55)***	0.273 (4.71)***	0.305 (4.01)***	0.240 (2.28)**
ROE	0.055 (5.51)***	0.133 (5.45)***	0.032 (2.97)***	0.038 (3.65)***	0.170 (4.43)***	0.021 (2.02)**	0.131 (4.81)***	0.113 (3.40)***	0.157 (3.14)***
Total assets TA	0.322 (65.09)***	0.326 (43.98)***	0.311 (45.32)***	0.323 (59.98)***	0.323 (37.16)***	0.311 (43.93)***	0.319 (28.62)***	0.329 (23.92)***	0.298 (15.22)***
Tenure	0.008 (9.05)***	0.008 (5.51)***	0.009 (7.31)***	0.010 (10.08)***	0.009 (5.73)**	0.011 (8.46)***	0.004 (1.73)*	0.004 (1.70)*	0.002 (0.47)
Return dummy	0.064 (3.13)**			0.071 (3.21)***			0.036 (0.73)		
Adjusted R^2	0.34	0.32	0.34	0.37	0.35	0.38	0.29	0.29	0.28
N	9882	4768	5114	7255	3070	4185	2626	1698	929

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level.

Table 5. Ordinary least-squares estimates of Pay-for-Performance of stock-based compensation from 1993 to 2003

The stock-based compensation includes stock options and restricted stocks, SR is the market rate of return of the firm stock, ROE is the net income before extraordinary items and discontinued operations divided by total common equity, TA is log of total assets. The Return dummy is 1 when the firm's market rate of return is greater than the rate of return of S&P 500 index and 0 otherwise. We call a firm is an Outperformed firm when the Return dummy=1 and an Underperformed firm when the Return dummy=0. We control the industry fixed effect by including dummy variables determined by the two-digit SIC code level. Coefficients of year dummies and industry dummies are suppressed for expositional convenience. Numbers in parentheses denote t-statistics.

dependent variable: ln(Stock options and restricted stocks)									
Sample / *Variable*	Whole range			1993~2000			2001~2003		
	All firms	Out-performed	Under-performed	All firms	Out-performed	Under-performed	All firms	Out-performed	Under-performed
Intercept	2.499 (22.14)***	2.532 (15.54)***	2.227 (13.82)***	2.728 (20.98)***	2.701 (13.46)***	2.463 (13.86)***	3.111 (15.99)***	3.134 (12.73)***	2.793 (8.55)***
Market return SR	0.093 (2.13)**	0.397 (5.40)***	-0.148 (-2.38)**	0.225 (4.40)***	0.626 (6.70)***	-0.066 (-0.95)	-0.266 (-3.11)***	-0.016 (-0.14)	-0.406 (-2.82)***
ROE	0.040 (2.27)**	0.085 (2.09)**	0.045 (2.30)**	0.044 (2.24)**	0.096 (1.34)	0.048 (2.36)**	0.033 (0.85)	0.066 (1.36)	0.013 (0.19)
Total assets TA	0.472 (51.61)***	0.472 (35.90)***	0.493 (37.52)***	0.440 (40.69)***	0.430 (26.00)***	0.475 (31.82)***	0.546 (32.44)***	0.556 (25.77)***	0.552 (19.71)***
Tenure	-0.004 (-2.08)**	-0.002 (-0.64)	-0.006 (-2.25)**	-0.003 (-1.41)	-0.001 (-0.14)	-0.005 (-1.67)	-0.005 (-1.33)	-0.003 (-0.77)	-0.008 (-1.25)
Return dummy	0.061 (1.58)			0.076 (1.70)*			0.004 (0.05)		
Adjusted R^2	0.35	0.34	0.37	0.33	0.33	0.32	0.39	0.36	0.42
N	7758	3767	3991	5618	2383	3235	2140	1384	756

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level.

Table 6. Tobit regression results for CEO cash-based compensation

The cash-based compensation includes salary and bonus. The whole data period is from 1993 to 2003 and we analyze two sub-periods, 1993~2000 and 2001~2003. We set up the Return dummy that is equal to 1 when the firm's stock return is higher than that of S&P 500 index and 0 otherwise. We denote the firm with Return dummy=1 as an Outperformed firm and Return dummy=0 as an Underperformed firm. TA is log of total assets, MB is equal to (market value of equity + book value of debt) / total asset, SHP is the % of firm stocks holded by CEO, NMT is the number of board meeting in the year, DR is the long term debt divided by the market value of equity, CR is (cash inflows from operating activities plus cash outflows to investing activities) / the market value of equity, CDD is 1 if CEO is also the board of director, and 0 otherwise, ITD is 1 if CEO is involved in a relationship requiring disclosure in the "Compensation Committee Interlocks and Insider Participation" section of the proxy statement, and 0 otherwise. We control the industry fixed effect by including dummy variables determined at the two-digit SIC code level. Coefficients of year dummies and industry dummies are suppressed for expositional convenience. Numbers in parentheses denote t-statistics.

Dependent Variable: % of cash-based compensation						
Sample / *Variable*	1993~2000			2001~2003		
	All firms	Out-performed	Under-performed	All firms	Out-performed	Under-performed
Intercept	1.066 (8.78)***	0.747 (4.55)***	0.991 (17.33)***	0.796 (6.79)***	0.945 (6.92)***	0.599 (2.67)***
Market to Book ratio, MB	-0.013 (-8.27)***	-0.011 (-5.94)***	-0.019 (-5.17)***	-0.033 (-7.26)***	-0.034 (-6.70)***	-0.031 (-3.15)***
Tenure	0.003 (6.67)***	0.003 (4.59)***	0.003 (4.87)***	0.003 (3.96)***	0.002 (2.53)**	0.005 (3.35)***
CEO ownership, SHP	0.546 (11.55)***	0.551 (7.32)***	0.546 (8.99)***	0.634 (6.72)***	0.567 (4.87)***	0.740 (4.59)***
Number of board meeting, NMT	-0.005 (-4.52)***	-0.006 (-3.20)***	-0.005 (-3.33)***	-0.002 (-1.02)	-0.001 (-0.25)	-0.004 (-1.11)
Total assets, TA	-0.042 (-18.95)***	-0.037 (-10.79)***	-0.046 (-15.74)***	-0.049 (-13.34)***	-0.053 (-11.32)***	-0.044 (-7.12)***
Debt ratio, DR	0.014 (4.91)***	0.038 (2.47)**	0.013 (4.38)***	0.006 (0.83)	-0.002 (-0.13)	0.008 (0.94)
Cash ratio, CR	-0.065 (-3.38)***	-0.087 (-1.69)*	-0.065 (-3.13)***	0.035 (2.23)**	0.052 (1.85)*	0.031 (1.51)
Dual CEO/Director, CDD	-0.027 (-0.72)	0.044 (0.70)	-0.064 (-1.37)	-0.112 (-1.41)	-0.109 (-1.18)	-0.101 (-0.64)
Interlock dummy, ITD	0.037 (3.50)***	0.029 (1.77)*	0.040 (3.06)***	0.034 (1.31)	0.043 (1.44)	0.010 (0.19)
Return dummy	0.0004 (0.06)			0.063 (5.74)***		
Pseudo R^2	0.6430	0.6117	0.6905	0.5342	0.6089	0.4885
Number of uncensored observations	7334	3006	4328	2604	1671	933
Log likelihood	-378.959	-177.893	-186.169	-226.110	-101.342	-109.108

*** Significant at 1% level, ** Significant at 5% level , * Significant at 10% level

Table 7. Tobit regression results for CEO stock-based compensation

The stock-based compensation includes stock options and restricted stocks. The whole data period is from 1993 to 2003 and we analyze two sub-periods, 1993~2000 and 2001~2003. We set up the Return dummy that is equal to 1 when the firm's stock return is higher than that of S&P 500 index and 0 otherwise. We denote the firm with Return dummy=1 as an Outperformed firm and Return dummy=0 as an Underperformed firm. TA is log of total assets, MB is equal to (market value of equity + book value of debt) / total asset, SHP is the % of firm stocks holded by CEO, NMT is the number of board meeting in the year, DR is the long term debt divided by the market value of equity, CR is (cash inflows from operating activities plus cash outflows to investing activities) / the market value of equity, CDD is 1 if CEO is also the board of director, and 0 otherwise, ITD is 1 if CEO is involved in a relationship requiring disclosure in the "Compensation Committee Interlocks and Insider Participation" section of the proxy statement, and 0 otherwise. We control the industry fixed effect by including dummy variables determined at the two-digit SIC code level. Coefficients of year dummies and industry dummies are suppressed for expositional convenience. Numbers in parentheses denote t-statistics.

Dependent Variable: % of stock-based compensation						
Sample / *Variable*	1993~2000			2001~2003		
	All firms	Out-performed	Under-performed	All firms	Out-performed	Under-performed
Intercept	-0.259 (-1.52)	0.132 (0.60)	-0.134 (-1.74)*	0.081 (0.53)	-0.087 (-0.50)	0.275 (0.91)
Market to Book ratio, MB	0.016 (7.94)***	0.013 (5.51)***	0.025 (5.09)***	0.044 (7.74)***	0.045 (6.94)***	0.045 (3.65)***
Tenure	-0.003 (-5.51)***	-0.004 (-3.90)***	-0.003 (-3.98)***	-0.004 (-4.17)***	-0.003 (-2.39)**	-0.007 (-3.99)***
CEO ownership, SHP	-1.091 (-15.04)***	-1.085 (-9.54)***	-1.098 (-11.67)***	-0.961 (-7.32)***	-0.945 (-5.91)***	-0.972 (-4.25)***
Number of board meeting, NMT	0.004 (2.92)***	0.007 (2.31)**	0.004 (1.94)*	0.0001 (0.03)	0.000 (0.08)	0.002 (0.39)
Total assets, TA	0.033 (11.09)***	0.028 (5.97)***	0.037 (9.56)***	0.048 (10.30)***	0.051 (8.52)***	0.046 (5.87)***
Debt ratio, DR	-0.020 (-5.06)***	-0.053 (-2.52)**	-0.018 (-4.46)***	-0.021 (-2.54)**	-0.020 (-1.20)	-0.023 (-2.25)**
Cash ratio, CR	0.077 (2.92)***	0.120 (1.73)*	0.075 (2.62)***	-0.021 (-1.06)	-0.021 (-0.59)	-0.023 (-0.89)
Dual CEO/Director, CDD	0.147 (2.88)***	0.079 (0.93)	0.182 (2.85)***	0.204 (1.90)*	0.198 (1.63)	0.245 (1.08)
Interlock dummy, ITD	-0.082 (-5.86)***	-0.053 (-2.35)**	-0.100 (-5.63)***	-0.075 (-2.16)**	-0.089 (-2.27)**	-0.024 (-0.34)
Return dummy	-0.001 (-0.16)			-0.056 (-4.03)***		
Pseudo R^2	0.1515	0.1483	0.1591	0.1618	0.1541	0.1916
Number of uncensored observations	5664	2333	3331	2123	1365	758
Log likelihood	-3380.927	-1414.629	-1951.676	-1180.399	-719.637	-444.559

Table 8. Probit regression from the two sub-period of 1993~2003

We use the data in the two sub-period, 1993~2000 and 2001~2003. The dependent variable is the Return dummy that is equal to 1 when the firm's stock return is higher than that of S&P 500 index and 0 otherwise. TA is log of total assets, MB is equal to (market value of equity + book value of debt) / total asset, SHP is the % of firm stocks holded by CEO, NMT is the number of board meeting in the year, DR is the long term debt divided by the market value of equity, CR is (cash inflows from operating activities plus cash outflows to investing activities) / the market value of equity, CDD is 1 if CEO is also the board of director, and 0 otherwise, ITD is 1 if CEO is involved in a relationship requiring disclosure in the "Compensation Committee Interlocks and Insider Participation" section of the proxy statement, and 0 otherwise. We control the industry fixed effect by including dummy variables determined at the two-digit SIC code level. Coefficients of year dummies and industry dummies are suppressed for expositional convenience. Numbers in parentheses denote z-statistics.

Dependent variable: Return dummy (1=Outperformed firm, 0=Underperformed firm)		
Variable	1993~2000	2001~2003
Intercept	0.399 (0.63)	1.170 (1.92)*
Market to Book ratio, MB	0.227 (12.73)***	0.106 (3.61)***
Tenure	0.002 (0.71)	-0.002 (-0.45)
CEO stock ownership, SHP	-0.114 (-0.46)	-0.303 (-0.66)
Number of board meeting, NMT	-0.016 (-2.73)***	-0.023 (-2.29)**
Total assets, TA	0.035 (2.95)***	-0.010 (0.52)
Debt ratio, DR	-0.307 (-7.06)***	-0.099 (-2.57)***
Cash ratio, CR	-0.586 (-3.03)***	-0.173 (-1.10)
Dual CEO/Director, CDD	-0.178 (-0.69)	-0.279 (-0.68)
Interlock dummy, ITD	-0.132 (-2.43)**	0.413 (3.04)***
Pseudo R^2	0.1143	0.0458
Wald statistics	710.36***	130.33***

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level.

OWNERSHIP STRUCTURE AND PERFORMANCE IN LARGE SPANISH COMPANIES. EMPIRICAL EVIDENCE IN THE CONTEXT OF AN ENDOGENOUS RELATION

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Abstract

The aim of this paper is to study the relationship between ownership structure and firm value. This relationship is analyzed taking into account not only the endogenous character of ownership but also the peculiarities of the Spanish corporate system. For this purpose, we select a balanced panel of 101 companies quoted in the Madrid exchange market from 1991 through 1997. We have applied econometric panel data techniques (generalized method of moments, gmm), which allows us to control the endogeneity problem through instruments. Our results confirm the positive effect of ownership concentration on firm market value. This relationship is robust to the inclusion of variables regarding the nature of the main shareholder, firm industry and time. Furthermore, we present some evidence about the relationship between the type of control (majority and minority) and a firm's market value.

Keywords: ownership structure, corporate performance, endogenous variable, generalized method of moments (gmm).

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1. Introduction

The relation between ownership structure and firm value is one of the most interesting issues in corporate finance. It is the subject of continuous debate since the original paper of Berle and Means (1932). In recent years the discussion has centred on an assessment of the relative advantages and drawbacks of concentrated ownership structure as opposed to the separation between management and ownership. It is reasonable to think, on the one hand, that concentrated ownership prevents certain problems emerging out of a divergence of interests. However, on the other hand, it is also logical to assume that, on certain occasions, specialisation may prove necessary for management to have the capacity to handle complex organisational structures, diversify risk among shareholders and obtain large enough funds to acquire specific assets.Indeed, there is no shortage of proposals which consider ownership concentration to be a monitoring mechanism, endowed with incentives to reconcile the interests of shareholders and management alike, and thus a determining factor in the value maximization. Such papers include, for example, Jensen (1986), Stiglitz (1985) and Shleifer and Vishny (1986), who foresee the possibility of concentrating ownership in the hands of a limited number of shareholders so as to monitor the behaviour of management and prevent inefficient use of resources. Positing the question thus, the benefits emerging from control over management favour the existence of a positive relation between ownership concentration and firm value[1]. Over-concentration of ownership may, however, prove to be an obstacle to exploiting growth opportunities as well as discouraging innovation and management initiative (Burkart et al., 1997; Hill and Snell, 1988), when such situations require greater specialisation both in management and provision of capital and risk taking. Further, it should not be forgotten that in corporate systems with a high ownership concentration, minority shareholders may suffer risk expropriation of wealth from majority shareholders (Shleifer and Vishny, 1997). Such expropriation merely aggravates the agency problem and reduces the firm's market value[2].

Recently, Demsetz and Villalonga (2001) intensify the controversy, evoking the former's

[1] The aim is to avoid the *free-rider* problem which emerges in highly disperse shareholder structures, due to the imbalance existing between the effort required to control management behaviour and the benefits such monitoring entails (Jensen, 1986; Stiglitz, 1985).

[2] Shleifer and Vishny (1997) state that in certain countries the main agency problem arises from the conflict of interests between majority owners, who exercise control, and minority shareholders, rather than any conflict between ownership and management.

analysis (Demsetz, 1983) with fresh studies and approaches, although in the same vein: "the structure of ownership is the endogenous result of various decisions reflecting shareholders' influence and stock movement in the market". In other words, no systematic relation should exist between changes in ownership and company efficiency. Underlying their analysis is a question which has shaped research into the issue of ownership structure in recent years, endogeneity. After modelling ownership structure as an endogenous variable and assessing two aspects of this structure, concentration of shareholdings and percentage of shares owned by management for a sample of American companies, Demsetz and Villalonga (2001) find evidence to support endogeneity of ownership but not its influence on value.

In this context, our paper aims to verify common hypotheses concerning ownership structure in Spanish companies, bearing in mind its potential endogenous nature as well as the specific corporate system in which firms operate, far removed from the Anglo-American system. As is well known, the Spanish corporate system is characterised by high ownership concentration, the presence of dominant shareholders and active financial intermediaries, and weak external control mechanisms. Taking these factors into account, our research follows on from previous studies, such as those of Galve and Salas (1993), Azofra, Rodríguez and Vallelado (1995), Andrés, Azofra and Rodríguez (2000) and Miguel, Pindado and Torre (2004), assessing the relation between ownership structure and firm value in a Spanish setting. To one degree or another, all of these studies reflect a certain linkage between ownership and value, the hypothesis of efficient supervision being the dominant factor to emerge. Yet, given the importance of endogeneity, these analyses should be re-appraised in this context so as to review their conclusions and determine, if indeed this is the case, the causality of the relation. The sole exception is the paper by Miguel *et al* (2004) that explicitly takes into account the endogenous nature of the corporate ownership.

