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Evolving Ownership and the Capital Structure Regime in Japan

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Abstract

This study is an attempt to investigate the implications of changes in ownership structure and control transfer in the Japanese corporate market—a trend attributed mainly to the government's increasing liberalization policies during the 1990s. Our results show that firms characterized by more concentrated ownership are likely to prefer less debt as ownership concentration reduces the extent of agency costs between managers and shareholders and facilitates equity issues. The main bank system enables corporations to obtain funds easily through the debt market. Additionally, unwinding cross-shareholding between banks and corporations provides impetus for investment in relatively risky projects. The ownership pattern of private and foreign individuals is consistently associated with a shift from bank debt to equity financing. Moreover, managerial ownership reduces the risk of wasting free cash flows. Managers make fewer decisions that may have a negative effect on the firm's value because the part of costs that they will absorb as shareholders increases as their share of capital rises. The results suggest that government ownership is associated with more pressure on management and enforces the efficient use of cash flows. Changes in ultimate ownership will likely lead to major asset and capital restructuring in the coming years.

Keywords: Corporate governance, change in control, capital structure, financial reforms.

JEL classification: G15, G32, G34, G38.

1. Introduction

Until the 1990s, indirect bank financing was the dominant practice among Japanese companies and had long shaped their financial structure. Their ownership structure was characterized by cross-shareholdings with banks and the corporate sector in which they operated. This type of

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shareholding pattern was not only associated with ownership structure, but it also had an impact on firms' financial choices for fund raising. This period resulted in close long-term business ties between firms and banks. According to a survey conducted by the Fuji Research Institute (1993), more than 90 percent of large listed corporations had one or two "main banks" (on average, 1.6) prior to the change in financial practices.[1]

This cross-holding pattern, in turn, formed the basis of conventional Japanese corporate governance, where firms were heavily financed by bank borrowing and banks were represented on the firms' corporate boards. While such close bank–firm ties increased the availability of capital for borrowing firms, they did not necessarily lead to higher profitability or growth (Weinstein & Yafeh, 1998).[2] Instead, they increased the cost of capital for firms. Banks involuntarily ended up extracting significant rents from their client firms through interest payments while inhibiting the latter's growth through conservative investment policies.

In the late 1980s, the age-old system hit a snag due to significant changes in the country's economic conditions (see Annex). In the first half of the 1990s, various regulations and restrictions introduced during the high-growth period were gradually relaxed or removed. During the decade, the process of dramatic deregulation and liberalization made corporate borrowing and raising equity in both domestic and foreign capital markets much easier. The liberalization of financial markets and easier access to capital markets reduced Japanese banks' market power. Access to foreign markets and more liberal domestic capital markets reduced the main banks' influence over firms' policies.

The availability of alternative sources of financing and the decline in the firm–main bank relationship led to a drastic change in firms' ownership structure. Increasingly, cross-held shares in companies that were once held for the purpose of maintaining a main bank's relationship with a firm were sold. Corporate governance structure and control,

[1] A main bank relationship—the relationship between a firm and a bank—is typically characterized by the following: (i) the firm continuously accounts for a large (or the largest) volume of borrowing over a long period; (ii) the bank is a main shareholder in the firm; (iii) the bank carries out a variety of banking and other transactions with the firm, such as handling foreign exchange and undertaking the trustee function of corporate bonds; (iv) the bank maintains a close personal relationship by dispatching executives to the client firm; and (v) although the bank does not intervene in the management of the client firm, as long as the firm is making reasonable profits, the bank often rescues the client firm when the latter is in financial distress, provided that it is judged as being eventually viable.

[2] Prowse (1990) suggests that, because large shareholders are also larger debt holders, they may preclude policies that attempt to transfer wealth from debt holders to shareholders.

therefore, changed significantly during this period. The main bank system was gradually replaced by the increased role of market investors and the capital market in generating long-term capital.

In this study, our main focus is the impact of governance structure and change in ownership on firms' financial choices and borrowing patterns—a change apparently necessitated by the legal and corporate reforms that took place in the post-"bubble" period Japan. In this context, we aim to understand the following:

- How companies determine their overall financial strategies
- Why they choose a particular mix of financial instruments
- Why they choose to limit borrowing or set up spare borrowing capacity
- The association between corporate governance structure and changes in ultimate ownership

Exploring these questions opens up the possibility of investigating:

- The specific factors or characteristics that encourage firms to choose different financial strategies
- Whether the structure of equity ownership can help explain cross-sectional variations in capital structure in the case of Japanese firms.

