An Examination of the Relationship between Corporate Governance Regime and Corporate Performance

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Abstract

This study brings together two important strains of the literature on the relationship between corporate governance and corporate performance. Like Gompers, Ishii, and Metrick (2003) we use an index to summarize the corporate governance regimes of individual firms. Rather than construct our own index, we use the Corporate Governance Quotient (CGQ), a commercially produced, widely disseminated governance index to measure the strength of firm governance. We also model governance and performance in a simultaneous equations framework to take into account the fact that governance regime and performance may be endogenous. Our empirical results are consistent with the proposition that CGQ captures differences in the strength of governance regime across firms. They also show that unsystematic risk is strongly related to this governance rating. This evidence suggests that business opportunities are an important determinant of cross-sectional variation in governance regime. Like Demsetz and Lehn (1985), however, we do not find governance regime is related to cross-sectional variation in firm performance. We conclude that pursuing governance ratings standards without regard to the firm's operating and financial policies may be unproductive or even counterproductive.

I. Introduction and Motivation

Corporate governance refers to the mechanisms that limit agency costs by checking managerial discretion and aligning manager and owner interests. In common usage corporate governance extends to a wide array of devices – internal and external, technical and legal, contractual, incentive and other – that shape the relationship between owners and managers and defines their response to the agency problem that exists between them. Two general questions have occupied academic researchers in the area of corporate governance. The first is whether specific governance mechanisms or groups of mechanisms work to alleviate the agency problem and lower agency costs. The second related question is whether differences in firm performance are related to differences in corporate governance. According to Hermalin and Weisbach (2003), if firm performance is related to governance, then the relationship is a "disequilibrium phenomenon," and firms can increase value by altering their corporate governance regimes. However, if firm performance is unrelated to governance, then the relationship is an "equilibrium

phenomenon" and managers cannot enhance value by changing their approach to governance. There is evidence to support both characterizations of the relationship. Morck, Schleifer, and Vishney (1988), McConnell and Servaes (1988), and Core and Larcker (2002), for example, find that governance structure affects firm value. In contrast, Demsetz and Lehn (1985) and Agrawal and Knoeber (1996) present evidence that suggests owners and managers select a variety of different governance structures, each of which may be value maximizing, but none of which are related to corporate performance.

Several difficulties arise in examining the governance-performance relationship empirically that may contribute to the divergence in the evidence. One is that governance and performance are likely to be jointly determined. For example, a governance mechanism like the ownership stake held by board members may lower agency costs by pumping up the rewards to effective monitoring. This may lead to better firm performance, but better firm performance may also lead board members to hold larger stakes of the firm, creating two-way causality between governance and performance. Many studies that examine performance and governance structure use a single regression equation framework, failing to account for the potential dual causality between performance and governance structure. Jensen, Solberg, and Zorn (1992), Barnhart and Rosenstein (1998), and Weber and Dudney (2003) tackle this problem by utilizing a simultaneous equations framework that allows firm performance and governance structure to be endogenous.

Another challenge for researchers is that corporate governance is multifaceted. Owners and managers select an array of governance variables in managing the agency problem to create an overall governance posture or governance regime. What matters for controlling agency costs in the regime isn't the level of any given variable, but the effectiveness of the overall regime.

Firms set poison pill provisions and CEO compensation in the context of the number of outsiders on the board, for example. From this viewpoint, isolating the effect of a given governance mechanism requires controlling for all other mechanisms that enter the regime. A regression that includes only one or a small subset of the governance mechanisms may ignore relevant governance variables or fail to take account of their interrelationships, leading to specification error.

Gompers, Ishii, and Metrick (GIM, 2003) offer a clever approach to this problem. They create a corporate governance index – the G-Index – that summarizes an array of variables comprising a firm's overall governance regime. Other researchers are increasingly adopting this approach. Chi (2005), Cremers and Nair (2005), Jiraporn, Kim, Davidson, and Singh (2006), and Core, Guay, and Rusticus (2006) use the G-Index to in empirical studies. Interestingly, the market has also picked up this idea. According to *CFO Magazine*, in 2002 at least five separate private enterprises were offering or preparing to offer comprehensive external evaluations of corporate governance for individual companies.[1] Much like bond ratings agencies, these governance-raters attempt to convert a complex array of corporate governance characteristics into a single, comprehensive, and comparable metric that describes a firm's governance regime.[2] Private governance ratings not only offer owners and managers an external evaluation of their governance regime, they also offer researchers a compelling alternative to constructing their own indexes to examine the relation between governance and firm performance.

In this study, we exploit the opportunity presented by private governance ratings to examine the relationship between a corporate governance and firm performance. The index we select is the Corporate Governance Quotient (CGQ) developed and published by Institutional

[1] "Introducing the Boardroom Scoreboard," CFO Magazine, December 2002, 18.
[2] In fact, one private purveyor of governance ratings was Moody's; however, in September 2005, Moody's announced it would no longer market this product.

Shareholder Services (ISS). Unlike the G-Index, CGQ is commercially produced and widely available to investors and managers. The study offers several useful extensions of the existing literature. Our study is the first academic study of which we are aware to investigate the relationship between any other commercially-produced governance rating or index and firm performance. Our study also ties together for the first time two important, but previously unconnected, strands of the extant literature. We use an index to represent corporate governance regimes, and we use a simultaneous equations model to explicitly account for joint determination of the governance regime and firm performance.