For our research we used a balanced panel of 101 non-financial Spanish firms quoted on the capital market between 1991-1997 (707 observations) as well as the econometric method provided by the Generalized Method of Moments (GMM). This estimation technique is particularly suitable as it includes instruments to monitor endogeneity of variables, avoid non-observable permanent heterogeneity arising from the specific characteristics of firms and analyse response processes over time. The results obtained bear out the positive effect of ownership concentration on firm value, a relation which holds after the inclusion of variables reflecting the nature of the largest shareholders, the industry or time. We also evidence the effect of various kinds of monitoring (minority and majority) on firm value.

The study is structured as follows. Section 2 discusses the endogenous nature of ownership structure. Section 3 reviews the theoretical and empirical literature on ownership and value from the perspective of endogeneity (exogeneity) and posits the hypotheses to be verified. Section 4 describes the sample of firms and the methodological approach adopted. Section 5 offers the main empirical results to emerge and, finally, section 6 rounds off the paper with the main conclusions.

2. Endogeneity and Ownership Structure

Analyses dealing with ownership structure may be split into two main blocks; those which consider ownership as a dependent variable or one which may be explained by a series of factors, and those which see it as a basic variable that affects the firm value. Within this second group, there is a certain discrepancy as to whether ownership is an exogenous or endogenous variable.

From the theoretical standpoint, exogeneity of ownership structure means that ownership is determined "outside" the firm (Goergen, 1998, pages. 9-10). In other words, it is a factor which is external or outside the nature of the enterprise. Yet, ownership structure has traditionally been justified in terms of a series of factors within the firm itself, inherent to the area of industry or sector in which it operates –such as size, the regulatory climate, risk, the degree of financial leverage …- (Bergström and Rydqvist, 1990; Leech and Leahy, 1991; Rodríguez, 1997 and Crespí, 1998). The endogenous nature of ownership structure therefore seems to closely reflect the influence that certain aspects of the firm exercise over it.

If the endogenous nature of ownership structure is accepted, in the sense that it is not determined randomly, we should bear in mind the impact of causality when analysing any relations which might be established between ownership and other aspects of the firm and, between these and firm value.

Much of the controversy to have emerged in recent years surrounding the endogenous or exogenous treatment of ownership structure is closely related to the arguments, yet to be totally confirmed in their extremes, put forward by Demsetz (1983): "*the ownership structure of firms is the endogenous result of competitive selection in which the advantages and disadvantages in costs are balanced to achieve a balanced organisation in the firm*". For Demsetz, a firm's ownership structure, whether concentrated or disperse, should maximise its value. Therefore, no systematic and generalised relation ought to exist between differences in ownership and variations in firm

performance. Nearly twenty years on, Demsetz and Villalonga (2001) maintain the same idea. In the intervening period, numerous empirical proposals have emerged, which we now examine, highlighting their main conclusions.

3. The relation between ownership structure and firm value. A survey of empirical evidence

A review of the empirical evidence on the influence of ownership structure on firm performance reflects the existence of two "groups" of papers dependent on the endogenous or exogenous nature assumed and which differ in: i) the treatment of endogeneity, ii) the evaluation techniques used for empirical analysis and, most importantly, iii) the conclusions to emerge (Demsetz and Villalonga, 2001).

3.1. Considering ownership as an exogenous variable

The first group of studies considers ownership structure as an exogenous variable, and does not therefore contemplate that both *insiders* and *outsiders* may effectively impact or manipulate firm ownership and control mechanisms (Goergen, 1998, page 22).

Amongst the empirical studies providing evidence for the relation existing between value and ownership, without considering endogeneity, prominent are the papers of Shleifer and Vishny (1986), Morck, Shleifer and Vishny (1988), Agrawall and Mandelker (1990), McConnell and Servaes (1990) and Leech and Leahy (1991). For the case of Spain, the studies of Galve and Salas (1993), Azofra, et al. (1995) and Andrés et al. (2000) merit particular attention.

Many of these papers, undertaken mainly in an Anglo-American environment, focus on the relation between the fraction of shares owned by management and firm value (Morck et al., 1988; McConnell and Servaes, 1990; Leech and Leahy, 1991). Their conclusions differ considerably as there is, for instance, no agreement vis-à-vis any lineal or non-lineal relation between management shareholdings and firm performance. Nor is there any consensus amongst authors proposing a non-lineal relation as to what fraction of shares owned by management may have a positive or negative impact on a firm value (Morck et al. 1988; McConnell and Servaes, 1990) [3].

Others assume the fraction of shares owned by a corporation's largest shareholders to be a representative element of ownership structure. The studies of Shleifer and Vishny (1986) and Agrawall and Mandelker (1990) underscore the positive relation between concentration and performance, such that an increase on the largest shareholders' fraction of shares is reflected in an improvement in value, or the works of Morck, Nakamura and Shivdasani (2000) and Gedajlovic and Shapiro (1998) who, focusing on a non-lineal relation between ownership concentration and value, find diverging and contradictory evidence depending on the corporate system in which the relation is analysed. For the case of Spain, evidence to support the monitoring effect of ownership concentration may be found in Galve and Salas (1993) and Azofra et al. (1995) and as an obstacle to maximising growth opportunities in Andrés et al.(2000).

Almost all of the papers cited employ transversal analyses and use least square regression techniques. Yet if, as recent literature would seem to suggest, the exogeneity hypothesis is not valid, explanatory variables would be correlated with the residual error term and estimators would not be consistent, meaning that such relations would require verification.

3.2. Ownership as an endogenous variable

In recent years a growing number of studies have considered ownership structure to be an endogenous variable, and have assessed the relation between ownership structure and firm performance. This not only provides an analysis of the causality of ownership on firm value but also speculates as to the determining factors in different kinds of ownership. To a large degree, this has become possible due to the development of various techniques which facilitate endogenous treatment of the variables involved in estimation. Such is the case of the simultaneous equations method, using transversal data, and the Generalised Method of Moments, with a panel of data.

Prominent amongst papers addressing a certain level of endogeneity in ownership structure are those of Demsetz and Lehn (1985), Hermalin and Weisbach (1988), Loderer and Martin (1997), Cho (1998), Goergen (1998), Demsetz and Villalonga (2001) and Miguel *et al*. (2004). As a representative

[3] For example, Morck et al. (1988) assess the relation between firm performance and management ownership, using lineal regression in sections, and find evidence of a significant non-monotonic relation: Tobin's Q initially increases at a management participation level of between 0% and 5%, falls between 5% and 25% and finally increases gradually as management ownership exceeds 25% of capital. The interpretation of these findings is consistent with the effects of the convergence of interests and "collusion" between shareholders and management although, as the authors themselves confess, the choice of these cut-off points has no specific theoretical basis. It is also interesting to highlight that studies which have repeated this particular work (using at times even the same sample) have evidenced different effects or indeed no impact of management ownership on firm value.

variable of ownership, most use some measure of the fraction of shares owned by management or the board of directors. The emerging results are quite contradictory, in the sense that when estimating regression in sections, similar to the approach advocated by Morck et al. (1988), significant non-monotonic relations are observed between management ownership and performance (Hermalin and Weisbach, 1988). However, when simultaneous equation systems are proposed in which both the measure of performance as well as ownership are endogenous, the conclusion is that ownership structure fails when predicting value, although the opposite is not the case (Loderer and Martin, 1997; Cho, 1998; Demsetz and Villalonga, 2001).

In addition to the explicit consideration of endogeneity, this disparity in results concerning the ownership - performance relation may be explained by the way in which firm performance is measured and the representative variable of ownership structure being used (Demsetz and Villalonga, 2001). A review of the literature, again addressing the Anglo-American setting, reflects that for both endogenous and exogenous treatment of ownership, Tobin's Q is used, and occasionally, return on equity. As regards *ownership structure,* the use of two factors is also worthy of note, the fraction of shares owned by management and the fraction of shares owned by the largest shareholders[3].

In short, numerous alternative evaluation proposals yielding a diversity of outcomes is how we may sum up a review of the literature. Whilst no consensus appears to have been reached as to the relation between ownership structure and firm value, clear progress does seem to have been made in the empirical literature. The first reflects the need to consider the endogenous nature of ownership structure. The second, a consequence of the previous one, refers to the use of techniques enabling us to tackle endogeneity and address an assessment of analysis processes over time. The third and last deals with the analysis of the corporate system where firms operate, whether in terms of the level of concentration or degree of minority shareholder protection (Laporta et al., 1999). As regards the theoretical setting, proposals are much clearer: the initial hypothesis of monitoring and reduction of divergence of interests (Berle and Means, 1932; Jensen and Meckling, 1976; Jensen, 1986; Stigliz, 1985; Shleifer and Vishny, 1986; Morck et al., 1988) defending the positive relation between ownership and firm performance[4], the specialisation hypothesis (Burkart et al., 1997) advocating just the opposite, and the null hypothesis of the absence of any linkage between ownership and performance (Demsetz and Lehn, 1985; Demsetz and Villalonga, 2001).

The aim of our paper is to verify the validity of these hypotheses for the case of Spain, bearing in mind the progress made in the empirical literature (consideration of endogeneity, longitudinal econometric techniques) and framing the analysis within the specific case of the Spanish corporate system, namely, contemplating the existence of majority shareholder blocks, groups of relevant shareholders, the effective presence of financial intermediaries and a restrictive regulatory corporate control market. We therefore focus our attention on the involvement of main shareholders, on the nature of the largest shareholder and on the use of techniques that enable us to tackle endogeneity. In the following section we will examine the empirical analysis.

4. Methodological Issues: Sample, Variables And Methodology

4.1. Sample

The sample used in our analysis comprises a panel of 101 non-financial firms listed on the Spanish stock market between 1991-1997. The selection criteria for the sample over the whole of the firms listed is defined in terms of the frequency with which the stocks are traded, so as to ensure a minimum level of efficiency in investors' valuations. With this goal in mind we chose all non-financial firms most commonly traded on the stock market during the period assessed. The combination of the 101 firms and the seven periods studied provides a balanced panel with 707 observations which can be analysed using panel data methodology. These firms account for a little over half the number listed on the Spanish stock market, and around 80 per cent of total stock market capitalisation together with nearly 66 per cent of the value of all company assets. Information was gathered from the Business Register at the Spanish Securities and Exchange Commision (CNMV) and the Madrid Stock Exchange.

[3] The interaction that may exist between these two factors should not be overlooked, as they need not necessarily be disjoint groups. One of the main shareholders might, for instance, be a director or one of the managers might be representing someone with a high degree of ownership, in which case their interests would be more closely aligned with those of outside investors than of management.

[4] Within this generic hypothesis there would also be the possibility of the expropriation of wealth of minority by majority shareholders (Shleifer and Vishny, 1986) and which would entail a negative relation for high concentration percentages.

Table 1. Distribution by industry sector and firm size

	Num	Assets			Capitalisation		
	%	Mean	Median	Variation coefficient	Mean	Median	Variation coefficient
Food	13.58%	55,438	31,802	1.1902	41,197	17,099	1.6420
Construction and Materials	23.46%	70,967	43,500	1.1636	51,546	26,916	1.2985
Real estate	9.88%	45,333	15,564	1.1927	21,453	6,430	1.7381
Transport and Communications	11.11%	527,422	42,794	2.3531	284,549	38,157	2.5317
Commerce	3.70%	109,397	26,986	1.2641	135,936	17,343	1.3649
Electricity	16.05%	613,886	256,317	1.2561	351,476	154,934	1.5608
Chemical and Energy	11.11%	217,743	23,280	1.9717	186,157	12,067	2.1980
Other services	4.94%	10,033	6,166	0.7304	12,990	4,263	1.6449
Metal-Mechanics	6.17%	20,066	22,045	0.7242	10,220	6,291	1.2139
Mining-Iron and steel	9.88%	37,556	27,553	0.9975	28,884	7,076	1.8313
Automobiles & Parts	3.70%	139,731	153,775	0.5589	37,735	32,063	0.7329
Textile and Paper	11.11%	26,240	13,240	1.0681	10,972	7,353	1.1313

Table 2. Mean of ownership structure and Q

Year	*C1 (%)*	*AJ (%)*	*Q*
1991	*38.26*	*9.76*	*1.13*
1992	*41.84*	*10.54*	*0.96*
1993	*42.54*	*9.64*	*1.19*
1994	*44.34*	*10.05*	*1.25*
1995	*45.29*	*11.04*	*1.20*
1996	*46.43*	*9.01*	*1.33*
1997	*44.59*	*8.50*	*1.59*

Table 1 offers an overview of the nature of the firms that make up the sample under analysis. In accordance with the nature of the firms quoted, the companies selected belong to twelve differing industries and may be considered medium and large companies within the Spanish business context. There is, however, a high degree of heterogeneity as regards mean size and company turnover, as a result of which the size bias over the whole of the sample is less than expected. Table 1 also highlights the different weight of the industries in terms of the number and size of traded firms. Worthy of note is the high proportion of sectors such as construction and materials, electricity companies and food in comparison to the commerce, services and automobiles industries.

4.2. Variables

Variables may be classified into three groups: company valuation by the market, ownership structure and control variables.

For company valuation by the market, we used Tobin's Q or one of its versions as is common in this type of study (Morck et al., 1988; McConnell and Servaes, 1990; Cho, 1998; Demsetz and Villalonga, 2001; Azofra et al. 1995; Andrés et al. 2000; Miguel et al., 2004). We use the financial Q or quotient between the market value of the firm and its accounting value[5].

With regard to the variables related to ownership structure, two measures are considered, reflecting two key aspects of ownership, the fraction of shares owned by the largest shareholder (C1) and the fraction of shares owned by the directors (AJ)[6]. Table 2 sums up the mean values achieved by these variables during each of the periods analysed.

Differences immediately emerge between the two variables representative of ownership structure, not only in terms of absolute values – ownership concentration reaches much higher values than board participation -, but also as to their evolution over time –increasing for concentration and slightly decreasing for board participation. As regards the

[5] Chung and Pruitt (1994) compare the financial Q values with Linderberger and Ross' (1981) Tobin Q values, the results showing that the financial Q accounts for at least 96.6% of Tobin's Q.

[6] As regards the latter variable, the ideal situation would be to analyse the percentage of social capital in the hands of the board. However, firms do not provide this information although it is not too speculative to assume that they have many determining factors in common.

evolution of the financial Q, greater variations are seen in keeping with cyclical variations in the economy.

In order to delve more deeply into the differences characterising the two factors representative of ownership structure in our country, we performed a breakdown of ownership into sections (table 3). It can thus be seen the fraction of shares owned by the board is below 5% in 67.33% of companies, whereas ownership concentration in the hands of the largest shareholder is above 50% in 38.61% of firms. This reveals the high ownership concentration of Spanish firms.

Table 3. Breakdown of C1 and AJ by sections

	% of Companies	
Participation	According to C1	According to AJ
> 50 %	38.61%	0.99%
25 % - 50 %	33.66%	13.86%
10 % - 25 %	21.78%	9.90%
5 % - 10 %	4.95%	7.92%
< 5 %	0.99%	67.33%

Bearing in mind the previously cited percentages, it is clear that the ownership structure of Spanish firms falls clearly within the European or continental model, in which ownership concentration is the mechanism to reduce agency problems. Yet, as pointed out, ownership concentration has its drawbacks as well as its advantages. One advantage is that it leads to more effective control over the discretional nature of the management although, on the other hand, specialisation between management and ownership is lost, which is especially required when growth opportunities emerge. Moreover, we should not overlook the risk of establishing agreements between majority shareholders and the managers so as to expropriate minority shareholders' wealth.

To analyse the impact of ownership concentration on value more closely, we divide the fraction of shares owned by the largest shareholder, C1, into three variables. The first, CON1, includes concentration values up to 20%, such that if the level of concentration, represented by C1, is below this limit, the CON1 variable is equal to C1, and if higher takes the value 20%. The second, CON2 takes the value 0 if C1 is below 20%, is equal to 30% if above 50%, and if between 20 and 50%, will be equal to C1 less 20%. Finally, the third variable, CON3, takes the value 0 if C1 is below 50% and in another case will be equal to C1 less 50 %. In other words, CON1 reflects minority concentration levels in all observations, and will thus have a negative impact on the firm's value; and CON2 and CON3, majority concentration levels, leading to the expectation of a positive relation with company value, particularly for the higher concentration level (CON3).

Finally, we included three control variables– size of the firm, level of financial leverage and risk- which might significantly impact company value and ownership structure. The size of the company is approached by the natural logarithm of book value of assets (LNTA), since the inclusion of the variable in absolute terms might lead to heteroskedasticity and spurious correlation problems. Degree of financial leverage (LEV) –an alternative approach to monitor board behaviour but at the same time one which may hinder maximisation of investment opportunities- is calculated as the quotient between the book value of debt and the book value of equity. Finally, as a representative measure of risk we include the beta of the industry (INDBETA).

Industrial allocation of companies is performed through a set of 12 dummies. We also introduced various control groups within the firm through a set of dummy variables which enable their classification into 5 groups depending on the nature of the largest shareholder –financial entities, goverment, families and private individuals, multinationals and other domestic firms. Differentiating the largest shareholders is important as control may vary depending on experience in monitoring and incentives for those involved. Although these variables were not mentioned in the theoretical discussion of the study, their inclusion for the case of Spain may prove relevant as the corporate system is highly concentrated in terms of share ownership, whereas firms in the Anglo-American system tend to maintain diffuse ownership, where corporate groups are not so relevant. Table 4 reflects the values adopted by these variables in the sample set through their basic statistics.