The rest of the paper is organized as follows. Section 2 describes methodological issues pertaining to variable construction and modeling. Section 3 presents our empirical results. Section 4 assesses the robustness of the results and Section 5 presents some concluding remarks.

2. Methodological Issues: Variables, Modeling, and Sample

The way in which a firm finances its operations through some combination of common and preferred stock, either with retained earnings or with bonds and loans, is known as "capital structure." Generally, firms use either debt or equity to finance their investments. However, within the broad categories of debt and equity there exists a variety of financing instruments that firms can use. Firms also have different options for raising equity. Their choices can range from the owner's wealth to venture capital to private equity, although issuing common stock and warrants are the most common ways of raising equity. Regarding debt, the number of alternatives available to firms has increased significantly over the last two

decades (Bauer, 2004). The conventional choices were bank debt and corporate bonds, but in recent years there have been numerous innovations in this field, especially in the design of corporate bonds.

Although a firm can use any combination of sources, it should use one that maximizes its market value and, in turn, shareholders' wealth.[3] "Optimal capital structure" refers to that combination of sources of financing that maximizes the firm's market value. The literature on capital structure focuses mainly on whether or not corporate financing decisions matters at all. If financing decisions were completely irrelevant, then actual capital structures should vary randomly from firm to firm and industry to industry. However, this is not what the empirical evidence suggests.

This section examines various ways to measure capital structure and its empirical relevance. This is followed by a discussion on ownership structure and changes in ultimate control. Finally, the section presents other relevant independent variables, a model specification, and sample description.

2.1. Capital Structure

Two broad measures of capital structure are commonly used—one based on book value and the other on market value—and both have their strengths and weaknesses. Accordingly, we compute two measures of capital structure in this study. The book value measure (BLEV) is defined as the ratio of the book value of total debt to the total book value of debt and equity, for instance, how the firm has been financed in the past and thus the relative claims of equity and debt over firm value (Jensen & Meckling, 1976; Myers, 1977). Here, the relevant measure is probably the amount of total book value of debt to capital. MacKay and Philips (2005) point out that the use of book value can be justified on the grounds that financial managers tend to focus on this value when designing financial structures. Barclay and Clifford (1995) justify its use on the grounds that there may be a spurious relationship between the market value measure and Tobin's q ratio (TQR).

Welch (2004) argues, however, that the market value measure of capital structure significantly explains stock returns. For this measure (denoted as MLEV), we follow Fama and French (2005) and Welch (2004),

[3] Profit maximization, which is the firm's ultimate goal, leads to the maximization of shareholders' wealth. More precisely, an increase in the firm's after-tax income yields higher dividend payments, which, in turn, maximizes the market value of the firm.

and compute it as the ratio of book value of total debt to the book value of debt and the market value of common equity.

2.2. Corporate Ownership Structure

In terms of explanatory variables, the ultimate ownership structure of firms is classified into six distinct categories of shareholders.

Financial institutions, including banks and insurance companies, usually have business dealings such as lending, insurance sales, and other financial transactions, with firms in which they hold shares (Charkham, 1994). Affiliated firms constitute another class of investor, commonly depicted as being a stable shareholder (Gerlach, 1992). These companies are the business partners—either suppliers or customers—of other firms with which they have cross-shareholding arrangements. These affiliated companies hold multiple interests in these firms (Lincoln, Gerlach, & Ahmadjian, 1996). The impact of these investors is evaluated by the percentage of total outstanding shares held by financial institutions (BKSH) and affiliated companies (NBKSH).

Two classes of investors, i.e., foreign shareholders and domestic private individuals, are considered representative market investors as they are interested in maximizing their current profits rather than developing ongoing business ties with the firms in which they own shares (Inoue, 1999; Yasui, 1999). The percentage of outstanding shares held by foreign investors (FRGN) and domestic private individuals (PRVT) are used to evaluate the importance of market investors.

The other two classes include the percentage shareholding of the government (GOVT) and that of internal investors such as directors and others (INSIDE).