Our results are consistent with an equilibrium characterization of the governance – performance relationship. When we use simultaneous equation estimation methods to estimate our model, we find that CGQ is not significantly related to firm value. However, we find that CGQ is inversely related to capital structure and dividend policy. Our results are consistent with CGQ measuring the strength of a firm's governance regime and with dividend policy and capital structure serving as substitutes for governance regime in controlling agency costs. The results are consistent with Jensen's (1986) free cash flow hypothesis and with the empirical results in Jensen, Solberg, and Zorn (1992). They also suggest that firms select among a range of mechanisms – not all included in CGQ – to manage the agency problem between owners and managers. Consistent with Demsetz and Lehn's results, different governance regimes can be consistent with agency cost minimization and value maximization at different firms.

A key discovery of our empirical work is evidence that unsystematic risk is strongly related to governance regime. We argue that this result is evidence that business opportunities are an important determinant of the mechanisms owners and managers select to control agency costs. For researchers our results indicate that controlling for only a few governance

mechanisms in empirical work may be insufficient. Investigating the governance-performance connection requires consideration of the overall governance regime in the context of firm opportunities and capital structures. The importance of our findings for managers and owners is similar. While governance indices or ratings may capture differences in the strength of governance regime, pursuing benchmarks without regard to the firm's operating and financial policies may be unproductive; indeed such a policy could be counterproductive. The next section of the paper describes briefly the ISS methodology for constructing CGQ. The rest of the paper is organized as follows: Section III discusses the literature; Section IV specifies the model; Section V describes the data; Section VI explains the results, and Section VII concludes.

II. The Corporate Governance Quotient - CGQ

The Corporate Governance Quotient published by Institutional Shareholder Services incorporates a wide range of governance factors identified in academic and practitioner research as important mechanisms for controlling agency costs. Unlike ratings offered by other private entities, CGQ is scalar - not qualitative. CGQ is a percentile ranking of firms according to their governance characteristics relative to two peer groups – a broad peer group such as the S&P 500 or the Russell 2000 and a more narrow industry group. A CGQ of 80 within the S&P 500 and 100 within industry group indicates that the firm is in the top 20 percent of corporate governance in the S&P 500 and in the top one percent within its two-digit GICS industry group. In this paper, we are interested in the group of firms rated relative to the S&P 500.

ISS exact methodology for determining CGQ is proprietary, but the process is described in detail at its web site - http://www.issproxy.com. ISS bases its most recent methodology for determining firm CGQs on a number of academic and industry studies, including Brown and

Caylor (2004) and GIM.[3] ISS indicates in their promotional material that, "the CGQ rating system was designed to assist institutional investors in evaluating the quality of corporate boards and the impact their governance practices have on performance."[4] To determine a firm's CGQ relative to its broader peer group and industry group, ISS analyzes 61 rating criteria within eight governance categories for U.S. companies.[5] These categories include Board, Audit, Charter/Bylaws, State of Incorporation, Executive and Director Compensation, Qualitative Factors, Ownership, and Director Education.

ISS establishes the importance of individual governance factors on the basis of their relationship to firm performance. Factors such as the presence of former CEO, chairman/CEO separation, state of incorporation, etc., are related to a indicators of firm profitability, valuation, market value, and risk, for a three-year period through the most recent fiscal year-end. The correlations between governance factors and performance variables determine the weight that each factor is assigned in determining CGQ within four categories. At the time of this study, these categories were weighted as follows: 40 percent for board related factors, 30 percent for compensation, 20 percent for anti-takeover, and 10 percent for audit-related factors.[6] ISS updates its rankings monthly to reflect firms entering and leaving the peer groups and twice each year to reflect changes in evaluation of the firm's governance regime. On April 19, 2005, *Yahoo! Finance* opened up free public access to company CGQs by providing the monthly updates on their company profile page.

III. Related Research

[3] See http://www.issproxy.com/governance/publications/2005archived/177.jsp for a list of publications ISS considers relevant to the topic.
[4] See http://www.issproxy.com/pdf/CGQFAQ.pdf.
[5] The list of criteria and a list of index groupings can be found at http://www.isscorporateservices.com/ratings/cgqdomesticcriteria.html. ISS continuously enhances their CGQ methodology, revises their sample and degrees of freedom.
[6] See http://www.issproxy.com/pdf/CGQOverviewChanges.pdf for a description.

Jensen and Meckling's (1976) seminal paper ignited interest in empirical study of corporate governance. Much of this research, reviewed extensively by Shleifer and Vishney (1997), examines whether corporate governance mechanisms or managerial decisions generate predictable stock price impacts. These studies typically view the arrival of new information with agency implications such as hostile takeover bids or investor proxy fights through the lens of an event study. Results are broadly consistent with the conclusion that agency costs are significant and vary systematically with the quality of specific corporate governance mechanisms.

A more recent and growing literature focuses on whether various corporate governance mechanisms contribute to corporate performance. For example, Klein, Shapiro, and Young (2005), Gugler, Mueller, and Yurtoglu (2004), Leng (2004), and Rossenstein and Wyatt (1988) consider how governance mechanisms such as incentive pay, institutional ownership, and family ownership relate to performance measures such as accounting returns, equity values, and stock returns. Widely cited papers by Morck, Shleifer, and Vishney (1988) and McConnell and Servaes (1990) examine the Berle and Means (1932) hypothesis that managers with limited stakes in an enterprise have strong incentives to exercise control rights to their own benefit. Morck, Shleifer, and Vishney find that the proportionate ownership stake of board members is systematically related to their measure of relative value - Tobin's *q*. Similarly, McConnell and Servaes find that board and insider ownership stake as well as the proportion of institutional ownership explain differences in the cross-section of Tobin's *q*. In Hermalin and Weisbach's (2003) review of similar literature, they characterize these results as consistent with a "disequilibrium phenomena" in the sense that owners can capture value by altering governance structure to increase agency costs.