Table 4. Descriptive statistics

	Mean	Median	Standard Dev.	Max	*Min*
Q	1.2375	1.0457	0.7515	8.6270	0.2164
C1 (%)	43.3298	39.865	26.6794	99.2000	0.0110
AJ (%)	9.8437	0.897	17.1680	89.8480	0
LEV	0.9078	0.5239	2.1550	35.5000	1.587E-05
LNTA	10.5800	10.4016	1.6137	15.2592	7.5923
INDBETA	0.9689	0.9950	0.1615	1.2900	0.4700
CON1 (%)	17.9901	20.000	4.1595	20.000	0.0110
CON2 (%)	16.8936	19.800	12.8274	30.000	0.0000
CON3 (%)	8.4130	0.000	14.4032	49.200	0.0000

4.3. Econometric Methodology

Having defined the sample and the variables used in the analysis, we briefly describe the econometric methodology employed, which is closely linked to having a panel of observations for seven one-year periods. The estimation approach used is the Generalised Method of Moments (GMM) which, on the one hand, enables the inclusion of instruments to control endogeneity of variables and, on the other, avoids constant non-observable heterogeneity arising out of the specific features of each firm which remain over time and which, in general, are difficult to observe and include in econometric models. Moreover, the dynamics of the panel enables an examination of the response processes over time and an observation of the variation of the dependent variable in the face of changes in its own determining factors over the time horizon considered.

Estimation was performed using the DPD98 (Dynamic Panel Data) program developed by Arellano and Bond (1998). To test the validity of the model specification we used the Sargan statistic of over-identification of restrictions, which analyses the absence of correlation between instruments and the error term. We also included statistics m_1 and m_2, to verify the absence of first and second order serial correlation in the first difference residuals, respectively. In addition to these specification contrasts we included in the estimation four Wald contrasts, one (z_1) of joint significance of the coefficients presented; together with three more (z_2, z_3 and z_4) for individual and joint significance of the dummy variables included.

The model proposed to analyse the relation posited includes the value of the firm as a dependent variable. Among the independent variables we include: i) the fraction of shares owned by the largest shareholder (C1) specifically considering its endogenous nature ii) the fraction of shares owned by the directors (AJ), also endogenous and iii) the previously defined control variables (LEV, INDBETA and LNTA). With regard to the variables which may entail problems of endogeneity, shareholder concentration and board participation, instead of using their current values, we use an instrumental variable estimator, the Generalized Method of Moments, and to remove the individual impact of each firm the variables are transformed into first differences.

It should be remembered that for the estimation of these equations the error term is broken down into three components: individual impact, η_i, to control unobservable heterogeneity, time effect, d_t, to control the impact of macroeconomic variables in firm behaviour and, finally, random disturbance itself, v_{it}. Therefore, in analytical terms, the expression to be verified is the following:

$$Q_{it}=\beta_0+\beta_1 C1_{it}+\beta_2 AJ_{it}+\beta_3 LEV_{it}+\beta_4 INDBETA_{it}+\beta_5 LNTA_{it}+d_t+\eta_i+\upsilon_{it}$$

The previous model is subsequently re-estimated replacing the continuous variable C1 with the three concentration variables which require the shareholders participation sections. In this case, the analytical expression adopts the following form,

$$Q_{it}=\beta_0+\beta_1 CON1_{it}+\beta_2 CON2_{it}+\beta_3 CON3_{it}+\beta_4 AJ_{it}+\beta_5 LEV_{it}+\beta_6 INDBETA_{it}+\beta_7 LNTA_{it}+d_t+\eta_i+\upsilon_{it}$$

where the sub-index *i* refers to the various firms included in the sample and the sub-index *t* to the temporal dimension.

5. Results

We begin this section with a few comments concerning some results obtained, although not reported, using the method of Ordinaty Least Squares for each of the periods analysed. As pointed out previously, this approach does not allow specific consideration of the endogeneity of variables, although in order to overcome this restriction we performed our analysis using both current values as well as historical data of potentially endogenous variables. Results do not allow us to verify the hypotheses put forward in any of the cases, as there is no unanimity as to the sign of the concentration coefficients for all the periods, in addition to which these do not even represent a significant variable in many of the cases. Results obtained using the Generalised Method of Moments for the initially proposed model are shown in table 5. The first column reflects the estimation including

the time variables, the second column includes time and industrial variables, and the third includes time variables and the nature of the largest shareholder. In all of them we report the significance of the coefficients (p-value), the serial correlation tests (m_1 and m_2), the Sargan instrument test and the Wald test for the joint significance of the set of variables (z_i). The results achieved in the estimation evidence a positive, systematic and significant relation between ownership concentration and firm value. This relation remains after screening for industrial allocation of firms (B) and for the nature of the main shareholder (C). Both the individual and joint significance tests are highly significant; the Sargan test does not discard the validity of the instruments used; and the correlation tests point to the absence of first and second order serial correlation.

Given that the ownership concentration variable was instrumented, the results provide evidence to favour the benefits to emerge from monitoring on management.

In the setting of a concentrated corporative system such as the Spanish one, ownership concentration emerges as a key mechanism to alleviate agency problems in organisations.

Table 5. GMM Estimation. Corporate Ownership and value

Estimations are performed for 101 firms with a total of 707 observations. The table details the estimated coefficients; the Sargan statistic which verifies the over-identification of restrictions; m_1 and m_2 statistics which compare the absence of first and second order serial correlation relation in the regression residuals; the Wald joint significance tests for all the explanatory variables (z_1) together with a further three (z_2, z_3, z_4) for individual and joint significance of the dummy variables included; and the p-value corresponding to the Student t statistic. The estimated model responds to the following expression:

$$Q_{it}=\beta_0+\beta_1 C1_{it}+\beta_2 AJ_{it}+\beta_3 LEV_{it}+\beta_4 INDBETA_{it}+\beta_5 LNTA_{it}+d_t+\eta_i+\upsilon_{it}$$

Column (A) refers to the inclusion of time dummies, (B) to time and industrial dummies and (C) to time dummies and the nature of the main shareholder.

		(A)		(B)		(C)	
Dependent Variable: Q		Coef. p-value		Coef. p-value		Coef. p-value	
CONSTANT		-0.179 (0.000)	***	-0.190 (0.000)	***	-0.178 (0.000)	***
C1		0.516 (0.002)	***	0.674 (0.019)	**	0.527 (0.022)	**
AJ		0.541 (0.023)	**	0.184 (0.277)		0.485 (0.097)	*
LEV		0.006 (0.071)	*	0.006 (0.103)	*	0.006 (0.056)	*
INDBETA		0.110 (0.261)		0.097 (0.317)		0.105 (0.275)	
LNTA		-0.009 (0.908)		-0.033 (0.697)		-0.020 (0.794)	
TIME		YES		YES		YES	
INDUSTRY				YES			
MAIN SHAREHOLDER						YES	
SARGAN TEST		28.913 (0.417)		25.102 (0.622)		24.048 (0.679)	
Wald Test of join significance	z_1	17.955 (0.003)	***	10.652 (0.059)	**	12.496 (0.012)	**
Wald Test Time Dums	z_2	159.093 (0.000)	***	83.859 (0.000)	***	61.607 (0.000)	***
Wald Test Industry / Nature Largest Shareholder Dums	z_3			18.942 (0.008)	***	11.490 (0.022)	**
Wald Test Both Dums	z_4			159.767 (0.000)	***	163.173 (0.000)	***
First-order serial correlation	m_1	0.140 (0.888)		0.155 (0.908)		0.121 (0.904)	
Second-order serial correlation	m_2	-0.980 (0.327)		-0.980 (0.327)		-0.897 (0.370)	

*** denotes signification at the 1%; ** at 5%; and * at 10% level

The three estimations also point to a similar causality relation in the other endogenous variable representative of ownership structure, director participation in capital (AJ), although its significance is not sufficient in the estimation with industrial variables.

Even with the caution in previous robustness, the resulting relation is totally coherent with the initial outcome, in the sense that participation in ownership provides directors with the incentive to undertake close monitoring and exercise control over management. The joint interpretation of the previous results provides evidence to support the kind of governance characteristic of non-financial Spanish companies: in general terms the relevant control mechanism is concentrated shareholdership and/or partially, the supervision by the board of director.

One further aspect which merits attention is the positive relation between financial leverage and value. As may be inferred from the literature (McConnell and Servaes, 1995; Andrés et al., 2000), the impact of debt on company value may differ when growth opportunities are present or absent, such that a positive impact is to be expected when faced with a lack of profitable investment opportunities, and a negative impact in the contrary case[7]. In the light of the estimations we have undertaken it can be seen that the positive relation between debt and value is upheld even in the case of alternative model specifications, a fact which supports debt as an additional disciplinary mechanism in the Spanish corporate system.

The previous model is re-estimated replacing the continuous variable C1 with the three concentration variables. The estimated coefficients and the various significance and validity tests are shown table 6. As already pointed out, the expected relations were a negative realtion between minority control (CON1) and value (Q), and a positive linkage between majority control (CON2 and, particularly, CON3) and value (Q).

In view of the emerging results, the hypotheses proposed are fully confirmed with regard to minority control (CON1) and partially in the case of majority control (CON3 when industry and time variables are included and CON 2 when only time variable is included). In the final column, when shareholder profile is included, the majority control variable ceases to be significant and is replaced, in full agreement with previous results, by participation of the directors in capital (AJ).

Once again, individual and joint significance tests prove highly significant. The Sargan test does not reject the validity of the instruments used and the correlation tests confirm the absence of first and second order serial correlation. These results again highlight the importance of ownership structure as a control mechanism for management, whether in continuous terms or in specific sections: greater (less) shareholder control leads to greater (less) efficiency.As regards the remaining variables, the positive and significant relation between debt and value is maintained and, therefore, the disciplinary nature of debt. Moreover, and for this estimation, the industrial beta proves to be a significant variable, displaying a beneficial effect on company value.

In short, after having considered the endogenous nature of ownership structure, having used a highly suitable econometric tool and employed a panel of data, the evidence gathered in our stydy supports the view of ownership structure as a key monitoring mechanism in Spanish firms which is also partially complemented with the disciplinary nature of debt. The evidence collected, after overcoming the shortcomings of previous papers addressing the Spanish case, confirm and underscore the findings of said papers, and do not allow us to upscale the conclusions to emerge from Demsetz and Villalonga (2001) to a Spanish context. Since the issue of endogeneity has specifically been addressed and the econometric technique employed vastly improved, explanations must be sought in the nature of the Spanish corporate system itself. If transferring analytical approaches from one context to another is always a risky business, in this case it proves to be unwise. We will always be left with the doubt, constantly updated with new theories, of the hazards involved in this new situation to maximise the benefits of specialisation, particularly in a competitive environment witnessing the ceaseless globalisation of business.

6. Conclusions

Our aim throughout the present study has been to analyse the relation between ownership structure and the value of Spanish firms, bearing in mind its endogenous nature as well as the idiosyncrasies of the corporate system in which firms operate. The most reasonable doubts as to the exogenous nature of ownership structure would seem to advise an explicit consideration of the possible interdependencies which might exist between ownership and value, through the use of vastly improved estimation techniques. Further, the differences existing between Anglo-American type corporate systems –which most studies address- and the continental model, which includes the case of Spain, make it difficult to achieve any unanimous consensus as to the approaches and conclusions obtained.

Applying these considerations – together with the commonly posited theoretical arguments when analysing the relation between ownership and value- to the empirical field was performed using a panel of 101 Spanish companies quoted on the Spanish capital market between 1991-1997. Econometric estimation is based on the Generalised Method of Moments, enabling us to monitor the

[7] When faced with a lack of profitable investment opportunities, debt may act as a control mechanism to minimise the over-investment problems common to such situations (Jensen, 1986), whereas when such opportunities do exist, the impact of debt on value leads firms to reject valuable growth opportunities, in line with the hypothesis of under-investment proposed by Myers (1977) and Jensen and Meckling (1976). Empirical evidence for the Spanish case may be found in Andrés et al. (2000). These authors bear in mind the presence or absence of profitable investment opportunities so as to compare obstacles to specialisation emerging from highly concentrated structures and which are particularly relevant in environments displaying growth opportunities. The results obtained highlight the positive, disciplinary effect of debt on the value of concentrated structure when faced with a lack of growth opportunities.

endogeneity of the variables, avoid non-observable heterogeneity arising from the specific nature of each firm and analyse response processes over time. The empirical evidence obtained leads to two main groups of findings. One the one hand, the results bear out the endogenous nature of ownership structure, highlight the need to replace conventional estimation techniques –mainly based on transversal analyses and least squares- with more robust procedures such as GMM, and bring into question certain previous research papers which failed to take account of the interrelations of these aspects. Further, the findings underscore the need to consider ownership structure as a key control mechanism in Spanish firms, and endow it with considerable importance when it comes to solving conflicts of interest emerging between managers and shareholders, and thus vital importance in the creation of value. In addition, this effect is partially complemented with the disciplinary nature of debt.

Although nowadays a certain consensus is gradually being reached with regard to the need to consider the endogenous nature of ownership structure, once endogeneity has specifically been included in the analysis, the conclusions to emerge differ from those of other similar studies addressing the Anglo-American environment (Demsetz and Villalonga, 2001) and provide empirical support for papers dealing with the Spanish setting (Galve and Salas, 1993; Azofra et al., 1995; Miguel et al., 2004).

Thus, the differing findings to emerge from the various studies addressing one system or another, force us to consider that institutional differences among countries play a crucial role, and that the specific nature of corporate systems is fundamental in the relation between ownership and value.

Table 6. GMM Estimation. Value and structure of ownership Regression on firm value. Concentration in sections

Estimations are performed for 101 firms with a total of 707 observations. The table details the estimated coefficients; the Sargan statistic which verifies the over-identification of restrictions; m_1 and m_2 statistics which compare the absence of first and second order serial correlation relation in the regression residuals; the Wald joint significance tests for all the explanatory variables (z_1) together with a further three (z_2, z_3, z_4) for individual and joint significance of the dummy variables included; and the p-value corresponding to the Student t statistic. The estimated model responds to the following expression:

$$Q_{it}=\beta_0+\beta_1 CON1_{it}+\beta_2 CON2_{it}+\beta_3 CON3_{it}+\beta_4 AJ_{it}+\beta_5 LEV_{it}+\beta_6 INDBETA_{it}+\beta_7 LNTA_{it}+d_t+\eta_i+\upsilon_{it}$$

Column (A) refers to the inclusion of time dummies, (B) to time and industrial dummies and (C) to time dummies and the nature of the main shareholder.

	(A)		(B)		(C)	
Dependent Variable:Q	Coef. p-value		Coef. p-value		Coef. p-value	
CONSTANT	-0.164 (0.000)	***	-0.199 (0.000)	***	-0.153 (0.000)	***
CON1	-1.828 (0.007)	***	-2.3026 (0.003)	***	-2.448 (0.000)	***
CON2	0.535 (0.077)	*	0.077 (0.834)		0.298 (0.373)	
CON3	0.310 (0.395)		0.870 (0.040)	**	0.336 (0.396)	
AJ	0.148 (0.327)		-0.045052 (0.815)		0.247 (0.097)	*
LEV	0.005 (0.045)	**	0.004 (0.081)	*	0.006 (0.018)	**
INDBETA	0.150 (0.014)	**	0.169 (0.002)	***	0.146 (0.011)	**
LNTA	-0.024 (0.581)		-0.052 (0.317)		-0.022 (0.644)	
TIME	YES		YES		YES	
INDUSTRY			YES			
MAIN SHAREHOLDER					YES	
SARGAN TEST	53.633 (0.565)		54.461 (0.533)		49.128 (0.730)	
Wald Test of join significance	21.428 (0.003)	***	22.519 (0.002)	***	31.465 (0.000)	***
Wald Test Time Dums	540.810 (0.000)	***	327.800 (0.000)	***	410.031 (0.000)	***
Wald Test Industry / Nature Largest Shareholder Dums			59.644 (0.000)	***	12.387 (0.015)	***
Wald Test Both Dums			768.102 (0.000)	***	603.996 (0.000)	***
First-order serial correlation	-0.119 (0.905)		-0.400 (0.689)		-0.253 (0.800)	
Second-order serial correlation	-0.751 (0.453)		-0.736 (0.462)		0.271 (0.471)	

*** denotes signification at the 1%; ** at 5%; and * at 10% level

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FINANCIAL CONTRACTING AND OPERATING PERFORMANCE: THE CASE FOR OBRA AND EFFICIENT CONTRACTING

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Abstract

When corporate governance is effective, new managerial contracts should maximize shareholder wealth. This paper examines operating performance measures after the Omnibus Budget Reconciliation Act (OBRA) of 1993 was passed. We find that firms affected by OBRA's $1 million cap on cash compensation experience an improvement in operating performance improves during the three years following contract revisions. Although prior performance was low, the post-contracting performance for affected firms is on par with comparison group. These findings are consistent with effective corporate governance and efficient contracting and contrary to expropriation theory.

Keywords: Contracting; Expropriation; Corporate governance; OBRA; CEO; Operating performance

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1. Introduction

If we accept the definition of firms as collections of financial contracts, then understanding the success of those contracts for wealth maximization is critical. The effectiveness of managerial contracts, in terms of increasing value has been a topic of debate among various researchers, and government agencies. While the debate focuses on compensation levels and operating performance, little research has examined the effect of new contracts in affecting operating performance. The primary purpose of this paper is to determine empirically if managerial contracts affect operating results in the years following the new contracts.