2.3. Change in Ultimate Ownership

Identifying the ultimate owner of and change in control for each firm involves two steps. First, we identify the firm's ultimate owner using the criterion of percentage shareholding. A particular corporate entity as described above is considered the ultimate owner if it owns 50 percent or more of the firm's total outstanding shares. If the shareholding is split and none of the six categories (financial institutions, nonfinancial corporations, foreign individuals, domestic private individuals, the government, and insiders) holds more than 50 percent of the shares, then an ultimate owner does not exist and the ownership of the firm is considered to be diverse.

In the next step, we identify changes in ultimate share ownership by analyzing the percentage change in the shareholding over the sample period for each individual category. Changes in ultimate ownership are measured when the percentage shareholding of a particular group changes from less than 50 percent in the previous period to 50 percent or more in the next period. This is recorded as a change in ultimate ownership (denoted as UCT).

Regarding the various transfers of control, all ownership transfers are grouped into one of four categories: financial (FIT), nonfinancial (NFIT), private individual (PFIT), and diverse transfers. The definition of leverage, ownership structure, change in control, and various other control variables that are likely to affect the firm's capital structure decision are presented in Table 1.

2.4. Control Variables

Given our objective in this study, we focus broadly on the relationship between the firm's leverage and ultimate ownership. However, it is necessary to take into account other control variables that might affect the firm's financial choices in order to avoid specification errors in the econometric model. Therefore, various firm-level financial ratios are included in the estimated model as control variables.

The size of a firm is included to account for the potential economies of scale and scope accruing to large firms. Size is an important determinant of capital structure as large firms are more likely to be debt-financed than their smaller counterparts. Large companies are more geospatially diversified and have more stable cash flows, which reduces the risk of the debt they hold. Additionally, they enjoy economies of scale when issuing securities to raise funds; smaller firms are likely to face higher costs when obtaining external funds because of information asymmetries.

We use the natural logarithm of total assets as the measure of firm size (SIZE) and expect it to have a positive impact on the leverage ratio. Profitability as a measure of the return on assets (ROA) has a negative relationship with leverage because firms usually prefer to finance their operations using internal funds rather than debt. Furthermore, the shares of profitable firms take on a high value in the stock market due to the higher dividends earned. Therefore, profitable firms may find it easy to raise funds by issuing equity. We therefore expect a negative relationship between ROA, as measured by the ratio of earnings before interest and tax (EBIT) to total assets, and the leverage ratio.

Firms that expect high future growth should use more retained earnings and equity rather than debt financing. An improvement in a firm's growth opportunities leads to an increase in the agency cost of debt, which further reduces the level of debt financing (Booth, Aivazian, Demirguc-Kunt, & Maksimovic, 2001). The firm's growth is measured by the TQR.

Greater volatility in the firm's earning stream leads to higher business risk, and lenders may be reluctant to provide loans. If the firm's earnings are volatile for seasonal or cyclical reasons or due to resource mismanagement, then they will have to pay an extra premium for debt financing. Moreover, such firms are likely to face difficulties in raising external funds because of their unstable cash flows and higher implied earnings volatility. In this study, the risk of the firm (RISK) is measured by the variability of the last ten year's earnings, and we expect it to have a negative impact on the debt ratio.[4]

Tangible assets consist mainly of fixed assets. Asset tangibility represents the firm's asset structure and has a direct impact on its capital structure choice. The value of a firm's tangible assets (TANG) is measured as the ratio of fixed assets to total assets, and is used as a proxy for collateral. In a world of asymmetric information, the firm's tangible fixed assets can often serve as collateral to lower the risk of lenders who undertake the agency cost of debt. Therefore, firms with a greater proportion of fixed assets tend to have a higher debt ratio.

Corporate income tax makes debt financing more advantageous than equity financing because interest expenses are tax deductible, lowering the effective cost of debt. The corporate income tax rate has long been identified as a potential determinant of the capital structure decision. Firms prefer to have more debt than equity because of the tax shield on interest. Miller (1977) finds a positive relationship between the corporate income tax rate and firm leverage. In this study, we use the ratio of tax paid by the firm to EBIT as a proxy for the tax shield benefits of debt (TAX) and expect a positive relationship.