Demsetz and Lehn (1985) suggest the alternative equilibrium interpretation. They argue that managers and owners of different enterprises may manage agency costs differently but with the same goal of minimizing them. They suggest that if agency costs are minimized with different ownership structures at different firms, then firm performance in the cross-section should not be related to ownership structure, and their results are consistent with this hypothesis. Agrawal and Knoeber (1998) extend this idea to the choices firms make across different governance mechanisms – including ownership by insiders, board members, blockholders, and institutions as well as outside directors, CEO tenure, and capital structure. They treat each of these variables, along with Tobin's *q*, as endogenous in a simultaneous equations model. Similar to Demsetz and Lehn, they find that the governance variables vary systematically with agency cost measures but not with performance. Core and Larker (2002) also use simultaneous equations methods to examine governance when governance structure and performance are endogenous. Using similar methods Jensen, Solberg and Zorn (1992) find evidence consistent with Jensen's free cash flow hypothesis. Their results suggest debt and dividend policies are set to send more free cash flow to investors when corporate governance is weaker. Cremers and Nair (2005) provide empirical support for the proposition that the impact of individual governance mechanisms is interrelated and individual governance variables are jointly determined.

Agrawal and Knoeber's paper illustrates the problem researchers face in attempting to incorporate more governance mechanisms in corporate performance models. The list of potential governance variables is long, and as the number of jointly determined variables grows, the models become more complex and statistical issues grow commensurately. GIM's G-index offers a clever alternative to modeling all relevant governance mechanisms in a single model that

also explains corporate performance. The G-Index summarizes 28 corporate governance variables that represent a significant portion of the owner-manager relationship. GIM investigate the relationship between the G-Index and firm operating performance, stock return performance, and Tobin's *q*. They find that high index (shareholder friendly) firms have higher profits, earn greater returns for investors, and are valued more highly in the market than low index (shareholder unfriendly) firms. Drobetz, Schillhofer, and Zimmermann (2004) and Bauer, Guenster and Otten (2004) adopt similar methods to investigate the governance-performance relationship for German and European firms respectively. Their results are consistent with the results from GIM for stock returns and market valuation.

The empirical work we present below brings together the approaches of Agrawal and Knoeber and GIM. An important distinction between our paper and Agrawal and Knoeber's is that they model governance mechanisms individually, whereas we use a summary index of governance regime. Unlike GIM we do not construct our own index but rather rely on ISS's CGQ rating. We believe using CGQ offers several interesting advantages. First, though the G-Index is simpler than the CGQ, the information necessary to construct the G-Index is unavailable to most managers, investors, or analysts. CGQ is readily available, and it is disseminated on the World Wide Web. CGQ is also regularly updated, and importantly, its commercial appeal depends upon its relevance. We also extend GIM by modeling CGQ and Tobin's *q* in a simultaneous equations framework. This allows us to consider firm value and governance structure as endogenous variables, avoiding the potential simultaneous equations bias which Core, Guay, and Rusticus (2006) suggest may be a problem in GIM's analysis.

IV. Model Specification

To begin our empirical analysis, we sketch a simple theoretical model where value and corporate governance are endogenous. In our model, a firm's investments and the degree to which claimants can expect to receive the benefits from these investments determine the firm's value. The firm's investments include assets in place and growth options. The market establishes the value of assets in place according to discounted cash flow principles and growth options according to option pricing principles. The firm's corporate governance regime affects value by limiting the extent to which managers can expropriate cash flows from the firm's investments. The corporate governance regime is in turn a function of the value available for managers to expropriate, characteristics of the firm's investments, and the firm's capital structure and payout policies. We specify the following structural econometric model on the basis of this theoretical sketch:

$$(1)\quad ln\text{Tobin's } q = \alpha_{12}\, logit\text{CGQ} + \alpha_{13}\, ln\text{Total Assets} + \alpha_{14}\, ln\text{Firm Risk} + \alpha_{15}\, ln\text{Market Risk} + \alpha_{16}\,\text{Growth} + \alpha_{19} + \varepsilon_1$$

$$(2)\quad logit\text{CGQ} = \alpha_{21}\, ln\text{Tobin's } q + \alpha_{23}\, ln\text{Total Assets} + \alpha_{24}\, ln\text{Firm Risk} + \alpha_{25}\, ln\text{Market Risk} + \alpha_{27}\,\text{Financial Leverage} + \alpha_{28}\,\text{Payout Rate} + \alpha_{29} + \varepsilon_2$$

where α_{11} and α_{22} have been normalized to equal -1 and α_{19} and α_{29} are constants.

Tobin's *q* in Equation (1) is a function of its governance rating, firm size, unsystematic risk, systematic risk, and growth. The sign and significance of the coefficient on *logit*CGQ - α_{12} - are of particular interest in this study. Since CGQ is a percentile ranking constrained by construction to lie between 0 and 1, we use the logit transformation of CGQ in our model. Following Hermalin and Weisbach (2003), if the corporate governance-value relationship is out

of equilibrium, then firms have not adopted agency cost minimizing governance regimes. On average, owners could expect to earn rewards for strengthening governance regimes and further limiting managerial discretion. In our regression analysis in this case α_{12} should be positive and significant, indicating higher CGQ firms are more valuable. However if Demsetz and Lehn's hypothesis is correct, then the governance-value relationship is characterized by equilibrium. Firms set their governance regimes to minimize agency costs. Cross-sectional analysis should show random variation in valuation around any given governance rating, but on average, owners could not expect to increase value by strengthening governance. In this case we expect α_{12} to be insignificantly different from zero.