The popular media and some managerial expropriation theories (see Core, Holthausen, and Larcker (1999); Johnson, Ryan Jr., and Tian (2006); Morck, Shleifer, and Vishny (1988); Benkel, Mather and Ramsay (2006); and Bebcheuk, Fried, and Walker (2002)) tend to support the view that managers extract rents from shareholders or fail to write contracts that maximize shareholder wealth/operating results. Relatively large U.S. executive salaries relative to other employees along with recent failures at WorldCom, Tyco, and Enron have contributed to the belief that managerial contracts are not efficient. Core et al. (1999) show that CEOs at firms with greater agency problems receive greater compensation; and that firms with greater agency problems have worse operating performance. Johnson et al. (2006) claim that the likelihood of fraud is positively related to incentives from unrestricted stock holdings and is unrelated to incentives from restricted stock and unvested and vested options. Their operating performance measures suggest executives commit corporate fraud following declines in performance. Morck et al. (1988) claim that the reason for suboptimal performance is contracts that do not optimize managerial ownership. Relatively high contracting costs therefore lead some firms to engage in less efficient operations. Benkel et al.(2006) find that CEO's tend to manage earnings, and that outside directors mitigate its use. Lastly, Bebchuk et al. (2002) view managerial compensation as an exercise in expropriation and not an effort at increasing operating performance. They claim that managers actively engage in pay camouflage with low-interest loans to CEOs, overly generous option grants or tunneling compensation into pension or retirement programs. Overall, these papers show inefficiency in managerial contracting that can lead to relatively poor performance.

Other researchers, such as Core and Larcker (2002); Hanlon, Rajgopal, and Shevlin (2003);

Abowd (1990); Core, Larcker and Thomas (2004); Perry and Zenner (2000); Brickley, Bhagat, and Lease (1985); and Holmstrom and Kaplan (2003) support the efficient contracting hypothesis. Core and Larcker (2002) argue that firms can maximize shareholders' wealth by occasionally recontracting with managers if the benefits of recontracting outweigh its transaction costs. Hanlon et al. (2003), who show that operating performance increases $3.71 for every $1 of options given to managers, conclude that the pay–performance relationship is helpful for owners. Abowd (1990) finds that an additional 10% bonus for good economic performance is associated with a 30 to 90 basis point increase in expected after-tax gross economic return the following year. Core et al. (2004) review Bebchuck and Fried (2004) and dispute point by point their view of inefficient contracting. For example, higher documented pay by U.S. CEOs may reflect their higher incentive and risk levels, not overcompensation. Perry and Zenner (2000) show that after section 162(m) was passed that salaries for CEO's were reduced, and that on average, the pay for performance sensitivity has increased following the regulations, especially for million-dollar firms. In their study of stock price reactions to long-term CEO compensation contracts, Brickley et al. (1985) find that new contracts increase firm value, even after market adjustments, and those firms make compensation contracting choices to maximize shareholder wealth. Finally, Holmstrom and Kaplan (2003) conclude that, though imperfect, corporate governance measures in the U S. effectively control managerial behavior.

Maisondieu-Laforge, Kim and Kim (2006) examine shareholder price reaction to new contracts after the Omnibus Budget Reconciliation Act (OBRA) of 1993. They found that firms not affected by OBRA had abnormal returns of .9%, and firms affected by OBRA had 3.6% abnormal returns from contracting. They conclude that financial contracting was efficient, and that response to OBRA was positive despite a possibility for expropriation by managers. This paper seeks to continue testing the efficient contracting hypothesis by examining operating performance after the OBRA 1993. OBRA provides a good environment for determining whether compensation contract changes encourage shareholder wealth maximization or expropriation. Consistent with efficient contracting theory, our findings show operating performance below control groups before recontracting, but on par with comparison groups after new contracts are written.

Recent papers show the importance of corporate governance measures in measuring firm value. Black, Kim, Jang and Park (2006) show that in Korea, improved performance is related to increased tobin's q, higher dividends, but not accounting measures. In measuring accounting measures, they account for neither new contracts, nor do they use comparable firms as a control group. This paper incorporates the Gompers index to control for governance measures and using an improved comparison group shows improvement in accounting performance for re-contracting, and stronger governance measures.

In the remainder of this section, we describe the importance of OBRA 1993 for creating an environment in which contracts are changed. In Section 2, we describe the data, followed by the operating performance consequences of contract changes in Section 3. We conclude the paper in Section 4.

1.1. Why OBRA?

For managers, Omnibus Budget Reconciliation Act of 1993 had two significant effects: It encouraged firms to alter their compensation contracts and shifted control rights from managers to owners.

Signed August 10, 1993, and effective January 1, 1994, OBRA 1993 included section IRS section 162(m) which limited the tax deductibility of cash compensation to $1 million per person and further restricted deductible compensation to that which qualified as performance related. To reduce the ability of managers to control their compensation contracts, it mandated that only outside directors be included on the compensation committee. It also requires that incentives be based on predetermined criteria, and that directors verify that those criteria have been met before making payments. Not following these procedures would result in the loss of compensation deductibility for tax purposes. These actions thereby encouraged changes in managerial contracts away from cash-based and toward performance-based compensation (Rose and Wolfram (2000) and Perry and Zenner (2000)). The September 6, 2006 issue of the wall street journal points that the long term effects of OBRA 1993 are still strong, and that the law is still under discussion. It attempted to curb excess managerial pay not associated with performance. The fear in congress is that it may have led to an overuse and abuse of options that was not intended by the law.

The period following OBRA 1993 thus provides a good environment for determining whether contract changes encourage wealth maximization (Core and Larcker (2002)) or expropriation (Bebchuck, Fried, and Walker (2002)). If contracts were changed for the benefit of managers, firm performance be consistently below peer groups. Firms with low CEO cash compensation are not directly affected by OBRA, and therefore the value of new contracts should not be affected by OBRA. Examining operating performance for these firms will help us examine whether contracts in general increase operating performance. Firms with large CEO cash

compensation on the other hand are affected by OBRA and have incentives to change their contracts even if operating performance was acceptable. Such a change would be for the primary purpose of keeping tax benefits, but would also affect agency costs and managerial control rights. What is unclear is whether the changes will be to shareholder's benefit, or detriment. Finding an increase in operating performance will confirm efficient contracting. Finding no change in performance will show poor contracting if performance was also weak before contracts were changed. Given that Maisondieu-Laforge et al. (2006) found a positive price reaction to new contracts for OBRA affected firms, showing an increase (or a steady operating performance) is still consistent with efficient contracting, indicating that the contract may have been changed for agency reasons, not operating performance improvements. In contrast, finding a negative market response to contract changes for affected firms would indicate that firms responded poorly to OBRA and that expropriation, or at least ineffective contracting took place. In the absence of OBRA, unaffected firms should have changed contracts naturally and should show whether contracting in general is efficient, even in the absence of OBRA.

OBRA not only attempts to control CEO pay, but may have led to a shift in effective control rights away from managers and toward owners. Grossman and Hart (1983) argue that control rights reside with owners, who control the assets. In contrast, Rajan and Zingales (1998) claim that effective control rights reside with employees, who control the assets unless forbidden to do so by the owners. Managers can increase their wealth by investing themselves in the firm. This is only beneficial if they expect to extract additional profits from their efforts. By changing the managerial compensation committee, OBRA reduces managerial incentives to work hard, but also reduces the agency costs associated with poor governance. This interchange can be measured by looking at improvements in operating performance. Since most firms who altered compensation contracts also altered their corporate structure in line with OBRA, the government pressure did change control rights, reduced agency costs, but reduced managerial incentives. What is unclear is if firm reaction to this change increased, or decreased shareholder wealth. The two effects of effective contracting or improving the agency/managerial control show similar results. Our results therefore represent a joint hypothesis of the effect of OBRA on affected firms as well as the efficiency of contracting. Although we discuss these results separately in the paper, any result must be interpreted as a joint result of these two effects.

2. Data

The data set includes managerial ownership, compensation information, operating performance measures and corporate governance data, and company data for the S&P 500 from 1994 to 2000. In addition, we gathered proxy statements from EDGAR for the S&P 500 during the sample period to find when contract was rewritten.[10] Using the intersection of Execucomp and EDGAR, we obtained 1,212 occurrences of changes to CEO compensation. However, 395 observations were contaminated by voting also for the following non-compensation items: new equity issues director compensation, among others. The resulting 817 uncontaminated firm year observations include voting on compensation items alone. To avoid overlapping effects, contract changes must be more than 3 years apart to be included in the sample. This reduces the sample to 466 events.

Two corporate governance measures were introduced as a control for price reactions caused by governance issues. To measure the strength of shareholder rights and corporate governance, we employ the Governance Index (GINDEX) developed by Gompers, Ishii, and Metrick (2003) and the Entrenchment Index (ENTINDEX) developed by Bebchuk, Cohen, and Ferrell (2004). We collect the governance data from the Investor Responsibility Research Center (IRRC), which publishes detailed listings of corporate governance provisions for individual firms in *Corporate Takeover Defenses* (Rosenbaum 1990, 1993, 1995, and 1998).[11] The data on governance provisions are derived from various sources, such as corporate bylaws, charters, proxy statements, annual reports, as well as 10-K and 10-Q documents filed with the Securities and Exchange Commission (SEC). The detailed explanation for each governance provision is available in the appendix of Gompers et al. (2003). The GINDEX is constructed for every firm by simply adding one point for every provision that restricts shareholder rights (increase managerial power). Thus, high GINDEX represents high management power or low shareholder rights. Alternatively, the ENTINDEX is constructed based on six provisions: staggered boards, limits to shareholder bylaw amendments, supermajority requirements for mergers, and supermajority

[10] Using the proxy statement as a source of contracting specifics is not infallible. It is possible to offer subsidized loans, or tunnel compensation into a pension plan without the specifics showing up on the contract; nevertheless, the proxy is the best source of contract specifics available.

[11] IRRC covers the governance provisions in year 1990, 1993, 1995, 1998, and 2000. As noted in Gompers, Ishii and Metrick (2003) and Core, Guay, and Rusticus (2005), we assume that governance provisions for years in between do not change from the earlier reported period.

requirements for charter amendments, poison pills and golden parachutes.

To gather operating performance measures, we employed Compustat, which provided us information on operating income scaled by assets (EBIT) and sales (OM) (Danielson and Karpoff (2002)). We use these measures to capture both efficiency increases in asset use and cost reductions. Specifically, we define EBIT and OM as follows: EBIT is operating income before depreciation (Compustat #13) minus depreciation and amortization (#14) divided by the book value of assets (#6), and OM is operating income before depreciation (#13) divided by sales (#12).

With EBIT scaled by assets, we can measure the firm's ability to generate profits for various amounts of assets. Increases indicate the improved use of assets, whereas decreases indicate inefficient uses. The OM measures the cost structure within a firm and therefore can capture decreases in costs or selling expenses relative to sales. Both measures can be affected by managerial effort. Finally, by reviewing the measures across several years, we minimize the possibility that the use of discretionary accruals could bias the results.

To account for firms affected by OBRA, we designate those firms whose executives' salary compensation is greater than $900,000.[12] Our choice of this benchmark is somewhat arbitrary; Rose and Wolfram (2000) use $1 million, whereas Perry and Zenner (2000) use $900,000 as ex-post measures of affected firms. However, we believe it is unlikely that an executive paid more than $1 million before the legislation would have his or her salary reduced much below $1 million afterwards, so we use $900,000 to capture such rare cases, if they exist, and still include executives whose salary is high enough that future contracts are likely to be affected by OBRA. Whereas Rose and Wolfram (2000) use an ex-ante measure of affected firms to avoid any endogeneity between their ex-post measure of compensation and firms that were affected in the past by OBRA, we suggest that endogeneity is minimized because of our $100,000 window when we calculate changes in salary. In addition, endogeneity is not relevant when we use abnormal stock prices as the dependent variable. On a practical note, using $1 million reduces the sample size of the affected firms dramatically.

3. Methodology and Empirical Results

We examine the relationship between compensation contract change and firm performance. After the contract is in place, operating results, such as EBIT or OM, can increase, stay the same, or decrease. If the contracts are efficient and provide incentive to maximize shareholder value, then operating performance should increase. If performance stayed the same, either the contracts are irrelevant to operating performance or the contract change is unrelated to operating performance. A decrease in performance is consistent with the contract contributing to entrenchment and that agency costs increased.

To find abnormal performance prior to the contract change, we use three benchmarks: 1. abnormal performance versus all firms; 2. six and twelve industry adjusted[13] abnormal operating performance; and 3. changes in abnormal operating performance. A stronger test developed by Barber and Lyon (1996) is also used to examine results after contracts are written. Their technique uses a one-to-one matching by performance a year before the contract change to find the control group. This benchmark keeps test statistics correctly specified and is more powerful than size or industry matches. Therefore, we use industry- and performance-matching criteria as benchmarks.

3.1 Industry Match Comparisons

We match event firms with a firm from the S&P 500 that experienced similar performance in year 0 that is in the same industry. Specifically, we performed a four-digit SIC search of firms with no contract changes and use the one with the closest performance measure EBIT or OM, within 5% (see table 1). If no matching firm meets this criterion, we repeat the procedure with three-, two-, and then one-digit SIC code matches, as well as with a 10% difference as the limit. We reduce repetition of match firms by excluding them from the pool of available matches in subsequent SIC searches. For example, after the four-digit SIC code search, we reduced the list of possible match firms by those accepted. For matches made with EBIT, this technique produced the sample size to 263; for the OM match, it produced a sample size of 261. Between the EBIT and OM matches, 183 or 54% of the events are in both match samples, and 86 or 25% have both the same event and matching firm. We examine 341 of the possible 466 separate events that represent 303 separate firms between the two matches.

(Insert table 1 here)

[12] For robustness check, we also use cash compensation (salary + bonus) to separate the affected firms. The results are similar to our findings.

[13] The six industry groupings are as follows: mining and construction; manufacturing; transport communication and utilities; wholesale and retail; finance and insurance; and services. The additional six classifications contained in the group of twelve are subcategories of manufacturing: food; paper and publishing; chemicals and petroleum; stone, concrete and metals; industrial equipment; and electronics and instruments. These groupings are similar to those used by Danielson and Karpoff (2002).

For both the year of the event and the previous year, we calculate abnormal earnings as follows:

$$Abnormal\ EBIT_{i,t} = EBIT_{i,t} - EBIT_{I,t} \quad (1)$$

$$Abnormal\ OM_{i,t} = OM_{i,t} - OM_{I,t}, \quad (2)$$

where the subscript i refers to the mean measure for the industry group. The Abnormal EBIT or Abnormal OM is the difference between the firm's performance and the average of the industry's performance.

In Table 2, we provide the abnormal performance results in years –1 through 3 relative to the industry-matched samples and control for OBRA affected firms and the governance index. Panel A includes the results for the level of EBIT performance measure. In years -1, 0 and 1 relative to the contract, firms tend to underperform against all firms, 6 and 12 industry matches. For example, firms underperformed by 1%, 1.3% and 1.1% relative to the 12 industry adjusted returns over years -1 to 1 with significance at the 5% or better in each.

[Table 2 approximately here]

Since managerial compensation increased over this period, result is inconsistent with Kole (1996), who argues that managers are rewarded for good performance. However, it is consistent with Core and Larcker (2002), who claim that recontracting corrects inefficiencies in existing contracts.

In years 2, and 3, the abnormal EBIT is not different than 0 regardless of the comparison group. For example, abnormal EBIT in year 3 compared with a 12 industry group is 0.04%. For all three comparison groups, adjusted performance increases monotonically from years 0 to 3. This finding suggests that negative abnormal performance before the contracts are rewritten does not continue afterward the rewriting, consistent with the optimal contracting idea that contracts improve operating performance. It is not consistent with managerial entrenchment. Separating events into firms not affected by OBRA (salary < $900,000) and those that were affected do not change the results. Despite the difference in motivation for changing contracts, firm performance increases afterwards indicating that once the contracts are rewritten, firm performance tends to improve.

The sample is also split into those with good corporate governance (i.e., strong shareholder rights, GINDEX =0) and those with less favorable governance (i.e., weak shareholder rights, GINDEX =1). The interaction of GINDEX and AFFECTED reveals the motivation for recontracting. For good governance sample firms that were UNAFFECTED underperformed less than those that were AFFECTED. Since governance measures for these firms are stronger, then contracts should be renegotiated at the correct time, and should provide the proper incentives. This would be reflected in better performance both before and after contracts are written. For UNAFFECTED firms in year 0, firms with good governance (GINDEX=0) had underperformance of 0.8% which was significant, but firms with weak governance (GINDEX=1) underperformed 1.7%, which is not only significant but also significantly worse. A similar relation exists in years 1 and 2 in which UNAFFECTED and GINDEX =1 firms underperformed UNAFFECTED and GINDEX =0 firms.

AFFECTED firms with good governance also underperformed significantly in years -1 to 1 but improved in years 2 and 3. Those with weak governance never underperformed significantly. This difference may be caused by the reason for recontracting. Affected firms may have been encouraged by OBRA even though low firm performance had not materialized. Overall, this result suggests that contracts improved firm performance by taking underperforming firms and turning them into average firms within 2 years of writing the new contract.

The operating margin results in Table 2, Panel B, provide less conclusive results. Years –1, 0 and 1 show statistically significant underperformance compared with all firms, 6 industry groupings, and 12 industry groupings, which become insignificant in years 2 and 3. The magnitude of the underperformance appears relatively constant over time. These indicate one of two possibilities. First, firms do not improve performance after contracting from an operating margin's point of view. Second, the results are caused by another factor such as size. The event firms are all part of the S&P 500. The industry comparison is based on the median of all firms on Compustat in the same industry classification. The size difference is captured in the depreciation expense which is part of the OM measure. In this way, Table 2 demonstrates the weakness of industry adjustments. Being affected by OBRA is correlated with firm size; larger firms tend to offer higher salaries (Murphy (1998)). Larger firms also tend to have lower operating margins; thus, OBRA-affected firms will tend to underperform a broad 12 industry grouping. For this reason, a more powerful matching technique is required.