The quick ratio is defined as the ratio of the book value of current assets after subtracting the book value of inventories to current liabilities. It captures the magnitude of assets that the company can transform into cash

[4] The risk of each firm is calculated as the standard deviation of the firm's earnings using the past ten years' data. A rolling window of size 10 is employed to calculate the standard deviation using the EBIT data for 1982–2009.

within a short period of time relative to what it owes in the short term. The more liquid the firm, the less it will rely on debt. Therefore, according to the pecking order theory, there should be a negative relationship between liquidity and internally generated cash flows and leverage. In this study, we use the quick ratio as a proxy for the firm's liquidity position (LIQR) and expect it to have a negative impact on leverage.

Finally, we include 29 industry dummy variables to control for systematic differences in leverage across industries due to differences in systematic risk and unequal possession of fixed assets. Industries are classified into 30 economic groups based on the classification adopted by the Tokyo Stock Exchange.

Table 1: Definition of variables

Variable	Description	Construction
BLEV	Proxy for firm capital structure	Leverage based on the book value; ratio of the book value of total debt to the total book value of debt and equity.
MLEV	Proxy for firm capital structure	Leverage based on the market value; ratio of the book value of total debt to the book value of debt and market value of common equity.
BKSH	Indicator of governance structure	Financial institutions share ownership; percentage ratio of shareholding by financial institutions.
NBKSH	Indicator of governance structure	Nonfinancial institutions share ownership; percentage ratio of shareholding by nonfinancial institutions.
PRVT	Indicator of governance structure	Private individuals share ownership; percentage ratio of shareholding by domestic private individuals.
FRGN	Indicator of governance structure	Foreign institutions and individuals share ownership; percentage ratio of shareholding by foreign institutions and individuals.
INSIDE	Indicator of governance structure	Inside share ownership; percentage ratio of shareholding by insiders such as directors and other employees.
GOVT	Indicator of governance structure	Government share ownership; percentage ratio of shareholding by the government and state-owned agencies.

Variable	Description	Construction
HI	Proxy for ownership concentration	Herfindahl index (HI) = $\sum_{j=1}^{m} X_j^2$ as X_j is the proportion of shares held by the top 10 largest shareholders in a particular firm.
UCT	Indicator of change in ultimate control	Change in ultimate ownership; dummy variable = 1 if ultimate ownership changes in a particular year and 0 otherwise.
FIT	Indicator of transfer of ultimate control to financial institutions	Dummy variable = 1 if the ultimate transfer is to financial institutions such as banks, and 0 otherwise.
NFIT	Indicator of transfer of ultimate control to nonfinancial institutions	Dummy variable = 1 if the ultimate transfer is to nonfinancial institutions such as other affiliate firms and 0 otherwise.
PFIT	Indicator of transfer of ultimate control to private individuals or foreign corporations	Dummy variable = 1 if the ultimate transfer is to private individuals or foreign corporations and 0 otherwise.
SIZE	Proxy for firm size	Natural logarithm of the book value of total assets.
ROA	Proxy for firm profitability	Return on assets; ratio of EBIT to total assets.
TQR	Proxy for firm growth	Tobin's q ratio; ratio of the market value of equity and the book value of debt to the book value of total assets; shows the replacement cost of total assets.
Risk	Proxy for firm risk	Earnings variability over the last 10 years; calculated as the standard deviation of the last ten years' EBIT.
TANG	Proxy for firm collateral value	Ratio of the book value of fixed assets to the book value of total assets.
TAX	Proxy for tax shield benefits on interest	Ratio of annual corporate tax paid to EBIT.
LIQR	Proxy for firm liquidity	Quick ratio; ratio of the book value of current assets less inventories to the book value of current liabilities.

Note: The table defines all the variables used in our empirical analysis.

There are several reasons for thinking that the industry in which a firm operates will have a significant effect on its capital structure. Significant differences exist across industries, which influence the capital structure of firms in a certain industry. Some industries may require heavy investment

in fixed assets, which is a significant variable in the determination of capital structure because fixed assets are closely related to the firm's collateral value. Some industries may carry a high cost of bankruptcy and financial distress. Heavy industries, such as construction, chemicals, electrical goods, engineering, and textiles, are likely to have higher leverage than other industries. Small industries, such as transportation, cement, and food and beverages, are likely to have low debt ratios. Tax structures and subsidies also vary significantly across industries, suggesting that there will be significant differences in leverage across industries.