Total Assets - measured at book value - enters Equation (1) as a measure of firm size and a proxy for its assets in place. Typically larger firms with more assets in place have proportionately less growth potential and therefore lower Tobin's *q*. Thus we expect α_{13} to be negative. Firm Risk is the firm's unsystematic risk, defined as the mean squared error of the residuals from a market model regression. According to our model, Tobin's *q* should be positively related to Firm Risk because greater unsystematic risk increases the value of a firm's growth options. Shin and Stulz (2000) note unsystematic risk may also increase firm value and Tobin's *q* by reducing the diversification discount. However, they indicate that since unsystematic risk may reduce the value of debt tax shields or increase the expected costs of financial distress, unsystematic risk may also reduce firm value and Tobin's *q*. The net impact of these countervailing effects is an empirical question, leaving the sign of α_{14} indeterminate. The final two variables in Equation (1) – Market Risk and Growth – relate to assets in place, and they enter on the basis of traditional discounted cash flow valuation models. We expect α_{15} to be negative as higher market risk increases the required return on assets in place and reduces their

present value. Growth increases the future cash flow component of the value of assets in place, and we expect α_{16} to be positive.

In Equation (2), we model the logit transformation of CGQ as a function of Tobin's *q*, firm size, unsystematic and market risk, financial leverage, and payout rate.[7] One argument for modeling corporate governance as an endogenous variable is that more valuable firms offer greater expropriation opportunities to managers. To ensure that owners realize the value of their investments, owners of more valuable firms may establish governance regimes that achieve higher governance ratings and more carefully limit managerial discretion. Under this interpretation, the sign of α_{21} should be positive. However, Chi (2005) notes that poor firm performance may lead owners to seek stronger governance regimes, inducing a negative relationship between Tobin's *q* and CGQ in cross-sectional analysis.

Total Assets in Equation (2) again measures size and proxies for assets in place. Because economies of scale are likely to exist in establishing and managing corporate governance regimes, larger companies are likely to spend more absolutely on corporate governance and achieve higher governance ratings. In addition, assets in place represent a resource to be converted to managerial uses. These influences suggest a positive relationship between total assets and governance rating and a positive sign for $\alpha_{23.}$

Risk enters Equation (2) because it exacerbates the information asymmetry that lies at the heart of the agency problem between owners and managers. As risk increases, owners' ability to distinguish between the outcomes related to managerial actions (for better or worse) and good or

[7] The system meets the criteria of the implicit function theorem as long as the Jacobian does not vanish. This requires that $\alpha_{11} \cdot \alpha_{22} \neq \alpha_{21} \cdot \alpha_{12}$. Estimation results presented below meet this condition.

bad luck may decline.[8] We therefore expect the strength of the corporate governance regime to be positively related to risk. However, we also note that the nature of the risks inherent in the business may matter to corporate governance regime selection. That is, systematic and unsystematic risks may pose different challenges for monitoring managers and designing mechanisms to limit their discretion to use firm resources. We therefore include both Firm Risk and Market Risk variables in the model, and we expect the coefficients α_{24} and α_{25} to be positive.

The final variables in Equation (2) are Financial Leverage and Payout Rate. According to Jensen (1986), financial policies are an important mechanism for limiting managerial discretion. Higher debt and dividend payments, other things the same, leave less cash for managers to squander on managerial welfare enhancements. We expect α_{27} and α_{28} to be negative, reflecting the theory that capital structure and dividend policy serve as key substitutes for the other governance mechanisms in controlling agency costs.

V. Data

To estimate Equations (1) and (2) we draw our sample firms from the S&P 500 as of the second quarter of 2004. Banks and diversified financial firms pose problems in the analysis as their leverage ratios and payout ratios are related to regulatory issues. Like other researchers we drop firms in GICS codes 4010-4040 eliminating 75 financial services firms from the sample. Lack of CGQ information reduces the sample by another 31 firms, and missing values for one or more explanatory values results in another reduction of 2 firms. The final sample size is 392 firms.

Table 1 presents descriptive statistics on the sample firms for the variables that enter the

[8] Hart (1995) notes that if owners could perfectly attribute firm performance to managerial effort there would be no need for corporate governance. Owners would simply eliminate the agency problem through complete contracts with managers.

regressions. The descriptive statistics are for the variables in levels – prior to the transformations of the variables used in the regressions. Balance sheet and income statement variables are taken from the Compustat database for each firm's fiscal year-end 2004. Beta and Standard Error are, respectively, the slope coefficient and the standard error of the regression resulting from estimating the market model using CRSP monthly returns for each stock against the CRSP value-weighted index. In the regressions presented below, we use the Market Risk variable obtained by squaring the beta and multiplying it by the variance of the monthly return on the CRSP value-weighted index for the sample period (i.e. Market Risk = $\beta^2_i \sigma^2_m$). The sample period for the market model regressions is the 60 month period from January 2001 through December 2005. Where 60 monthly returns are not available, at least 24 monthly returns are required for the firm to enter the sample. Two firms did not meet this criterion.

[Insert Table 1 about here.]