3.2 Performance Match Comparison

Because of the weakness of industry analysis, the remainder of the paper uses the Barber and Lyon (1996) matching method based on prior performance. After we identified the match firms, we calculated the abnormal performance measures as follows:

$$Abnormal\ \Delta EBIT_{i,(0,t)} = \left(EBIT_{i,t} - EBIT_{i,0}\right) - \left(Matched\ EBIT_{I,t} - Matched\ EBIT_{i,0}\right) \quad (3)$$

$$Abnormal\ \Delta OM_{i,(0,t)} = \left(OM_{i,t} - OM_{i,0}\right) - \left(Matched\ OM_{I,t} - Matched\ OM_{I,0}\right) \quad (4)$$

The abnormal change in EBIT is the change in the event firm's EBIT between year 0 and year t, minus the change in the match firm's EBIT during the same time. The measure is cumulative, in that the three-year abnormal EBIT in each year contributes to the measure. The abnormal change in operating margin is calculated similarly.

The results in Table 3 show that for years 1, 2, and 3, firms do not underperform their matched sample after contracts are rewritten. In the complete sample, the mean abnormal EBIT is never statistically significant but monotonically increases from –0.3% to 0.4%. Firms not affected by OBRA do not underperform statistically in years 1, 2, or 3 according to both the means and the medians for both the EBIT and OM measures. In year 2, UNAFFECTED firms underperform by 0.3%, and in year 3, they overperform by 0.3%. Although neither number is significant, the difference is significant at the 10% level. In the OM measure, there is no underperformance in any year, neither are the differences significant. These results show that overall, firms do not underperform after contracts are rewritten which is consistent with efficient contracting hypothesis.

For firms affected by OBRA, the results are similar. Using the EBIT measure, firms underperform their competitors by 1.1%, with a *p* of 2% for the first year. The median is also negative and significant. In years 2 and 3, they do not underperform their competitors, and the increases in both the means and the medians are monotonic. The increase from year 1 to year 2 is significant according to a Wilcoxon rank sum test. Although the OM measure is not monotonic in its increase, there is an increase in performance which is not significant. In no year is performance negatively significant

[Table 3 approximately here]

Splitting the sample by the strength of the corporate governance does not change the overall pattern, but does show that firms with better governance tend to outperform those with less efficient governance. Using EBIT, firm performance increases monotonically for all firms, AFFECTED and not AFFECTED for good governance firms. Although weak governance firms also have insignificant operating levels, unaffected firms in years 1 and 2 perform significantly worse than good governance firms in the same years. For AFFECTED firms, the sample size becomes small and the differences are not significant. Using OM, performance improves for all 3 measures, but gets worse for bad governance firms. For all firms and not affected firms, performance is monotonically decreasing with time while it improves for good governance firms. These results indicate that overall, the efficient contracting hypothesis holds strongly for firms with good corporate governance. For firms with weak governance, the results are mixed. The firms do not underperform their match firms, but do underperform well governed firms.

In Table 4, we separate the firms that underperform in year 0 and track their performance in years 1, 2, and 3. Overall, firms that performed poorly before the contract do not underperform after the contract. Their performance increases monotonically during the next three years for both EBIT and OM measures using all firms and firms with good corporate governance In year 3, the OM abnormal returns are positive and significant for firms that underperformed in year 0 with a p of 1%. These findings indicate a turnaround in both EBIT and OM for firms that performed poorly before the contract change. Firms that performed well before the contract changes are not significantly different than their counterparts after the contracts are written, although both performance measures decrease almost monotonically. Firms with poor corporate governance do not show any consistent pattern in performance improvement. In 3 out of 4 measures, performance in year 3 is lower than in year 1, but not significantly. The motivation for writing contracts therefore may differ for firms according to their needs. Underperforming firms seek to improve performance, and firms that are doing well, or have poor corporate governance may have other motives. Finding these motives is left to additional research.

[Table 4 approximately here]

4. Conclusions

Financial contracts represent the core of business relationships, and one of the main roles of corporate governance is to encourage managers to enact compensation contracts that increase shareholder wealth. With OBRA 1993, we have the opportunity to examine a situation in which managers have an opportunity to expropriate funds, and to examine the effect of shifting some control rights from managers to owners.

Changing managerial contracts also increases operating performance. Prior to writing the contract, firms on average underperform their industry groups. After the contracts are written, performance is indistinguishable from industry averages or performance matched sample. The effect is more pronounced for the subset of firms whose performance was lower than the industry average or their matched firm prior to the contract change. Performance for these firms improves monotonically during the next three years. These results suggest that the need for recontracting, as described by Core and Larcker (2002), is correct and that recontracting brings poorly performing firms back to average. Poor performance before

recontracting contradicts Kole (1996), who suggested that contracts were changed to reward managers. Firms affected by OBRA tended to improve performance faster than unaffected firms. Firms with better governance measures outperform those with poor governance measures. The overall implication is that recent publicized corporate failures may be isolated cases, not evidence of structural problems among U.S. corporations (Holmstrom and Kaplan, 2003).

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Appendices

Table 1. Results of Performance matching

Panel A: EBIT matched sample

SIC digits	Reduced Match Sample 5% criteria	10% criteria
4	71	1
3	18	0
2	57	0
1	99	17
Total Match Found		263
No Match Found		203
Total matches possible		466

Panel B: OM matched sample

SIC digits	Reduced Match Sample 5% Criteria	10% Criteria
4	68	1
3	14	4
2	53	0
1	118	3
Total Match Found		261
No Match Found		205
Total matches possible		466

Note: Events are independently matched to one firm with the same industry and performance in year -1. For the full matched sample, the 4 digit SIC matched firm with the closest performance (EBIT or OM) that is within 5% of the event is accepted. If none is found, the procedure is repeated with 3, 2, and 1 digit SIC. Unmatched events are then compared to 10% performance match. The reduced match sample uses the same procedure, but does not allow replacement at the next SIC level. Matchable firms must be S&P 500 firms with no contract change in year -2 to 2.

Table 2. Abnormal Changes by Industry Groupings

Panel A: Abnormal EBIT

The mean of abnormal performance is measured as EBIT scaled by assets. The number of observations is listed in parentheses.

$$Abnormal\ EBIT_{i,t} = EBIT_{i,t} - EBIT_{I,t} \quad (1) \qquad Abnormal\ EBIT_{i,t} = EBIT_{i,t} - EBIT_{I,t}, \quad (2)$$

	Time	All	6 Industry Matched	12 Industry Matched	12 Industry Matched Sal<900k	12 Industry Matched Sal>900k
EBIT	-1	-1.0%*	-0.9%*	-1%*	-0.8%+	-1.5%*
		(261)	(261)	(261)	(189)	(70)
	0	-1.3%**	-1.3%**	-1.3%**	-1.3%**	-1.3%*
		(263)	(263)	(263)	(190)	(70)
	1	-1.1%**	-1.1%**	-1.1%**	-0.9%*	-1.8%**
		(260)	(260)	(260)	(187)	(70)
	2	-0.6%	-0.6%	-0.6%	-0.5%	-0.8%
		(162)	(162)	(162)	(126)	(33)
	3	0.04%	-0.2%	0.04%	0.19%	0.15%
		(123)	(123)	(123)	(98)	(22)

	Time	All	12 Industry Matched		All	12 Industry Matched	
			Sal<900k	Sal>900k		Sal<900k	Sal>900k
		GINDEX = 0			GINDEX = 1		
EBIT	-1	-0.7%	-0.2%	-1.7%+	-1.2%*	-1.3%*	-0.7%
		(128)	(89)	(39)	(107)	(82)	(25)
	0	-1.0%*	-0.8%+	-1.6%+	-1.4%**	-1.7%**	-0.3%
		(129)	(90)	(39)	(107)	(82)	(25)
	1	-0.9%+	-0.4%	-2.1%*	-1.3%*	-1.5%*	-0.6%
		(127)	(87)	(40)	(106)	(81)	(25)
	2	-0.21%	0.43%	-1.4%	-1.1%	-1.3%	0.1%
		(78)	(58)	(20)	(63)	(51)	(12)
	3	0.36%	0.58%	-0.5%	0.06%	-0.1%	0.81%
		(58)	(45)	(13)	(48)	(39)	(9)

Note.- The sample of 263 events comes from S&P 500 firms that changed managerial contracts between 1994 and 2000 and had at least three years between contract changes, a matching firm, and enough data for analysis. Abnormal performance is measured as the difference between the event performance and the mean of all non-event firms or the mean of 6 and 12 industry matched performance. Firms are subdivided into those with CEO salary below or above $900,000 to indicate firm susceptibility to OBRA 1993. GINDEX is a measure of corporate governance. Higher numbers indicate inferior governance. GINDEX signifies whether the governance index is above the median (GINDEX=1) or below the median (GINDEX=0). The $^{+}$, * and ** indicate that the difference in performance is statistically significant at the 10%, 5%, and 1% level.

Table 2 Continued
Abnormal Changes by Industry Groupings

Panel B: Abnormal Operating Margin (OM)

$$Abnormal\ EBIT_{i,t} = EBIT_{i,t} - EBIT_{I,t} \quad (1)$$

$$Abnormal\ OM_{i,t} = OM_{i,t} - OM_{I,t}, \quad (2)$$

	Time	All	6 Industry Matched	12 Industry Matched	12 Industry Matched	
					Sal<900k	Sal>900k
OM -1	-1	-1.5%**	-1.7%**	-1.5%*	-0.9%+	-2.8%**
		(260)	(260)	(260)	(182)	(76)
OM 0	0	-1.8%**	-1.9%**	-1.8%**	-1.4%**	-2.9%**
		(261)	(261)	(261)	(183)	(76)
OM 1	1	-1.6%**	-1.8%**	-1.6%*	-0.8%	-3.3%**
		(253)	(253)	(253)	(176)	(75)
OM 2	2	-2.0%**	-1.9%*	-2%+	-1.7%*	-2.7%
		(162)	(162)	(162)	(122)	(38)
OM 3	3	-2.0%+	-1.8%+	-2%	-1.6%	-4.0%
		(108)	(108)	(108)	(90)	(16)

	Time	All	12 Industry Matched		All	12 Industry Matched	
			Sal<900k	Sal>900k		Sal<900k	Sal>900k
		GINDEX = 0			GINDEX = 1		
OM	-1	-1.1%	-0.3%	-2.9%*	-1.3%*	-1.0%	-2.5%
		(136)	(92)	(44)	(102)	(78)	(24)
	0	-1.5%*	-1.0%	-2.7%*	-1.5%+	-1.3%+	-2.4%
		(137)	(93)	(44)	(102)	(78)	(24)
	1	-1.3%	0.5%	-2.9%*	-1.1%	-0.7%	-2.7%
		(131)	(88)	(43)	(101)	(77)	(24)
	2	-1.9%	-1.9%	-1.7%	-1.2%	-0.5%	-4.3%
		(86)	(63)	(23)	(61)	(49)	(12)
	3	-2.2%	-1.6%	-5.5%	-1.1%	-0.7%	-3.6%
		(57)	(48)	(9)	(40)	(34)	(6)

Note.- The sample of 263 events comes from S&P 500 firms that changed managerial contracts between 1994 and 2000 and had at least three years between contract changes, a matching firm, and enough data for analysis. Abnormal performance is measured as the difference between the event performance and the mean of all non-event firms or the mean of 6 and 12 industry matched performance. Firms are subdivided into those with CEO salary below or above $900,000 to indicate firm susceptibility to OBRA 1993. GINDEX is a measure of corporate governance. Higher numbers indicate inferior governance. GINDEX signifies whether the governance index is above the median (GINDEX=1) or below the median (GINDEX=0). The number of observations is listed in parentheses. The $^{+}$, * and ** indicate that the difference in performance is statistically significant at the 10%, 5%, and 1% level.

Table 3. Abnormal Performance Versus Matched Firm After Managerial Contract Changes

$$Abnormal\ \Delta EBIT_{i,(0,t)} = \left(EBIT_{i,t} - EBIT_{i,0}\right) - \left(Matched\ EBIT_{I,t} - Matched\ EBIT_{i,0}\right) \quad (3)$$

$$Abnormal\ \Delta OM_{i,(0,t)} = \left(OM_{i,t} - OM_{i,0}\right) - \left(Matched\ OM_{I,t} - Matched\ OM_{I,0}\right). \quad (4)$$

		AΔEBIT(0,t)			AΔOM(0,t)		
	Year	All firms	Sal<900k	Sal >900k	All firms	Sal<900k	Sal >900k
Mean	1	-0.3%	0.0%	-1.1%*	0.0%	0.3%	-0.8%
		(243)	(175)	(65)	(241)	(168)	(71)
	2	-0.1%	-0.3%	0.6%	-0.2%	-0.1%	-0.3%
		(149)	(120)	(26)	(156)	(119)	(35)
	3	0.4%	0.3%	0.7%	0.0%	-0.1%	0.4%
		(114)	(93)	(19)	(104)	(89)	(13)
Median	1	-0.1%+	-0.1%	-0.6%*	0.0%	-0.5%	-0.3%
	2	-0.2%	-0.2%	-0.4%	-0.1%	-0.9%	-0.5%
	3	-0.1%	-0.1%	0.8%	0.0%	0.4%	0.2%

		AΔEBIT(0,t)			AΔOM(0,t)		
	Year	All firms	Sal<900k	Sal >900k	All firms	Sal<900k	Sal >900k
GINDEX = 0							
	1	-0.00%	0.42%	-1.1%+	-0.0%	0.31%	-0.70%
		(147)	(101)	(43)	(147)	(96)	(49)
	2	0.28%	0.45%	-0.7%	0.21%	0.03%	0.64%
		(92)	(72)	(17)	(97)	(71)	(24)
	3	0.51%	0.78%	-0.6%	0.51%	0.43%	0.41%
		(69)	(56)	(11)	(66)	(55)	(9)

GINDEX = 1						
1	-0.70%	-0.6%	-1.20%	0.08%	0.37%	-0.90%
	(96)	(74)	(22)	(94)	(72)	(22)
2	-0.70%	-1.4%	3.18%	-0.80%	-0.40%	-2.40%+
	(57)	(48)	(9)	(59)	(48)	(11)
3	0.12%	-0.4%	2.54%	-0.80%	-0.90%	0.50%
	(45)	(37)	(8)	(38)	(34)	(4)

Note.- The event firms were matched by four-digit SIC within 5% of performance in year –1 to the event firm. Unmatched firms are matched with SIC3, SIC2 and SIC1 using firms not already used. The matching process is repeated with performance within 10%. The matching is done on the basis of EBIT and OM. GINDEX is a measure of corporate governance. Higher numbers indicate inferior governance. GINDEX signifies whether the governance index is above the median (GINDEX=1) or below the median (GINDEX=0). The abnormal performance for years 1, 2, and 3 are tested versus a null hypothesis of being equal to 0. The number of observations is listed in parentheses.

Table 4. Abnormal Performance Versus Matched Firm After Managerial Contract Changes

$$Abnormal\ \Delta EBIT_{i,(0,t)} = \left(EBIT_{i,t} - EBIT_{i,0}\right) - \left(Matched\ EBIT_{I,t} - Matched\ EBIT_{i,0}\right) \quad (3)$$

$$Abnormal\ \Delta OM_{i,(0,t)} = \left(OM_{i,t} - OM_{i,0}\right) - \left(Matched\ OM_{I,t} - Matched\ OM_{I,0}\right). \quad (4)$$

AEBIT(0,t)

	ALL EVENTS		GINDEX =0		GINDEX =1	
Year	Firm < Match	Firm > Match	Firm < Match	Firm > Match	Firm < Match	Firm > Match
1	-0.7%	0.1%	-0.3%	0.27%	-1.3%**	-0.08%
	125	118	77	70	48	48
2	-0.2%	0.1%	0.23%	0.34%	-0.9%	-0.4%
	82	67	49	43	33	24
3	0.8%	-0.2%	1.48%	-0.70%	-0.2%	0.61%
	64	50	38	31	26	19

AOM(0,t)

	ALL EVENTS		GINDEX = 0		GINDEX = 1	
	Firm < Match	Firm > Match	Firm < Match	Firm > Match	Firm < Match	Firm > Match
1	0.0%	0.0%	0.12%	-0.10%	0.42%	-0.20%
	111	140	65	82	45	49
2	0.8%	-0.6%	0.34%	0.12%	-0.08%	-1.4%*
	75	83	40	57	28	31
3	2.0%**	-0.4%	0.88%	0.25%	-0.40%	-1.0%
	52	69	27	39	14	24

Note.- The sample is split between firms that outperformed or underperformed one of two benchmarks. The industry columns were separated by under- or overperformance versus the 12 industry match. The match comparison splits the sample into firms that under- or overperformed in year 0 versus the match firm. Regardless of the benchmark, years 1, 2, 3 compare the event firm with the matched performance. The event firms were matched by four-digit SIC within 5% of performance in year 0 (the year prior to the contract change). Unmatched firms are matched with SIC3, SIC2, and SIC1 for firms not already used in other SIC groups. The matching process is repeated for performance within 10%. The matching is done on the basis of EBIT and OM. The mean abnormal performance for years 1, 2, and 3 are tested versus a null hypothesis of being equal to 0. GINDEX is a measure of corporate governance. Higher numbers indicate inferior governance. GINDEX signifies whether the governance index is above the median (GINDEX=1) or below the median (GINDEX=0).

GLOBAL DIVERSIFICATION: EVIDENCE FROM CORPORATE OPERATING PERFORMANCE

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Abstract

This study casts light on the impact of the decision to diversify globally on the firm's operating performance. Examining operating performance enables us to circumvent the measurement errors associated with excess value that is used to measure the diversification discount/premium. Our central empirical results for a sample of firms that chose to diversify globally reveal that sample firms, in spite of exhibiting a diversification discount, significantly outperform their domestic counterparts following the diversification. Our findings imply that global diversification does not result in misallocation of investment resources. The fact that our firms exhibit the diversification discount and yet outperform their domestic counterparts confirms previous studies' conclusions that the diversification discount is most likely an artifact of measurement error.