2.5. Model Specification

The objective is to assess the impact of ownership structure and change in ultimate ownership on financing behavior at various points in time. The model needs to be dynamic to enable us to compare the state of capital structure at the time of change in control and after the change in control. We will also compare transfers to various corporate entities, such as financial institutions, other affiliated corporation, and private individuals.

The most important consideration in developing such a model is to separate the impact of ownership and change in control from other factors that might influence capital structure. This can be achieved through panel estimations and by including the lag of the dependent variable as one of the right-hand side regressors. With this lagged dependent variable, any measured influence on financing behavior is conditioned on the entire history of the right-hand side variables. In the econometric literature and in the context of panel data, such models are usually referred to as dynamic panel data models and are written as follows:

$$y_{it} = \sum_{j=1}^{m} \gamma_j y_{i,t-j} + x'_{it}\beta + \alpha_i + \lambda_t + \varepsilon_{it} i = 1, 2, \ldots \ldots N, \text{ t} = 1, 2, \ldots \ldots T \qquad (1)$$

The λ and β are parameters to be estimated; x_{it} is a ($k \times 1$) vector of strictly exogenous covariates; α_i and λ_t are the unobservable individual and time-specific effects, respectively; and ε_{it} is the independent identically distributed (iid) error term with a zero conditional mean and variance-covariance matrix Ω.

Standard panel models, such as fixed-effects and random-effects models, are biased and inconsistent in this case as the lagged dependent variable is correlated with the error term ε_{it}. This inconsistency persists even when no autocorrelation in the error term is assumed. The general

approach to estimating such a model relies on Arellano and Bond (1991), who suggest using a generalized method of moments (GMM) estimator and instrumental variables technique. GMM uses the data in first-differenced form, which distributes the underlying heterogeneity among the various cross-sectional units.[5] Accordingly, equation (1) can be written as:

$$y_{it} - y_{i,t-1} = \sum_{j,l=1, j\neq l}^{m} \gamma_j (y_{i,t-j} - y_{i,t-l}) + (x_{it} - x_{i,t-1})\beta + \lambda_{t-1} + (\varepsilon_{it} - \varepsilon_{i,t-1}) \quad (2)$$

By taking the first difference, the lagged differences of the dependent variable on the right-hand side of the equation are no longer correlated with the $(\varepsilon_{it} - \varepsilon_{i,t-1})$ term. Equation (2) can be estimated using $y_{i,t-l}$ as an instrument for $(y_{i,t-j} - y_{i,t-l})$. Although Arellano and Bond (1991) suggest using additional lags of the dependent variable as instruments to enable even more efficient estimation, doing so can lead to the over-identification of the model. They show that GMM provides a consistent estimator if the underlying assumption of no second-order autocorrelation in the differenced residuals is fulfilled. The first-order autocorrelation in residuals from equation (2) does not imply inconsistency in the estimated parameters. Arellano and Bond also suggest applying a specification test to check for over-identification (j-statistics) in the model and a test for second-order autocorrelation.

In estimating the impact of ownership structure, we estimate the following model using GMM:

$$y_{it} = \sum_{j=1}^{2} \gamma_j (y_{i,t-j}) + (GOV_{i,t-1})\psi + \delta_1 SIZE_{it} + \delta_2 ROA_{it} + \delta_3 TQR_{it} + \delta_4 RISK_{it}$$

$$+\delta_5 TANG_{it} + \delta_6 TAX_{it} + \delta_7 LIQR_{it} + \delta_8 HI_{it} + \sum_{p=1}^{29} \phi_p DUM_{ip} + \alpha_i + \lambda_t + \varepsilon_{it} \quad (3)$$

[5] By using GMM, one is better able to control for the effects of missing or unobserved variables. Specifically, including the lag of the dependent variable as an explanatory variable in the estimated equation enables us to capture the effects of omitted variables. These effects are driven by either individual time-invariant variables or period individual-invariant variables. Individual time-invariant variables are the same for given cross-sectional units over time but vary across cross-sectional units (intangible assets, managerial skill). Period individual-invariant variables are the same for all cross-sectional units at a given time but vary over time (macroeconomic scenario). All these omitted variables may be correlated with the independent variable. Hence, the GMM technique overcomes possible heterogeneity and omitted variable problems, which often arise with cross-sectional analysis. We also incorporate a year dummy to control for unobserved macroeconomic effects.