Total Assets is measured in millions of dollars. LT Debt/Capital, Growth, and Payout Rate are percentages. Growth is the three-year annual compound rate of growth in net sales from fiscal year-end 2001 to fiscal year-end 2004. Payout Rate is the ratio of cash dividends to reported net income for fiscal year 2004. The average Payout Rate for the sample for fiscal 2004 was 0.18%. LT Debt/Capital is the ratio of long-term debt to long-term debt plus total equity on a book value basis. The Financial Leverage variable we use in the regressions is the equity multiplier transformation of the long term debt ratio.[9]

Tobin's *q* is the ratio of market value of assets to replacement cost. The market value of assets in the numerator is defined, following GIM, as the book value of total assets plus the difference between the market and book value of the firm's equity plus its deferred taxes. The

[9] $\text{Financial Leverage} = 1 + \left[(\text{LT Debt}/\text{Cap}) \Big/ (1 - (\text{LT Debt}/\text{Cap})) \right]$.

market value of the firm's total equity is Compustat item *Market Value – Traded Issues – Fiscal Year* taken for fiscal year 2004 from Compustat. Compustat items *Deferred Taxes (Balance Sheet)* and *Stockholder's Equity* for the fiscal year-end 2004 are also taken from Compustat. Replacement cost in the denominator of Tobin's *q* is the book value of total assets measured by the Compustat item *Assets - Total*.[10]

CGQ is the Institutional Shareholder Services' (ISS) Corporate Governance Quotient percentile ranking relative to the S&P500 as reported on the *Yahoo! Finance* Company Profile Page in October, 2005.[11] CGQ is approximately uniformly distributed across the sample. The average CGQ of 51.39 indicates that firms eliminated from the sample for various reasons did not come disproportionately from high or low ranges of CGQ.

VI. Estimation Results

The first concern we address in estimating the system (1) and (2) is the estimation method. Estimating the system by Ordinary Least Squares (OLS) treats each equation separately, ignoring the potentially endogenous relationship between Tobin's *q* and CGQ. Barnhart and Rosenstein (1998) point out that when theory doesn't dictate a particular model structure OLS may be a good estimation method. OLS estimates are less sensitive to misspecification error than other simultaneous equations methods; however, OLS estimates are biased and inconsistent. By the order condition, equation (1) is over-identified and equation (2) is just-identified, so simultaneous equations estimation methods can also be applied.[12] We

[10] Support for this general approach to measuring Tobin's *q* can be found in Perfect and Wiles (1994) and Chung and Pruitt (1994).

[11] The authors are grateful to Institutional Shareholder Services for providing us with firm CGQs.

[12] The system (1) and (2) is linear in the parameters but non-linear in the variables. It may be written in partitioned matrix form as $\varepsilon' = [\alpha_1 \vdots \alpha_2 \vdots \alpha_3][y' \vdots x']$, where ε is the matrix of disturbance terms, y and x are the endogenous and exogenous variable vectors, and α_1, α_2, and α_3 represent the partitions of the coefficient matrix for the endogenous variables, nonlinear exogenous variables, and linear exogenous variables respectively. Brown (1983) points out that identification conditions for non-linear systems are not generally identical to identification conditions for strictly linear systems and may be substantially more complex. However, the identification of the system defined above

estimate the model using both OLS and Three Stage Least Squares (3SLS) but present only the 3SLS estimates below.

Table 2 presents correlation coefficients for the variables after various transformations prior to estimation. The correlation coefficient is the top figure in each cell. The bottom figure is the p-value for a test of the null hypothesis that the correlation coefficient equals zero. Tobin's *q*, Total Assets, Firm Risk, and Market Risk are in natural logs. CGQ(SP500) is the logit transformation of the firm's CGQ relative to the S&P500 (i.e. ln[CGQ/(1-CGQ))]. Among the instrument variables, the null hypothesis of zero correlation is rejected at normal significance levels for the correlation between Firm Risk and Market Risk, Firm Risk and Total Assets, Firm Risk and Payout, Market Risk and Total Assets, and Financial Leverage and Total Assets. But in no case is the correlation coefficient among these variables greater than 0.48 in absolute value. Multicolinearity does not seem to be a concern.

[Insert Table 2 about here.]

Table 3 presents the 3SLS estimation results for the system.[13] Panel A presents the results for equation (1) where Tobin's *q* is the explained variable. Interestingly, α_{12} - the coefficient estimate for CGQ(SP500) - is positive, but its standard error is relatively high. We cannot reject the hypothesis that CGQ(SP500) is unrelated to cross-sectional firm performance at the usual small-sample confidence levels.[14]

[Insert Table 2 about here.]

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may be treated as identical to the strictly linear case. This follows from Brown as long as α_3 achieves full row rank and $[\alpha_3\ \phi_i']$ has rank equal to 1, where ϕ_i is the vector of linear restrictions on the linear exogenous coefficients in α_3 for the i^{th} equation. The system above meets these conditions and therefore, we conclude on the basis of the order condition for a linear system that the identification is achieved in each equation.

[13] The instruments in the first two stages of the 3SLS estimates here include all of the exogenous variables used in the model.

[14] Although t-ratios from simultaneous equation estimations are often treated the same as single equation estimates, the small sample properties of the estimators are generally unknown. However, 3SLS estimators are asymptotically efficient.

While this result is consistent with the previous cross-sectional analysis by Demsetz and Lehn and by Agrawal and Knoeber, it is important to note that it does not indicate corporate governance is irrelevant to individual firm performance. Rather, it supports Demsetz and Lehn's interpretation that governance is characterized by equilibrium where firms set their corporate governance regimes to minimize agency costs. According to this view, as circumstances differ across firms, so too do the corporate governance mechanisms the firms select to control agency costs. Any index or rating of corporate governance reflects a particular mapping of the vector of individual governance variables into the index. While the index or rating may consistently map differences in governance across firms, if different governance regimes are equally successful (or unsuccessful) at controlling agency costs, performance may not be closely related to governance ratings across firms. This result has an important practical implication. Managers and investors must take care in setting governance ratings benchmarks, factoring in influences on agency costs excluded from the rating system. Otherwise, the governance regime may be either too restrictive or too lenient, depending on the role of the other factors in limiting managerial discretion. We present further evidence to support this conclusion below.