Keywords: Global, Diversification, Operating Performance

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Introduction

The recent plethora of studies on diversification reflects a large interest in the implications of diversification on firm value. The empirical evidence emerging thus far from these studies yields mixed results. Earlier studies in this area document a diversification discount indicating that industrially diversified firms are valued at a discount relative to a portfolio of comparable single-segment firms (Berger and Ofek (1995a), Stulz (1994) and Servaes (1995)). The obvious implication of these findings is that industrially diversified organizations are prone to misallocating their resources, and thereby destroying firm value. However, more recent studies provide contradictory evidence. For example, Campa and Kedia (2002) find that diversified firms were trading at a discount prior to adopting a diversification strategy, while other recent papers have even shown a diversification premium.[1] These results cast doubt on the hypothesis that the diversification discount is caused by misallocation of capital within the firm.

While much of the literature on diversification focuses on industrial diversification, the effect of geographical/global diversification[2] on the firm has received limited attention in the financial literature. Not unlike the research on industrial diversification, research in this area also produces inconclusive results. Bodnar, Tang and Winthrop (1999) and Errunza and Senbet (1984) document that global diversification confers value on the firm while Morck and Yeung (1991), who find a diversification premium, attribute the excess value to firms possessing intangible assets derived from R&D and advertising spending.[3] [4] Indirect evidence in support of global diversification decisions from research on investment portfolios, finds that U.S. investors can obtain substantial benefits from international diversification by holding U.S. multinational firms in their portfolios (see Errunza, Hogan and Hung

[1] Using a new establishment-level database (BITS), Villalonga (2004) finds a diversification *premium* after controlling for sample selection bias and concludes that the diversification discount is an artifact of the segment data used in prior studies while Sanzhar (2004) documents a significant large discount for multi-divisional firms that are neither industrially nor geographically diversified, where the divisions of the firm are closely related in terms of investment. Mansi and Reeb's (2002) findings reveal that the diversification discount stems from the risk-reducing effects of corporate diversification. In a different vein, Whited (2001) proposes that the value effect of diversification is an artifact of measurement error and shows that the diversification discount is not caused by inefficient investment.

[2] We use the terms geographical diversification and global diversification interchangeably.

[3] See also Fatemi (1984) who finds that firms experience a positive and significant cumulative abnormal return at the announcement of international expansion, and Doukas and Travlos (1988) who show that international acquisition announcements by U.S. firms are received positively by the market.

[4] Errunza and Senbet's (1984) and Morck and Yeung's (1991) sample periods are in the 1970s.

(1999)). The above studies imply that U.S. investors gain when they hold claims on cash flows that originate from non-U.S. operations. On the other hand, Denis, Denis and Yost (2002) and Click and Harrison (2000) find that global diversification is associated with a discount in firm value in the range of 6 percent to 18 percent. The literature measures whether global diversification has a net positive or net negative effect on firm value. However, with financial and trade barriers among countries gradually being eliminated, and speedier communication around the globe, increasingly the world is transforming into a unified, and the benefits at some point may overshadow the costs as barriers are abolished. Global arms of U.S. corporations are becoming more important to firms' viability. For example, over 50 percent of Coca Cola's revenues and profits, as well as for many other U.S. companies, originates from abroad. Hence, it is difficult to argue that a strategy of operating globally is per se value destroying. Previous research documenting the diversification discount does not address the question of why global diversification would exist if it, in fact, destroys firm value. Given the measurement error in excess value and the limited research on global diversification, this study casts light on the impact of the decision to diversify globally on the firm's operating performance. We reason that if firms that diversify globally sell at a discount due to poor investment decisions arising from diversification, then poor investments would be mirrored by poor firm operating performance when compared to an appropriate benchmark group. On the other hand, if the methodology that measures excess value is flawed, as suggested by Campa and Kedia (2002), and the global diversification decision is based on value maximization, then we should observe that firms choosing to diversify globally outperform their domestic counterparts, on average.

By examining the link between the global diversification decision and operating performance, we are able to circumvent the problems related to measurement of excess value encountered by previous studies examining the diversification discount. Our focus in this paper is to capture the net benefits or costs of geographic diversification by measuring abnormal operating performance. In summary, our analysis adds a new perspective to the corporate diversification literature by examining how globally diversified firms perform compared to their domestic counterparts.

We analyze a sample of 1,389 U.S. firms that chose to diversify globally in the period, 1997 to 2003. Our empirical findings document that firms that choose to add global operations outperform their benchmark firms in the year of the decision to globalize and in the two ensuing years. We find that the median globally diversified firm in our sample experiences a significantly higher cash flow to assets ratio in the event year (by 1.5%) than its matched firm portfolio. Similarly, in the two years following the diversification, the median diversified firm outperforms its matched portfolio by a statistically significant 2.1% and 2.5% respectively. Our primary finding of positive abnormal operating performance by globally diversifying firms counters the notion that global diversification results in value destruction and supports Hyland (1999) who finds no evidence that agency costs explain the decision of firms to diversify as well as Bodnar, Tang and Winthrop (1999), Errunza and Senbet (1984).

More importantly, the fact that our sample firms exhibit a significantly negative excess value clearly demonstrates that the superior operating performance that we observe is not due to a diversification premium. This finding establishes that a negative excess value cannot be interpreted to be synonymous with poor performance and further confirms the conclusions drawn by recent research that attributes the diversification discount phenomena to various artifacts (Whited (2001) and Campa and Kedia (2001)). We test the robustness of operating performance to the matching criteria that generated the benchmark firms and find that our results are robust to alternate matching criteria and to alternate measurement of performance. Univariate analysis reveals that sample firm superior performance is also invariant to whether firms operate in one industry segment or multiple segments. Similarly, whether a firm chose to operate in one or multiple foreign geographical segments, it outperforms its counterparts in the year of the diversification and in the two ensuing years. Our results also exhibit robustness to whether a firm reports investment in foreign assets or not. To assess the sensitivity of our results to the choice of the time period, we subdivide the sample into two time periods (1997-1999 and 2000-2003), and find no significant difference in abnormal operating performance over the two time periods. Our findings from univariate and multivariate regression analysis do not support the notion that inefficient cross-subsidization occurs in multiple industrial segment firms nor in multiple foreign segment firms. The regression results also document that larger firms and firms with higher cost of goods sold are better able to benefit from global diversification. Finally, we do not find support for Morck and Yeung's (1991) argument that global operations can enhance firm value by internalizing markets for intangible assets such as those generated from R&D expenditure and advertising.

The organization of the remainder of the paper is as follows. In section I, we discuss the literature and testable implications. We describe the sample selection criteria and the algorithm for choosing matching firms in section II. The empirical evidence is presented in section III. We conclude the paper in Section IV with a summary and conclusion.

I. Literature and Testable Implications

A. The Pros and Cons of Global Diversification

Prevailing theoretical wisdom posits that global diversification confers costs as well as benefits on shareholders. The degree to which one outweighs the other determines whether geographical diversification adds to or subtracts from shareholder value. A number of potential beneficial effects from global diversification have been advanced in the literature. Arguments in favor of value-enhancing global diversification rest on capitalizing on synergistic effects from lower production costs, increased operating flexibility and accessing of new markets. Globally diversified firms may enjoy increased operational flexibility such as the ability to shift production from high production cost countries to low cost countries. In addition, globally diversified firms can change the distribution of goods to markets where the demand is highest.

Another potential beneficial aspect of diversification is improved access to external capital markets documented by Hadlock, Ryngaert and Thomas (2001) who find evidence that Myers and Majluf's (1984) problem created by the presence of asymmetrical information at the time of equity issuance will be less severe for diversified firms than for focused firms. They conclude that diversification improves access to the market for external capital. This argument can be extended to globally diversified firms with geographically diversified operational units.

Dunning and Rugman (1985), among others, maintain that benefits from global diversification are rooted in exploiting foreign market opportunities and imperfections. For example, globally diversified firms could enhance firm value by exploiting the differences in tax systems across countries, thereby reducing their tax liabilities. Moreover, a globally diversified firm can gain by borrowing through affiliates that have higher tax rates to increase the interest tax shield[5]. Also, to the extent that capital markets are segmented, globally diversified firms can also potentially access outside capital markets at more favorable terms, thereby reducing the cost of capital (see Thomadakis and Usmen (1991)). Research on portfolio allocations (eg. Errunza, Hogan and Hung (1999) among others) finds that U.S. investors can obtain substantial benefits from international diversification by holding U.S. multinational firms in their portfolios. Diversification also gives the firm the ability to utilize internal capital markets. Whether such internal capital markets are a net positive or a net negative to the firm is still an open question. Some studies, such as Stein's (1997), contend that internal capital markets can create value as headquarters, by virtue of its control rights, engages in "winner picking" by channeling funds from one project to another. Maksimovic and Philips (2000) show that diversified firms allocate capital to the most productive units. However, a number of studies argue that there are agency costs associated with diversification (see Rajan, Servaes and Zingales' (2000) and Scharfstein and Stein's (2000)). These studies assert that unit managers wield their power to boost the assets under their control, thereby leading to inefficient cross-subsidization where funds are channeled from high growth to low growth units.

The aforementioned benefits of global diversification may be offset by value-reducing effects. For example, in an agency-cost argument, if managers pursue diversification because of private benefits they derive from managing a more diversified firm, diversification could reduce firm value. Also, it has been argued that managers may pursue diversification because it imbues them with greater power and prestige (Jensen (1986) and Stulz (1990)). Further, by increasing the value of resources under their control, manager may obtain larger compensation packages (Jensen and Murphy (1990)). Managers also may accrue benefits from diversification through personal risk reduction.

Some argue that globalization introduces dis-synergies because of the additional complexity of coordination of corporate policies among geographical divisions and information asymmetry between headquarters and divisional managers (Harris, Kreibel, and Raviv (1982). Because globally diversified firms are inherently more complex than purely domestic firms, it is more difficult for shareholders to monitor the managers of such firms (Bodnar, Tang and Weintrop (1999)). It can be argued that the costs engendered by complexity of coordination and organizational hierarchy may be larger the greater the geographical diversification. In addition, foreign market impediments (arising from unexpected changes in regulatory requirements, exchange controls, expropriation and adverse local economic and political developments) may render additional costs/risks to foreign operations. These arguments could lead to global diversification being associated with reduction in firm value and performance.

B. Testable Implications

Given that global diversification confers benefits as well as costs on diversifying firms, the degree to which costs exceed benefits or vice versa is an empirical issue. Our methodology of comparing sample firms' operating performance to matching

[5] The foreign borrowing, in turn, can be instrumental in hedging foreign exchange risk as well as country and political risks.

firms that are purely domestic enables us to provide evidence on the net effect of global diversification on the firm while avoiding the controversial measures of valuation presented in earlier studies. Whether firms that diversify globally under-perform their counterparts has not been addressed yet. There is also the possibility that not diversifying globally may be harmful to some firms. Anecdotal evidence from various discussions with executives at multinational firms indicates that some firms diversify globally to maintain their sales to corporate customers who are already global; otherwise they stand to lose the business. Thus, choosing not to follow their corporate clients abroad may have a negative impact on some firms.

Arguably, the costs and benefits of global diversification are not fixed, and may thus differ in magnitude over time; this is especially true as new foreign markets become more open and as regulations and red tape toward U.S. firms are reduced. To the extent that the costs of global diversification have diminished during the last decade due to continuing deregulation, and dismantling of currency controls, under- or over-performance of firms that operate globally may differ in magnitude over time. By partitioning the sample into two periods (1997-1999 and 2000-2003), we test whether there is a differential impact of globalization on firm performance over time. If opening up of new markets accompanied by deregulation has changed during these two periods resulting in reduction of the cost of doing business abroad, we should observe that firms tend to perform better in the latter period.

To assess whether global diversification results in inefficient cross-subsidization of less profitable geographic segments, we examine firm operating performance for single foreign geographic segment firms and multiple segment firms. Highly geographically diversified firms (i.e., with multiple foreign segments) are more prone to have variable profit outlooks, and hence, the possibility of subsidization of less profitable geographic segments by more profitable segments exists. In addition, the scale of complexity of managing an enterprise that has multiple geographic segments is greater than that of a firm with a single foreign segment. If inefficient cross-subsidization occurs, then we should observe that firms with a single foreign segment exhibit better performance, on average, than multiple foreign segment firms.

II. Sample Selection and Methodology

In this section, we depict the sample selection process and the methodology employed to compute corporate operating performance.

A. Sample Selection

The Compustat Geographical Segment (CGS) database reports segment information for all Compustat firms for the most recent seven years. Beginning with 1977, Statement of Financial Accounting Standards #14 (SFAS 14) required publicly traded firms with an industry or geographical segment constituting more than 10% of the firm's sales, operating income or assets, to provide audited financial data by each industry segment. FASB 14 gives each firm the discretion to categorize its foreign operations depending on its particular circumstances. However, in 1997, SFAS 131 began requiring firms to disclose and report segments (comprising 10% of assets, sales or profits) based on breakdown used by management in defining its segments internally. The purpose of SFAS 131 is to ensure that management reporting of segment financial information is according to internal organization of business activity. Since 1997, the Compustat Geographical Segment Database increased the number of foreign segments from four to five (including the domestic segment). Given that our sample period starts when SFAS 131 begins to take effect, our sample differs from prior samples examining global diversification in two ways: first, the number of foreign segments specified is larger, and second, the breakdown of segments may be more in accord with actual organization of business activity and hence more informative. We select our sample firms using the following criteria. We identify all firms in the annual Compustat Industrial data file that initially report foreign operations in the period 1997 to 2003. We restrict the sample to industrial firms incorporated in the U.S. Non-U.S. firms, utilities (SIC 4900 - 4999) and financial firms (SIC 6000 - 6999) are eliminated. We also exclude firms where the sum of the geographical segment sales is greater than 101% of total reported sales. These selection criteria result in a final sample of 1,389 firms that diversified globally during the period 1997 to 2003.

B. Methodology

Our principal measure of operating performance is pre-tax operating cash flows. We use pre-tax operating cash flows to measure operating performance rather than earnings for two reasons. First, earnings include interest expense, special items and income taxes which can obscure operating performance, the focus of our research. Second, operating cash flows represent the economic benefits generated by the firm, and as a pretax measure, they are unaffected by the changes in tax status or capital structure issues (Barber and Lyon (1996)).

Since the level of these economic benefits depends on the total value of the firm's assets, we scale cash flows by firm asset value to have a performance measure that can be used to compare across firms and through time. Pre-tax operating cash flows are net sales, less cost of goods sold, less selling and administrative expenses before

deducting depreciation and amortization expense (OIBDA, Compustat data item #13). Book value of assets is the year-end total asset value (liabilities and net worth) from the balance sheet (Compustat data item #6).

We examine diversifying-firm operating performance over a four-year period beginning with the year before the diversification (designated year -1) and ending two years after the diversification decision (year +2). Our primary benchmark for measuring global firm's abnormal operating performance is a control portfolio constructed for each firm using the following methodology. The control portfolio is formed from all firms with the same three-digit SIC code as the diversifying firm, that have no foreign sales in year -1 and year 0, and that have book value of assets within 50 percent of the diversifying firm's in the year prior to the global diversification. The performance of the control portfolio is the median value for the matching firms. We compute the abnormal operating performance of the diversifying firm by subtracting the performance of the control portfolio from the value for our sample firm (henceforth, matched-adjusted cash-flow return). If less than five firms are matched to the diversifying firm using these two criteria, we next match using 2-digit and 1-digit SIC codes. If a minimum of five matching firms is not found for the diversifying firm using 1-digit SIC code, that firm is dropped from the sample.[6]

This methodology controls for economy-wide and industry effects on performance. It also controls for possible mean reversion in earnings and other operating ratios that has been documented in prior studies (Fama and French, 1995). For significance testing, we use procedures suggested by Barber and Lyon (1996). In the non-parametric analysis, we test for differences from zero using medians tests and for significance differences between groups using the Wilcoxon signed-rank test. For the regression analysis, to reduce the influence of outliers and improve model specification, we trim the sample by deleting firms with matched cash flow return below the first or above the 99th percentile for the full sample in any of the test years.

III. Main Empirical Results

A. Summary Statistics

Panel A of Table 1 provides the distribution of 1,389 industrial firms that commenced global operations during the period 1997-2003. Panel B of the table documents the number of geographic and business segments for sample firms. Over half of the sample firms (50.51%) begin their global operations in one foreign geographic segment, a quarter of the firms (24.41%) have two foreign geographic segments and another quarter (24.83%) operates in three foreign geographic segments. Only two of the 1,389 sample firms chose to operate in four global segments. The mean and median numbers of non-U.S. geographical segments are 1.75 and 1, respectively. The fact that about half of the firms start foreign operations in multiple geographical segments suggests that these firms are making a significant commitment to global operations. Corroborating this notion are the statistics on the proportion of total sales originating from foreign operations in the first year. For example, the median of foreign sales as a fraction of total sales in the first year of global operation is 22.5%.[7] The information in the business segment columns in Panel B reveals that the sample is almost evenly split between firms that are exclusively focused in one business segment (57%) and firms that are industrially diversified (43%). We observe a range from one to ten business segments with an average of 1.98 segments.

Panel C of the table provides the distribution of firms by SIC category for each sample year and for the total sample period. The greatest frequency of sample firms occurs in the manufacturing sector (other), 34.05%, manufacturing (computer and electronics), 22.53%, and services, 27.07%. Each of the remaining industry categories accounts for less than 5 percent of the total firms that chose to globalize operations.