The dependent variable y_{it} represents various measures of capital structure; $\gamma \psi \delta$, and ϕ are parameters to be estimated; and $GOV_{i,t-1}$ is the governance structure of firm *i* in the year *t* – 1. GOV is a (6 × 1) vector of ownership ratios, including banks (BKSH), other corporations (NBKSH), foreign institutional investors (FRGN), domestic private individuals (PRVT), inside investors (INSIDE), and the government and other state-owned agencies (GOVT) (see Section 2.2). SIZE represents firm size, ROA is the return on assets, TQR is Tobin's q ratio, RISK is earnings variability, TANG is the firm's collateral value, TAX is the corporate tax, LIQR is the quick ratio, and HI is the Herfindahl index. DUM comprises the 29 industries' dummy variables. The estimation consists of a cross-sectional individual effect α_i and the λ_t time effect. SIZE, ROA, TQR, RISK, TANG, TAX, and LIQR are included to control for other relevant variables and heterogeneity in firms. The Herfindahl index enables us to control for ownership concentration.

Next, we estimate the following model to determine the impact of change in ultimate control:

$$y_{it} = \sum_{j=1}^{2} \gamma_j (y_{i,t-j}) + (GOV_{i,t-1})\psi + \beta_0 UCT_{\tau=0} + \beta_1 UCT_{\tau=1} + \beta_2 UCT_{\tau=2}$$

$$+\delta_1 SIZE_{it} + \delta_2 ROA_{it} + \delta_3 TQR_{it} + \delta_4 RISK_{it} + \delta_5 TANG_{it} + \delta_6 TAX_{it} + \delta_7 LIQR_{it}$$

$$+\delta_8 HI_{it} + \sum_{p=1}^{29} \phi_p DUM_{ip} + \alpha_i + \lambda_t + \varepsilon_{it} \quad (4)$$

The $\gamma \psi \beta, \delta$ and ϕ terms are parameters to be estimated, and UCT_τ is the set of dummy variables that show the change in ultimate ownership. *UCT* is equal to 1 if the firm undergoes a change in control and 0 otherwise. Three different time periods are considered with τ for the year of change, τ for the first year after the change, and τ for the second year after the change in control.

In the third stage, we estimate a more detailed model comprising information about the entities to which ownership is transferred. As discussed previously, all transfers are categorized as transfers to financial institutions (FIT), to nonfinancial corporations (NFIT), to domestic private individuals and foreigners (PFIT), or to none of the above corporate entities (diverse transfers). The general model to be considered is written as follows:

$$y_{it} = \sum_{j=1}^{2} \gamma_j (y_{i,t-j}) + (GOV_{i,t-1})\psi + \beta_1 FIT_{\tau=0} + \beta_2 FIT_{\tau=1} + \beta_3 FIT_{\tau=2}$$

$$+\beta_4 NFIT_{\tau=0} + \beta_5 NFIT_{\tau=1} + \beta_6 NFIT_{\tau=2} + \beta_7 PFIT_{\tau=0} + \beta_8 PFIT_{\tau=1} + \beta_9 PFIT_{\tau=2}$$

$$+\delta_1 SIZE_{it} + \delta_2 ROA_{it} + \delta_3 TQR_{it} + \delta_4 RISK_{it} + \delta_5 TANG_{it} + \delta_6 TAX_{it} + \delta_7 LIQR_{it}$$

$$+\delta_8 HI_{it} + \sum_{p=1}^{29} \phi_p DUM_{ip} + \alpha_i + \lambda_t + \varepsilon_{it} \quad (5)$$

Similar to the previous model in equation (5), we consider three different time periods with τ for the year of change in control, τ for the first year after the change in control, and τ for the second year after the change in control. Three categories of transfers are considered to assess the impact of transfers on restructuring activities and firms' financing behavior: FIT, NFIT, and PFIT are dummy variables indicating transfers to financial institutions, nonfinancial corporations, and private individuals, respectively. The reference category is transfers to diverse groups.

2.6. Sample

The dataset we use is based on firms' own financial accounts and contains corporate financial data on 1,362 firms that were publicly listed on the Tokyo Stock Exchange 1 and 2 during the period 1991 to 2009 (19 years). However, financial institutions (financial services comprising commercial banks, insurance companies, securities firms, and mutual funds) are not included in the sample because they have a special capital structure. Their capital structure is strongly influenced by investors' insurance schemes and debt-like liabilities that are not comparable to the debt issued by corporate (nonfinancial) firms. The data used in this analysis has been taken from the Nikkei Economic Electronic Databank System (NEEDS); the data on share prices used to calculate the market value-based measures is taken from the Toyo Keizai share prices database.