Among the remaining results in Panel A, the coefficients on Total Assets (α_{13}), Market Risk (α_{15}), and Growth (α_{16}) are large enough relative to their standard errors to be significant at least at the 10% level in small sample tests. The apparent inverse relationship between Tobin's *q* and Total Assets is consistent with our hypothesis that larger firms derive proportionately less value from growth options than from assets in place. The inverse relationship between Market Risk and Tobin's *q* and the positive relationship between Growth and Tobin's *q* are consistent with traditional discounted cash flow valuation models. Increasing Market Risk increases the discount rate for cash flows - decreasing discounted value; increasing Growth increases future

cash flows - increasing discounted value. Although the sign on the Firm Risk coefficient (α_{14}) is positive, its standard error is relatively high indicating statistical insignificance. This may reflect the fact that the positive influences of unsystematic risk on value are offset by the negative influences suggested by Shin and Stulz, either within each firm or in the cross-section of firms.

Panel B of Table 3 presents the 3SLS results for equation (2) where CGQ(SP500) is the explained variable. Results for Total Assets (α_{23}) and Market Risk (α_{25}) are of the expected sign in our model; governance rating is positively related to both assets in place and to systematic risk. However, the standard errors of coefficients for these variables are large and indicate statistical insignificance. The standard error of α_{21} - the coefficient on Tobin's *q* - is also relatively large, rendering it statistically insignificant. The negative sign on α_{21} is consistent with Chi's suggestion that low performance invites more stringent governance. It may also reflect the fact that some relatively high Tobin's *q* firms select less restrictive corporate governance regimes to allow managers more discretion to pursue growth options. The coefficient estimate for Firm Risk (α_{23}) which is negative and large relative to its standard error supports this interpretation.

Though we expect increasing unsystematic risk to be associated with greater information asymmetry and therefore the sign of α_{23} to be positive, it may be that managerial flexibility is more important than strong corporate governance to firms with high unsystematic risk and unrealized growth option value.[15] A startup pharmaceutical firm with a successful basic research program but in the initial stage of drug trials may offer an example. Such a firm will have high unsystematic risk and negative free cash flow. Management's ability to protect the firm's intellectual property and guide its drug development is far more important to owners ultimately

[15] Holstrom and Kaplan (2003) argue that one of the effects of tightening corporate governance is that it chokes off innovation.

earning a payoff than limiting managerial discretion over the firm's resources. Tying the interests of owners and managers through high powered options and select levels of other governance mechanisms in this situation may achieve a lower CGQ rating, but be recognized in the market as a superior governance strategy. This strategy may effectively control relevant agency costs at such a firm without restricting managers from pursuing investment opportunities with significant unsystematic risk.

The coefficient estimates on Financial Leverage (α_{27}) and Payout Rate (α_{28}) are also large relative to their standard errors. Because ISS does not consider debt and dividend payout policies in constructing CGQ, these results are especially interesting. Jensen's (1986) free cash flow hypothesis asserts that firms may reduce cash flow available for managers to waste by increasing dividends and debt service payments. In addition, as Easterbrook (1984, 1991) argues, eliminating cash flow through dividend payments and debt service requires firms to return to the capital markets more frequently. This in turn invites scrutiny from new analysts and investors, externalizing monitoring costs. These arguments suggest firms can manage agency costs through dividend payout and capital structure in addition to corporate governance regime. By disgorging free cash flow through dividend and interest payments, firms that select weaker corporate governance regimes may achieve the same level of agency cost control as firms with stronger governance regimes. The negative signs on α_{27} and α_{28} suggest firms with higher debt and dividend payout respectively choose governance regimes that achieve lower governance ratings. These findings are consistent with Jensen, Solberg and Zorn's (1992) empirical results indicating that dividend payout and capital structure are "substitutes" for other governance mechanisms in controlling agency costs and provide strong, if indirect, support for the proposition that CGQ captures meaningful differences in corporate governance regime across

firms.

Finally, we present the reduced form coefficients obtained from the structural form estimation.[16] The reduced form coefficients show the predicted influence of changes in the exogenous variables when their effects have been fully traced through the system. For example, the reduced form coefficient on Firm Risk in the Tobin's *q* equation includes both the direct effect of a change in Firm Risk on Tobin's *q* as well as its indirect effect through CGQ(SP500). The reduced form results are useful in gauging whether the estimation results fit the predictions of the theoretical model sketched above.

[Insert Table 4 about here.]

Review of the results in Table 4 for the reduced form show that, in the system, Tobin's *q* is inversely related to Market Risk and positively related to Growth. Consistent with our theoretical model, greater growth increases future cash flows and therefore increases value; greater systematic risk increases the discount rate for the cash flows and therefore decreases value. The reduced form coefficient on Firm Risk is positive, suggesting the net effect of positive influences of unsystematic risk outweigh the negative influences of unsystematic risk on value. The signs of the coefficients in the reduced form equation for CGQ(SP500) are similarly consistent with our theoretical approach. In the system, CGQ(SP500) responds positively to Total Assets and Market Risk and negatively to Firm Risk, Growth, Financial Leverage and Payout Rate. Larger firms and firms with more systematic risk choose governance regimes that achieve higher ratings. The negative sign on the Firm Risk variable is consistent with firms choosing less highly rated governance regimes when there is greater growth option potential; and

[16] The structural form in matrix notation is $\varepsilon' = \alpha_1 y' + \alpha_2 x'$, where y' and x' are the endogenous and exogenous variable matrices respectively; we obtain the reduced form by pre-multiplying the system by the inverse of the endogenous variable coefficient matrix α_1^{-1}. Rearranging terms yields the reduced form $y' = \beta x' + e'$, where $\beta = -\alpha_1^{-1}\alpha_2$.

the negative signs on Financial Leverage and Payout Rate are consistent with firms utilizing financial policies as well as governance regime to control agency costs.