Table 2 provides summary statistics for sample firms as well as for the matching portfolios. The value for each matched portfolio is the median for all firms in that portfolio. The first four rows of the table reporting book value, cash flow, sales and market value in the year prior to going global indicate that both sample firms and the median firm from the matched portfolio are small in size with book value of equity of $151.32 million and $100.91 million, respectively. Table 2 also documents various other financial characteristics such as, total foreign sales in the year of the event, foreign sales as a proportion of total sales, and market to book ratio for the firm in the year of the event. Another noteworthy result in Table 2 is that the cost of goods sold to sales in the year the decision to diversify globally was made is significantly lower for our sample firms that for their counterparts. For instance, in the year of the decision to diversify, our sample firms enjoy a median cost of goods sold to sales ratio of 0.616 while the median match firm's comparable figure

[6] In the sample, 795 firms are matched based on 3-digit SIC code, 371 are matched based on 2-digit SIC code and the remaining are matched using 1-digit SIC code. Our empirical results are not sensitive to this matching criterion.

[7] These figures are similar to those observed by Christophe (1997) and Denis, Denis, and Yost (2002) for a sample of firms that have global operations but are not necessarily starting global operations.

stands at 0.641. Similar differential exists in the two following years (unreported). This finding points to one potential beneficial impact from global diversification that could result in augmentation of operating performance.

B. Operating Performance Results

Table 3A reports the operating performance of sample firms and the median matched-firm for the years surrounding global diversification (year -1, 0, +1, +2) using cash flow to book value measure of performance. The most notable result is that sample firms outperform their counterparts significantly not only in the years following geographic diversification but also in the year preceding the decision. The difference between the sample firms' cash flow to book value in the year prior to the event, 0.107, and that of the matched firm portfolios, .079, is statistically significant at the 1 percent level. This implies that firms that diversify globally are not poor performers prior to the diversification. In fact, the significant superior performance of sample firms in the year prior to the global diversification suggests that efficiently run firms decide to expand globally. Measured net of matched counterparts, the sample firms' operating performance in years 0, +1 and +2 are 1.5 percent, 2.1 percent, and 2.5 percent respectively, all of which are statistically significant. In combination, the results in Table 3A are consistent with the notion that sample firms outperform their competitors in the years that surround the event and that diversification is not an outgrowth of free cash flow problems.

To test the possibility that our sample firms are outperforming their counterparts because they are not undervalued to begin with, we calculate the excess value á la Berger and Ofek (1995) for our globally diversified firms. Excess value (EV) is defined as the natural logarithm of the ratio of the firm's actual market value to its imputed value. A firm's actual market value is its book value minus the book value of equity plus the market value of equity. The firm's total imputed value is the sum of the imputed values for each of its segments. Each segment's imputed value is obtained by multiplying the segment's sales by the median ratio of market value to sales for all single-segment firms in that industry. Following Berger and Ofek (1995), we eliminate firms with extreme excess values ($-1.386 < EV < 1.386$).

Our results are in line with those reported by prior research in this area in that globally diversified firms exhibit negative and significant mean and median excess values for the year of the diversification of -0.048 and -0.056 respectively while the mean and median excess values of single-segment match firms are insignificantly different from zero. This finding clearly demonstrates that the superior operating performance that we observe in this study is not due to a positive excess value; i.e., our sample firms are not exhibiting a diversification premium. Moreover, this finding establishes that a negative excess value cannot be interpreted to be synonymous with poor performance and further confirms the conclusions of the strand of literature that refutes the diversification discount phenomena. A number of studies have questioned the methodology that measures excess value, and hence the conclusions drawn from the diversification discount (see Whited (2001), Campa and Kedia (2002), Mansi and Reeb (2002), and Villalonga (2004)).

C. Robustness Checks

The first robustness check that we conduct relates to the operating performance measure itself. Panel B of Table 3 re-estimates Panel A using sales to book value as an alternative performance measure. The findings of Panel B are very similar to those reported in Panel A indicating robustness of our findings to the performance measure used.[8]

The results in Table 3 could be construed to imply that superior performance is caused by superior management and not necessarily due to the global investment decision. To test the robustness of our results, we use alternative benchmark to measure operating performance following the decision to diversify globally. Specifically, we control for the sample firms' operating performance prior to the decision to go global. We re-estimate the analysis in Table 3A using an alternative matching criteria, matching by SIC code and operating performance in the year prior to going global. The results[9], not reported in a table for parsimony, indicate that the performance of sample firms is still significantly higher than the median of the matched-firm portfolio for all three years: year 0, +1 and +2. This finding implies that the superior operating performance is robust to the matching criteria and also that the superior performance of sample firms cannot be attributed to managerial talent of diversifying firms exhibited in the year prior to the event.[10] We also conduct another

[8] We also conduct the analysis in the remainder of the paper using this alternative measure of performance (sales to book value) and find the results to be indistinguishable from those with cash flow performance measure.

[9] The results are available from the authors upon request.

[10] In order to investigate whether sample firm's performance after the diversification is caused by changes in the riskiness of the firm, we calculate the dispersion of the operating cash flow to book value pre- and post-diversification. We use the actual and absolute deviation of cash flow to book of firm j around the median of the whole sample as measures of dispersion. We find no statistically significant difference for these dispersion measures between year –1 and year +1. Also, no significant differences are detected when the dispersion measure for year –1 is compared to year +2, nor when a match-adjusted cash flow dispersion measure is used. Thus, the data allows us to conclude that there is no change in the variability of operating performance

matching procedure (unreported) where the sample firms are matched to domestic firms in the major industry category of the diversifying sample firm. Our findings exhibit robustness to this matching criterion as well.

Similar to other studies, our sample selection criterion for considering a firm to be globally diversified is that it reports foreign sales. Yet, a number of firms in our sample (n=979) do not report foreign assets in the year of the diversification. This group of firms perhaps represents firms that operate globally through outsourcing or by selling abroad, rather than owning physical assets abroad. To ensure that our results are robust to the inclusion of these firms, we measure relative cash flow to book value for firms that indicate foreign asset investments (n=395) and those that do not. The relative cash flow is defined as the sample firm's cash flow to book value divided by the median match-firm portfolio's cash flow to book value. The results reported in Panel A of Table 4 suggest that there is no material difference between the two sets of firms. Both subgroups significantly outperform their matched portfolio median in each of the four years. Moreover, the difference between the medians of the two subgroups is not statistically different from zero indicating that control of physical foreign assets is not a pre-condition for superior operating performance. Our results contrast with those obtained by Click and Harrison (2000) who document that multinational firms that own foreign assets are associated with value destruction.

Next, we subdivide the sample in two periods: 1997-1999 and 2000-2003. The results on operating performance of sample firms relative to benchmark firms from the year prior to diversification to two years following the event is reported in Panel B. The mean abnormal operating performance in the 1997-1999 period is positive and significant in each of the four years surrounding the diversification (year -1 through year +2) and range from 0.014 in the year of diversification to 0.022 two years after the event. Similarly, the median abnormal operating performance for the 2000-2003 period is significantly positive throughout the four-year period with a range of 0.016 to 0.034. It is noteworthy to mention that the match-adjusted cash flow return in 2000-2003 period is consistently larger in years 0, +1 and +2 than those reported for the 1997-1999 period, perhaps an indication that deregulation and liberalization in foreign countries have rendered global diversification more beneficial with the passage of time. However, based on the Wilcoxon z-value for difference of medians of the two subperiods' match-adjusted cash flow return, none of the differences are significantly different from zero. In Panel C of Table 4, we examine the abnormal operating performance of firms with sales of less than $20 million from firms with sales equal to or greater than $20 million. Some previous studies on global diversification exclude firms with sales less than $20 million. By subdividing the sample into two such groupings, we can ascertain whether our results of significant superior performance are a consequence of the inclusion of smaller firms. The median relative cash flow to book value for smaller firms in year 0, +1 and +2 relative to the global diversification event are negative and statistically significant. In contrast, the abnormal operating performance of firms with larger sales are positive and significant at the 1 percent level in every year from the year prior to the diversification to two years following global diversification. Firms with larger sales significantly outperform smaller firms over the four-year period. Thus, our finding of superior performance for the overall sample is somewhat mitigated by the inclusion of smaller firms. This result suggests that smaller firms may be at a disadvantage when operating globally.

D. Operating Performance by Industrial and Global Diversification

We examine the role of industrial diversification of the firm on operating performance following global diversification. The cross-subsidization argument suggests that firms with one industrial segment would outperform those with multiple segments. In addition, it is argued that complexity arising from diversification detracts from firm value. If complexity of global diversification is compounded with industrial diversification, then industrial diversification may hinder the firm from benefiting from global diversification. In this scenario, we would expect to find that industrially focused firms outperform those operating in multiple industrial segments. However, it is also plausible that the complexity of the operations of the firm arising from industrial diversification prepares the firm's management to deal with global complexity. In which case, we should observe that industrially diversified firms are better able to harness the benefits of global diversification.

In Panel D, the first subgroup is composed of firms whose operations are focused on one industry segment (N=784), while the second subgroup is comprised of firms with multiple industrial segments (N=590). The empirical results reveal that although the abnormal operating performance of focused firms (one industrial segment) is higher than that for firms with multiple-industrial segments, the difference is not statistically significant as measured by Wilcoxon z-value for the difference across the two subgroups. From these empirical findings it can be inferred that there is no

due to the global diversification. And as a result, the enhanced operating performance cannot be attributed to changes in risk.

inefficient cross-subsidization in industrially diversified firms and that complexity does not detract from firm performance. We also compare the relative operating performance of firms operating in one foreign segment versus those operating in multiple foreign segments. The findings reported in Panel E of Table 4 suggest no difference between the two subgroups. The results from the above two panels indicate that the superior performance of our sample firms is robust to the degree of industrial diversification and global diversification. Finally, we subdivide the sample into a two-by-two matrix (not reported in a table for brevity) based on industrial and geographical diversification (single and multiple industry segments and single and multiple geographic segments). We find that there are no significant differences among four different categories using matched-firm adjusted performance.

E. Operating Performance by Industry Categories

There may exist heterogeneity across firms in the costs and benefits of global diversification that lead to value enhancement for some industries from global diversification and value reduction for others. For example, industries that can reduce production costs significantly by operating in lower cost countries are more likely to profit from their ventures abroad. In an attempt to distinguish between these two possible outcomes, in Panel F of Table 4 we subdivide the sample into various industry categories based on SIC code. For brevity, we report the relative operating performance for industry categories with 50 firms or more. The abnormal operating performance for all industry categories with less than fifty firms is not statistically significant. The data reveal that only two industry groups' abnormal operating performance is positive and statistically significant in the event year and in the two ensuing years. These two industry groups are (1) manufacturing – computer and electronics and (2) manufacturing – other.[11] However, when we test for difference in medians across the different industry categories for each of the four years, the differences are not significant at customary levels. The fact that none of the industry groups significantly underperform following the diversification decision implies that geographical diversification's impact ranges from value neutral to value enhancing. The empirical results do not lend credence to the argument that managers are motivated by self-interested behavior that is harmful to shareholders, across various industry groups.

F. Multivariate Regression Analysis

In this section, we estimate various regression models to explain the abnormal performance of sample firms diversifying globally. We control for the following firm financial characteristics: relative natural log of firm size, relative leverage, relative R&D expenditure to sales, relative advertising expenditure to sales[12], relative leverage, relative capital expenditure to sales and relative cost of goods sold to sales. Relative variables are calculated by subtracting the median value for that variable for the matched firm portfolio from the corresponding value for the sample firm. To control for industry effects, we include two dummy variables representing the manufacturing (computer and electronics) and manufacturing (other) industry categories. In Table 5, we report six regression models explaining firm abnormal operating performance in year 0 and year +1. Unlike prior work in this area, our regression analysis does not suffer from pooling of cross-sectional and time-series data, which can result in mistaken inferences due to inflated t-statistics. The results from the regressions identify several variables that are significantly related to abnormal operating performance of firms that decide to diversify globally.We use a dummy to represent industrial diversification which takes a value of one if the firm's business spans more than one industrial segment. This variable is not statistically significant in any of the regression models suggesting that industrial diversification does not impact operating performance of firms that decide to diversify. This result contrasts with Denis, Denis and Yost (2002) who find that industrial diversification combined with geographical diversification results in a diversification discount. To proxy for the firm's degree of global diversification, we use two variables. The first is a dummy variable that takes a value of one if the firm has more than one foreign geographic segment. Following Errunza and Senbet (1984), we also use the proportion of foreign sales to total sales. It is argued that expanding abroad renders the firm's operations more complex than that of a domestic firm, and hence, the task of monitoring management becomes more onerous. This in turn may give license to managers to act in their own self-interest. Based on this argument, it would be expected that the greater the number of

[11] It is interesting to note that the retail industry's abnormal operating performance in the year prior to global diversification is significantly positive but reverts to positive and insignificantly different from zero in the three following years. The change in abnormal operating performance from year –1 to year +1 is significantly negative indicating that firms in the retail industry are worse off following global diversification. It is often argued by practitioners that global diversification in the retail industry may not yield as high a return as that in the U.S. given the lower purchasing power of most regions outside the U.S. This could perhaps be one explanation for this observation.

[12] We set all missing values of R&D or advertising expenditures to zero.

foreign segments, the lower the value of benefits from global diversification. However, with a greater number of foreign segments, it is more likely that the firm will benefit from diversification of foreign exchange risk. Given the two opposing effects, it is not clear what the net result of the degree of diversification will be on performance. The regression results show that the coefficients of the dummy variable proxying for global diversification is insignificant in all six models indicating that disadvantages arising from complexity of operations may be offset by other benefits. The combination of the findings for this variable and the industrial diversification variable do not support the notion that inefficient cross-subsidization occurs in multiple-industry segment firms nor in multiple foreign segment firms. Even though the coefficients of the proportion of foreign sales variable are negative and statistically significant in models 2 and 3 (when explaining abnormal performance in year 0), the size of the coefficient, -0.0007, is not economically significant. Further, in models 5 and 6 which explain the abnormal performance in year +1, the coefficients of this variable are not statistically significant. These results, combined with the fact that global diversification for the whole sample generates positive abnormal performance, suggest that greater global involvement at the *outset* of diversification may generate complexity that slightly reduces match-adjusted cash flow return. However, this complexity hurdle is overcome in year +1 as the firm adapts to operating globally. A related variable to the degree of global diversification is whether the firm reports foreign investments or not. We include a dummy variable that takes a value of one when the firm reports foreign investments and zero otherwise. This variable exhibits insignificance in five of the six models supporting the results from the univariate analysis and the view that foreign assets do not hamper firm's performance.

Commonly R&D is viewed as a proxy for technical expertise of the firm while advertising, which creates product differentiation, is used to proxy for marketing sophistication. Morck and Yeung (1991) argue that the value of international operations of the firm is a function of the company's firm-specific advantages such as R&D or advertising and that such firm-specific skills are principal catalysts for expanding globally. This line of reasoning implies that firms operating in research- and advertising-intensive industries are expected to enjoy greater operating performance. In contrast to the findings of Morck and Yeung (1991), we find the coefficients on the relative R&D variable are negative and significant in all models.[13] So are the coefficients on the advertising variable.

Empirical evidence on the influence of firm size and capital expenditure to sales is similar to that reported in previous studies. For instance, the size variable's coefficients are positive and significant in all models indicating that smaller firms are at a disadvantage when diversifying globally, while larger firms may be better able to process raw materials and labor inputs than smaller firms. The regression results show that capital structure does not contribute to a firm's abnormal operating performance neither in the year of diversification nor in the following year. The coefficients of the relative cost of goods to sales variable are consistently positive and statistically significant indicating that firms with a larger component of cost of goods sold to sales benefit more from operating in a global environment, perhaps because of lower production costs abroad that may have motivated the geographic diversification in the first place. Finally, in Models 3 and 6, we control for industry effects by including two dummy variables representing two largest industry categories-- manufacturing (computer and electronics) and manufacturing (other). The coefficient for the manufacturing (other) industry variable is positive and significant in Model 3 and positive and insignificant in Model 6 indicating that global diversification significantly enhances the operating performance of firms in this sector only in the year of the diversification. The other industry dummy variable is not significant in either model.

To check the robustness of multivariate results to a different benchmark, all the regressions in Table 5 are re-estimated using abnormal operating performance from alternative matching criteria where we match by SIC code and operating performance in the year prior to going global. Using the same independent variables from Table 5, the three regressions explain the abnormal operating performance (obtained with alternative benchmark) for years 0, +1 and +2. The results, and hence the implications, are remarkably similar to those obtained from the previous table. If anything, the few differences in Table 6 are more in support of the notion that global diversification is beneficial. For example, the variable representing the percent of foreign sales/total assets is insignificant in all three regressions (instead of negatively significant in Table 5) while the dummy variable representing diversification in one or more foreign areas becomes statistically significant in year +2. Both these findings indicate that global diversification does not confer wealth destruction.

[13] We also re-estimate the regressions using dummy variables which take a value of one if the relative R&D expenditures/sales or relative advertising/sales are above their respective median values and 0 otherwise. The coefficients on both dummy variables remain negative and significant.

IV. Summary and Conclusion

Our interest in the impact of global diversification is motivated by the limited number of empirical studies in this area and the need to understand how the decision to operate globally affects corporate operating performance. Our main empirical finding reveals that global diversification does not impact operating performance negatively. Specifically, we find that firms that choose to diversify globally exhibit positive abnormal operating performance relative to benchmarked firms in the year of the decision to diversify and in the two ensuing years. Our central result thus refutes the notion that global diversification results in misallocation of resources and is consistent with maximization of shareholder value in support of the findings of Bodnar, Tang and Winthrop (1999) and Hyland (1999), among others. We also document that the superior performance of globally diversified firms is not due to positive excess value as our sample firms exhibit a negative and significant excess value as measured by Berger and Ofek (1995). This result confirms the conclusions of prior studies that the diversification discount is an artifact of measurement error. Thus, our study shows that the negative excess value in previous studies cannot be interpreted to be synonymous with poor performance.