VI. Conclusions

One question that remains open in corporate governance literature is how individual corporate governance mechanisms affect firm performance. Because owners and managers select a variety of mechanisms to manage agency costs in the context of unique circumstances facing each firm, we argue that it will be difficult to isolate the effect of individual governance mechanisms on firm performance. We believe it is more productive to frame the question in terms of the relationship between firm performance and overall posture toward corporate governance. Then the question becomes whether some corporate governance regimes are better than others in the sense that they are systematically related to firm performance. If so, then it should be possible to identify best practices or optimal governance policies for similar firms. If not, then firms should still optimize their governance policies, but similar firms may establish governance regimes that combine governance mechanisms differently to achieve similar agency cost control.

This study addresses this question by bringing together two important recent innovations in the analysis of the corporate governance – performance relationship. The idea of measuring a firm's governance posture or regime using an index is becoming increasing popular in research and in practice. We adopt GIM's approach, using an index to capture the array of governance mechanisms managers and owners select to represent a firm's overall governance regime. This allows us to examine the relationship between corporate governance regime and corporate performance in a relatively simple simultaneous equations model. A similar representation would be virtually impossible using individual measures of governance mechanisms. Unlike

previous researchers, however, we do not construct our own governance index. Rather, we represent governance regimes with a widely disseminated, commercially produced index whose success in the market depends on its relevance to investors. This is the first academic study of which we are aware to use a commercially produced index in this context.

An important result of our investigation is that the index we employ - CGQ - is not related to cross-sectional firm performance. We believe this indicates that firms can achieve similar agency cost control with different combinations of corporate governance mechanisms. We also find that CGQ is related to unsystematic risk across firms. We believe this result indicates that the mix of a firm's investments between assets in place and growth options is an important factor determining the mix of governance mechanisms owners and managers select to define its corporate governance regime. In particular, firms with unrealized growth option potential require managerial flexibility – and weaker governance - to capture the value of such options. Providing managers strong incentives to pursue growth options may also lead firms to choose governance regimes that garner lower ratings. Finally, we find that CGQ is inversely related to leverage and dividend payout across firms. We believe this provides important support for the proposition that CGQ measures the strength of a firm's corporate governance regime and that firms set their governance regimes in the context of their capital structure and dividend policies. Taken together, these results are consistent with the equilibrium characterization governance-performance relationship first suggested by Demsetz and Lehn. They support the proposition that firms minimize agency costs utilizing a variety of governance mechanisms according to the circumstances that confront them.

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Table 1. Descriptive statistics of variables in levels.

Variable	Mean	Standard Deviation	Minimum	Maximum
Tobin's *q*	2.17	1.356	0.787	12.116
CGQ	51.39	28.242	0.400	99.800
Total Assets (in $ millions)	19,853.73	51,310.580	507.024	750,507.000
LT Debt / Capital (in %)	33.83	32.152	0.000	248.971
Growth (in %)	6.83	15.773	-53.246	100.917
Payout Rate (in %)	0.182	1.548	-0.235	11. 501
Beta	1.216	0.795	-0.325	4.907
Standard Error (Market Model)	0.105	0.045	0.0401	0.296

Data for Tobin's *q*, Total Assets, LT Debt /Capital, Growth, and Payout Rate are taken from Compustat. Tobin's *q* is the ratio of market value of assets to replacement cost. The market value of assets is defined following Gompers, Ishii, and Metrick (2003) as the market value of the firm's equity plus the book value of total assets less the book value of equity and deferred taxes. The replacement cost is the book value of total assets. Support for this approach to Tobin's *q* is in Perfect and Wiles (1994) and Chung and Pruitt (1994). CGQ is the ISS Corporate Governance Quotient percentile ranking relative to the S&P500. Total Assets is the book value of total assets for fiscal year-end 2004. LT Debt/Capital is the ratio of total long term debt to long term debt plus owner's equity for fiscal year-end 2004. Growth is the compound rate of growth in sales from 2002 through 2004. Payout Rate is fiscal year 2004 dividends divided by 2004 net income. Beta is the slope coefficient from a market model regression for each firm using CRSP monthly returns against the CRSP value-weighted index. Standard Error is the standard error from the market model regression for each firm. The sample period for the regressions is the 60 month period from January 2001 through December 2005. Where 60 monthly returns are not available, at least 24 monthly returns are required for the firm to enter the sample.

Table 2. Correlation matrix for all variables as they enter the regression model.

	Tobin's *q*	CGQ (SP500)	Total Assets	Financial Leverage	3YR Sales Growth	Payout Rate	Market Risk	Firm Risk
Tobin's *q*	1							
CGQ(SP500)	-0.17053	1						
	0.0007							
Total Assets	-0.3729	0.2411	1					
	<.0001	<.0001						
Financial Leverage	-0.11582	-0.08266	0.03251	1				
	0.024	0.1072	0.527					
Growth	0.19919	-0.02632	-0.01085	-0.0994	1			
	<.0001	0.6038	0.8307	0.0529				
Payout Rate	-0.02914	-0.05996	0.02043	0.04042	-0.03611	1		
	0.5656	0.2362	0.6868	0.4315	0.4765			
Market Risk	-0.04317	-0.0819	-0.18561	0.02682	-0.07129	-0.06811	1	
	0.3946	0.1054	0.0002	0.6017	0.1595	0.1784		
Firm Risk	0.08623	-0.22042	-0.33102	0.01298	-0.02469	-0.10583	0.48125	1
	0.0886	<.0001	<.0001	0.8006	0.6265	0.0362	<.0001	

The correlation coefficient is the top figure in each cell. The bottom figure is the p-value for a test of the null hypothesis that the correlation is zero. The correlations reported are for the transformed variables. Tobin's *q*, Total Assets, Market Risk, and Firm Risk are in natural logs. CGQ(SP500) is the logit transformation of the firm's CGQ relative to the S&P500 (i.e. ln[CGQ/(1-CGQ))]. Financial Leverage is (1/(1-LT Debt/Capital)) where LT Debt/Capital is measured as total long term debt to long term debt plus owner's equity. Firm Risk is the natural log of the mean square error -- σ^2_i -- from estimating the market model for each firm. Market risk is the product of the firm's squared beta coefficient and the sample variance of the market return -- $\beta^2_i \sigma^2_m$ -- from these regressions. We estimate the market model using CRSP monthly returns for each stock against the CRSP value-weighted index. The sample period for the returns is the 60 month period from January 2001 through December 2005. Where 60 monthly returns are not available, at least 24 monthly returns are required for the firm to enter the sample.

Table 3. Coefficient estimates, standard errors, t-statistics, and p-values from Three Stage Least Squares (3SLS) regressions. Tobin's *q* and CGQ(SP500) are endogenous. The remaining variables are instruments. Model performance presented below.

Panel A. Dependent Variable: Tobin's *q*.

Variable		Parameter Estimate	Standard Error	t-Statistic	p-Value
CGQ (SP500)	α_{12}	0.186	0.138	1.35	0.1771
Total Assets	α_{13}	-0.216	0.047	-4.57	<.0001
Firm Risk	α_{14}	0.358	0.292	1.23	0.2213
Market Risk	α_{15}	-0.036	0.019	-1.88	0.0608
Growth	α_{16}	0.006	0.002	3.3	0.001
Intercept	α_{19}	2.736	0.628	4.35	<.0001

F-Statistic for significance of second stage regression = 10.80, p-value <0.0001

Panel B. Dependent Variable: Logit CGQ(SP500).

Variable		Parameter Estimate	Standard Error	t-Statistic	p-Value
Tobin's *q*	α_{21}	-0.971	1.037	-0.94	0.3500
Total Assets	α_{23}	0.129	0.188	0.69	0.4925
Firm Risk	α_{24}	-1.702	0.537	-3.17	0.0017
Market Risk	α_{25}	0.014	0.063	0.22	0.8280
Financial Leverage	α_{27}	-0.043	0.020	-2.14	0.0332
Payout Rate	α_{28}	-8.974	5.525	-1.62	0.1051
Intercept	α_{29}	-2.250	2.219	-1.01	0.3112

F-Statistic for significance of second stage regression = 6.68, p-value <0.0001

System Weighted $R^2 = 0.1098$

Tobin's *q*, Total Assets, Market Risk, and Firm Risk are in natural logs. CGQ(SP500) is the logit transformation of the firm's CGQ relative to the S&P500 (i.e. ln[CGQ/(1-CGQ))]. Financial Leverage is (1/(1-LT Debt/Capital)) where LT Debt/Capital is measured as total long term debt to long term debt plus owner's equity. Firm Risk is the natural log of the mean square error -- σ^2_i -- from estimating the market model for each firm. Market risk is the product of the firm's squared beta coefficient and the sample variance of the market return -- $\beta^2_i \sigma^2_m$ -- from these regressions. We estimate the market model using CRSP monthly returns for each stock against the CRSP value-weighted index. The sample period for the returns is the 60 month period from January 2001 through December 2005. Where 60 monthly returns are not available, at least 24 monthly returns are required for the firm to enter the sample.

Table 4. Reduced form results.

	Dependent Variables	
Explanatory Variable	Tobin's *q*	CGQ(SP500)
Total Assets	-0.1622	0.2884
Firm Risk	0.0371	-1.7232
Market Risk	-0.0278	0.0413
Growth	0.0054	-0.0036
Financial Leverage	-0.0067	-0.0355
Payout Rate	-1.4227	-7.5583
Intercept	1.9647	-4.1690

Tobin's *q*, Total Assets, Market Risk, and Firm Risk are in natural logs. CGQ(SP500) is the logit transformation of the firm's CGQ relative to the S&P500 (i.e. ln[CGQ/(1-CGQ))]. Financial Leverage is (1/(1-LT Debt/Capital)) where LT Debt/Capital is measured as total long term debt to long term debt plus owner's equity. Firm Risk is the natural log of the mean square error -- σ^2_i -- from estimating the market model for each firm. Market risk is the product of the firm's squared beta coefficient and the sample variance of the market return -- $\beta^2_i \sigma^2_m$ -- from these regressions. We estimate the market model using CRSP monthly returns for each stock against the CRSP value-weighted index. The sample period for the returns is the 60 month period from January 2001 through December 2005. Where 60 monthly returns are not available, at least 24 monthly returns are required for the firm to enter the sample.