We conduct a number of robustness checks. First, we show that our matched-adjusted cash flow return measure is invariant to alternative sets of benchmark firms. Our result of positive abnormal performance also exhibits robustness over different time periods. Univariate analysis reveals that sample firm abnormal performance is invariant to whether firms operate in one industry segment or multiple segments. Similarly, whether a firm chooses to operate in one or multiple foreign geographical segments, it outperforms its matched portfolio in the year of the diversification and in the two ensuing years. These findings, which are corroborated by multivariate analysis, suggest that cross-subsidization and the increase in the organizational complexity due to diversification are not influential factors to firm operating performance.

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Appendices

Table 1. Various Distributions of Firms That Diversified Globally

Sample consists of 1,389 U.S. industrial firms that diversified operations globally during the period 1997-2003. The sample is drawn from the *Compustat Geographic Segment Database* maintained by *Standard & Poors*.

Panel A: Distribution of Firms Diversifying Globally by Year

Year	Firms Diversifying Globally
1997	109
1998	354
1999	393
2000	234
2001	126
2002	90
2003	83
Total	1389

Panel B: Distribution of firms' foreign geographic segments and business segments

Number of segments	Reported Foreign Geographic Segments	Reported Business Segments
1	703	792
2	339	197
3	345	196
4	2	113
5	-	58
6	-	20
7	-	9
8	-	2
9	-	1
10	-	1
Total	1389	1389

Table 1 (Cont'd). Various Distributions of Firms That Diversified Globally

Panel C: Distribution by SIC category by year and for the total sample period

SIC Category	1997	1998	1999	2000	2001	2002	2003	Total
Agriculture	1	2	1	0	0	0	0	4
Mining, Oil	4	9	10	4	4	4	3	38
Construction	1	2	1	0	1	1	1	7
Manufacturing - Computer & electronics	27	80	93	66	24	14	9	313
Manufacturing - other	26	123	153	62	43	37	29	473
Transportation	10	22	11	13	6	2	4	68
Wholesale trade	7	11	21	6	3	3	0	51
Retail trade	5	8	12	8	4	4	9	50
Services	27	95	90	73	40	24	27	376
Public Administration	1	2	1	2	1	1	1	9
Total	109	354	393	234	126	90	83	1389

Table 2. Summary Statistics for Firms that Diversified Globally and Matching Firm Portfolios

Summary statistics for 1,389 firms that diversified globally during the period 1997 to 2003. The sample is drawn from the *Compustat Geographic Segment Database maintained by Standard & Poors*. We also report statistics for these firms' matching portfolios. The value for each matched portfolio is the median for all firms in that portfolio. Each matched portfolio is formed from all firms with: 1) no foreign sales in the year or the year prior to the firm adding foreign operations, 2) having same 3-digit SIC classification, and 3) with book value within 50% of sample firm's book value in the year prior to the diversification. If a minimum of five matching firms could not be found using these criteria, we match using 2-digit and 1-digit SIC codes. We report the median (means in brackets). Cash flow is defined as operating income before interest, taxes and depreciation. Utility firms and banks/financial service firms are eliminated (SIC codes 4900-4999 and 6000-6999).

Variable	Firms Diversifying Globally	Matched Firm Portfolios
Book value ($MM)	151.32 (1584.50)	100.91 (911.32)
Cash flow ($MM)	10.96 (216.18)	5.74 (120.50)
Sales ($MM)	122.98 (1407.70)	93.65 (804.89)
Market value of firm ($MM)	328.91 (4000.65)	159.87 (1620.70)
Total foreign sales in the year first reported ($MM)	23.89 (421.95)	-
Foreign sales as a fraction of total sales in the year first reported	0.225 (0.303)	-
Cost of goods sold as a fraction of total sales in the year of diversification	0.616 (1.152)	0.641 (0.715)
Market to book value ratio for the firm	1.65 (3.11)	1.564 (1.878)

Table 3. Operating Performance of Firms Diversifying Globally and Their Matched-Firm Portfolios

Operating performance for 1,389 firms that diversified operations globally during the period 1997- 2003 and for the matched-firm portfolios. The samples are drawn from the *Compustat Geographic Segment Database*. Operating performance is measured as a firm's ratio of operating cash flow (Compustat item #13) to its book value of assets (Compustat item #6) in Panel A and as ratio of sales to book value of assets in Panel B. We report median (mean) changes for firms diversifying globally, their matched firm portfolios and the matched-firm-adjusted ratios for diversifying firms. Utility firms and banks/financial service firms are eliminated (SIC codes 4900-4999 and 6000-6999).

Panel A: Cash Flow to Book Value of Assets

	Firms Diversifying Globally	Matched Firm Portfolio Medians	Firms Diversifying Globally - Median of Matched Portfolio
Cash Flow to Book Value in the year prior to the diversification	0.107*** (-0.011)	0.079*** (0.004)	0.019*** (-0.005)
Cash Flow to Book Value in the year of the diversification	0.092*** (0.001)	0.071*** (0.004)	0.015** (-0.001)
Cash Flow to Book Value in the year after the diversification	0.089*** (-0.014)	0.065*** (-0.002)	0.021*** (-0.010)
Cash Flow to Book Value in the second year after diversification	0.087*** (-0.069)	0.058*** (-0.001)	0.025*** (-0.075)

Panel B: Sales to Book Value of Assets

Sales to Book Value in the year prior to the diversification	0.983*** (1.070)	0.931*** (0.962)	0.037*** (0.110)
Sales to Book Value in the year of the diversification	0.949*** (1.064)	0.918*** (0.960)	0.040** (0.102)
Sales to Book Value in the year after the diversification	0.951*** (1.085)	0.923*** (0.989)	0.027*** (0.106)
Sales to Book Value in the second year after the diversification	0.956*** (1.194)	0.927*** (0.996)	0.022** (0.204)

***, **, * denote significance at the 1%, 5% and 10% levels respectively using medians test.

Table 4. Abnormal Operating Performance of Firms that Choose to Diversify Globally to Their Matched-Firm Portfolios by Sub-categories

Operating performance for 1,389 firms that diversified operations globally during the period 1997-2003 relative to those firms' matched-firm portfolios. The samples are drawn from the *Compustat Geographic Segment Database*. Operating performance is measured as a firm's ratio of operating cash flow (Compustat item #13) to its book value of assets (Compustat item #6). We report median (mean) changes for firms diversifying globally, their matched firm portfolios and the matched-firm-adjusted ratios for diversifying firms. Utility firms and banks/financial service firms are eliminated (SIC codes 4900-4999 and 6000-6999).

Panel A: Abnormal operating performance of firms reporting investment in foreign assets compared to firms not reporting foreign investment

	Abnormal cash flow to book value in year –1	Abnormal cash flow to book value in year 0	Abnormal cash flow to book value in year +1	Abnormal cash flow to book value in year +2
Firms not reporting foreign assets (n=979)	0.015*** (-0.014)	0.011*** (-0.008)	0.020*** (-0.013)	-0.027*** (-0.082)
Firms reporting foreign assets (n=395)	0.029*** (0.015)	0.028*** (0.016)	0.022*** (-0.003)	0.023* (-0.058)
Wilcoxon z-value for difference of medians	1.283	1.210	0.516	-0.797

Panel B: Abnormal operating performance of firms diversifying globally in 1997-1999 period vs. 2000-2003 period

	Abnormal cash flow to book value in year -1	Abnormal cash flow to book value in year 0	Abnormal cash flow to book value in year +1	Abnormal cash flow to book value in year +2
Period 1997-1999 (n=849)	0.020*** (-0.008)	0.014*** (-0.002)	0.016*** (-0.012)	0.022*** (-0.098)
Period 2000-2003 (n=525)	0.016*** (-0.002)	0.016*** (0.000)	0.031*** (-0.006)	0.034** (-0.006)
Wilcoxon z-value for difference of median	0.059	0.944	-1.351	0.707

Table 4 (Cont'd). Abnormal Operating Performance of Firms that Choose to Diversify Globally to Their Matched-Firm Portfolios by Sub-Categories

Panel C: Abnormal operating performance of firms with less than $20 million in total sales in year 0 compared to firms with $20 million or more in total sales

	Abnormal cash flow to book value in year -1	Abnormal cash flow to book value in year 0	Abnormal cash flow to book value in year +1	Abnormal cash flow to book value in year +2
Firms with less than $20 million in total sales (n=264)	-0.017 (-0.114)	-0.037 (-0.105)	-0.023** (-0.145)	-0.013* (-0.436)
Firms with $20 million or more in total sales (n=1110)	0.021*** (0.020)	0.021*** (0.024)	0.024*** (0.022)	0.027*** (0.008)
Wilcoxon z-value for difference of medians	-2.089**	-3.331***	-3.240***	-2.177**

Panel D: Abnormal operating performance of firms reporting more than one industry to firms reporting only one industry segment.

	Abnormal cash flow to book value in year -1	Abnormal cash flow to book value in year 0	Abnormal cash flow to book value in year +1	Abnormal cash flow to book value in year +2
One industry segment firms (n=784)	0.021*** (-0.026)	0.018*** (-0.012)	0.025** (-0.028)	0.038*** (-0.142)
Multiple industry segments firms (n=590)	0.019*** (0.021)	0.013*** (0.013)	0.016*** (0.014)	0.017*** (0.009)
Wilcoxon z-value for difference medians	0.445	0.075	-0.063	-0.817

Table 4 (Cont'd). Abnormal Operating Performance of Firms that Choose to Diversify Globally to Their Matched-Firm Portfolios by Sub-categories

Panel E: Abnormal operating performance of firms reporting more than one foreign segment compared to firms reporting only one foreign segment

	Abnormal cash flow to book value in year -1	Abnormal cash flow to book value in year 0	Abnormal cash flow to book value in year +1	Abnormal cash flow to book value in year +2
One foreign segment (n=697)	0.020*** (0.006)	-0.001*** (-0.001)	0.018** (-0.022)	0.023*** (-0.156)
Multiple foreign segments (n=1338)	0.018*** (-0.018)	0.016*** (-0.001)	0.026*** (0.002)	0.025*** (0.006)
Wilcoxon z-value	0.310	0.449	-1.405	-0.129

Panel F: Abnormal operating performance of globally diversifying firms across SIC classifications

	Abnormal cash flow to book value in year -1	Abnormal cash flow to book value in year 0	Abnormal cash flow to book value in year+1	Abnormal cash flow to book value in year +2
Manufacturing: Computer & electronics (n=310)	0.029*** (-0.002)	0.030* (-0.003)	0.040*** (0.003)	0.042** (-0.023)
Manufacturing: other (n=470)	0.026*** (0.032)	0.024*** (0.042)	0.025*** (0.021)	0.033*** (-0.168)
Transportation (n=68)	0.017 (-0.000)	-0.004 (0.025)	0.001 (0.077)	0.003 (0.007)
Wholesale trade (n=51)	-0.005 (0.015)	-0.018 (0.021)	-0.003 -0.064	0.001 (0.006)
Retail trade (n=50)	0.021** (0.031)	0.016 (0.011)	0.014 (-0.014)	0.011 (-0.070)
Services (n=372)	0.011 (-0.060)	0.011 (-0.049)	0.021 (-0.059)	0.020 (-0.046)
Chi-sq value for difference across categories	4.54	5.71	8.39	6.10

***, **, * denote significance at the 1%, 5% and 10% levels respectively using the Wilcoxon test.

Table 5. Regression Analysis of Abnormal Operating Performance of Firms Choosing to Diversify Globally

The table reports ordinary least squares regression estimates with the dependent variable being the abnormal operating performance for firms diversifying globally for the year of diversification and the following year. Independent variables are dummy variable indicating presence or absence of industrial diversification, investment overseas, multiple foreign operations, foreign sales/total sales and a set of control variables. Abnormal operating performance is defined as sample firm cash flow/book value minus that for matched firm. The sample is drawn from the *Compustat Geographic Segment* database. Operating performance is measured as a firm's ratio of operating cash flow (Compustat data item #13) to book value of assets (Compustat data item #6). Utility firms and financial firms are eliminated (SIC codes 4900-4999 and 6000-6999).

	In the year of global diversification			In the year following the global diversification		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-0.009 (-0.51)	0.008 (0.43)	-0.022 (-1.06)	-0.020 (-0.98)	-0.013 (-0.59)	-0.027 (-1.06)
Dummy equal to one if more than one industry	0.021 (1.21)	0.018 (1.00)	0.013 (0.74)	0.019 (0.89)	0.018 (0.82)	0.015 (0.68)
Dummy equal to one if more than one foreign area	-0.005 (-0.27)	0.036 (1.29)	0.005 (0.25)	0.024 (1.15)	0.028 (1.28)	0.030 (1.35)
Dummy equal to one if reporting foreign investment	0.026 (1.34)	0.032 (1.64)	0.036 (1.82)*	0.008 (0.35)	0.010 (0.44)	0.011 (0.50)
Percent of foreign sales/total sales		-0.0007 (-2.07)**	-0.0007 (-2.13)**		-0.0003 (-0.69)	-0.0003 (-0.69)
Natural log of ratio of relative firm market value	0.035 (4.18)***	0.034 (2.96)***	0.036 (4.45)***	0.024 (2.45)**	0.024 (2.43)**	0.025 (2.58)***
Relative leverage	-0.012 (-0.19)	-0.015 (-0.24)	-0.015 (-0.24)	0.071 (0.91)	0.071 (0.90)	0.073 (0.94)
Relative ratio of capital expenditure to sales	0.026 (2.22)**	0.026 (2.17)**	0.025 (2.15)**	0.022 (1.57)	0.022 (1.55)	0.022 (0.94)
Relative ratio of research and development to sales	-0.050 (-7.45)***	-0.048 (-7.04)***	-0.049 (-7.25)***	-0.042 (-5.32)***	-0.041 (-5.12)***	-0.042 (-5.21)***
Relative ratio of advertising expense to sales	-0.121 (-7.64)***	-0.115 (-7.10)	-0.115 (-7.16)	-0.131 (-7.03)***	-0.128 (-6.73)***	-0.129 (-6.76)***
Relative ratio of cost of goods sold to sales	0.005 (6.16)***	0.028 (5.82)***	-0.005 (-1.73)*	0.020 (3.65)***	0.020 (3.51)***	0.020 (3.60)***
Dummy equal one if manufacturing -other			0.071 (3.61)***			0.035 (1.45)
Dummy equal one if computer/electronics			0.017 (0.76)			-0.0006 (-0.69)
R^2	0.090	0.085	0.0952	0.109	0.110	0.101
F	11.13***	10.31***	9.91***	12.71***	11.48	9.80***
N	1016	1016	1016	944	944	944

***, **, * denote significance at the 1%, 5% and 10% levels respectively.

Table 6. Regression Analysis of Abnormal Operating Performance of Firms Diversifying Globally Using Alternative Matching Benchmark

Table reports ordinary least squares regression estimates. The dependent variables used in the three models are the abnormal operating performance for our sample firms for the year of diversification (year 0), the following year (year +1) and two years following diversification (year +2). All variables are obtained using alternative matching criteria where we match by SIC code and operating performance in the year prior to going global. The independent variables are: dummy variable indicating presence or absence of industrial diversification, investment overseas, multiple foreign operations, foreign sales/total sales and a set of control variables. Abnormal operating performance is defined as sample firm cash flow/book value minus that for matched firm portfolio. Matched firms are selected based on performance in the year prior to diversification and SIC code. Operating performance is measured as a firm's ratio of operating cash flow (Compustat data item #13) to book value of assets (Compustat data item #6). Utility firms and financial firms are eliminated (SIC 4900-4999 and 6000-6999).

	For the year relative to global diversification:		
	Year 0	Year +1	Year +2
Intercept	-0.019 (-1.16)	-0.028 (-1.32)	-0.039 (-1.15)
Dummy equal to one if more than one industry	0.005 (0.35)	0.000 (0.01)	0.003 (0.09)
Dummy equal to one if more than one foreign area	-0.016 (-1.05)	0.021 (1.09)	0.062 (2.09)**
Dummy equal to one if reporting foreign investment	0.004 (0.24)	-0.027 (-1.34)	-0.063 (-2.01)**
Percent of foreign sales/total sales	-0.0002 (-0.77)	-0.001 (-0.28)	-0.0008 (1.44)
Natural log of ratio of relative firm market value	0.017 (5.00)***	0.018 (4.15)***	0.020 (2.93)***
Relative leverage	-0.122 (-2.29)**	0.032 (0.48)	0.105 (0.98)
Relative ratio of capital expenditure to sales	0.033 (3.53)***	0.073 (6.28)***	-0.008 (-0.42)**
Relative ratio of research and development to sales	-0.027 (-6.13)***	-0.064 (-11.74)***	-0.019 (-1.94)*
Relative ratio of advertising expense to sales	-0.061 (-5.65)***	-0.133 (-10.04)***	-0.079 (-3.64)***
Relative ratio of cost of goods sold to sales	0.011 (3.38)***	0.024 (5.81)***	0.015 (2.15)**
Dummy equal one if manufacturing -other	0.033 (2.01)**	0.010 (0.50)	0.040 (1.20)
Dummy equal one if computer/electronics	0.014 (0.76)	0.000 (0.01)	0.004 (0.10)
R^2	0.078	0.197	0.056
F	7.02***	19.05***	4.06***
N	1015	947	840

***, **, * denote significance at the 1%, 5% and 10% levels respectively.