The initial sample consisted of financial data on more than 2,400 firms, but 1,099 firms were omitted because of missing data, either due to their recent entry in or delisting from the stock market. Our analysis is based, therefore, on the remaining 1,362 firms for the period 1991 to 2009, spread across 30 industrial categories. The distribution of sampled firms in various industries is based on the classification adopted by the Tokyo Stock Exchange. Tables 2 and 3 provide descriptive statistics for both the dependent variable(s) and explanatory variables.

Table 2: Summary statistics of variables

Variable	Mean	Median	Max.	Min.	SD	Skewness	Kurtosis
BLEV	48.104	54.802	65.426	13.187	21.350	1.873	22.802
MLEV	46.693	46.732	68.625	8.080	21.493	0.002	12.191
BKSH	29.679	28.700	77.200	0.000	14.649	0.233	2.362
NBKSH	27.053	23.500	85.600	0.000	17.060	0.773	2.985
FRGN	7.644	3.900	35.800	0.000	9.499	2.130	9.069
PRVT	33.123	31.100	99.800	0.000	16.109	0.618	3.038
INSIDE	4.352	0.613	45.300	0.000	8.837	3.324	16.232
GOVT	0.126	0.092	65.782	0.000	1.921	23.982	14.650
SIZE	11.161	10.965	16.476	5.124	1.383	0.629	3.533
ROA	4.442	3.870	59.400	-27.270	4.334	0.613	15.419
TQR	0.988	0.762	35.826	0.031	2.053	42.778	25.336
RISK	54.751	51.842	69.791	25.539	16.834	3.825	6.451
TANG	48.972	48.201	71.542	36.173	18.677	0.248	2.619
TAX	53.573	51.801	59.500	-13.175	36.490	18.373	23.175
LIQR	125.316	99.080	145.126	36.378	38.488	11.140	42.825
HI	0.542	0.527	0.898	0.240	0.052	3.307	13.144
UCT	0.288	-	1	0	0.453	0.936	1.875
FIT	0.115	-	1	0	0.319	2.410	6.808
NFIT	0.075	-	1	0	0.263	3.239	11.488
PFIT	0.160	-	1	0	0.366	1.857	4.450

Note: The selected sample consists of 1,362 firms for the period 1991 to 2009 (19 years). Thus, the total sample includes 25,878 observations.
Source: Authors' calculations.

The data for certain variables, such as the TQR and leverage, have outliers that could affect the regression results. We use the Winsorized transformation for possible outliers in the dataset, which limits extreme values to reduce the effect of possibly spurious outliers. All the outliers are set to 90 percent Winsorization, which sets data below the fifth percentile to the fifth percentile and data above the 95th percentile to the 95th percentile.

Table 3: Summary of key ownership transfers

Variable	Description	Firms
UCT (UCT = 1)	Firms experience change in control	703
UCT (UCT = 0)	Firms that do not experience change in control	659
N	Total firms included in sample	1,362
FIT	Transfer of ultimate control to financial institutions	232
NFIT	Transfer of ultimate control to nonfinancial institutions	159
PFIT	Transfer of ultimate control to private individuals or foreign corporations	389

Source: Authors' calculations.

3. Empirical Results

Examining the effect of ultimate ownership reveals two general observations. On one hand, the signs and statistical significance of the regression coefficients for both measures of capital structure are stable. On the other, there are marked differences in the magnitude of impact of the explanatory variables on leverage.

3.1. Ownership Structure and Capital Structure

Table 4 shows the impact of ownership structure on leverage. The results support the idea that ownership structure strongly influences firms' leverage. Ownership concentration, represented by the Herfindahl index (HI), has a negative statistically significant effect on both measures of leverage (BLEV and MLEV). However, the magnitude of impact and statistical significance is higher for BLEV than for MLEV, suggesting that shareholders of a firm with more concentrated ownership may prefer less debt if debt brings about more monitoring (Leland & Pyle, 1977; Diamond, 1984). It also shows that ownership concentration reduces the agency cost between managers and shareholders and facilitates equity.

In terms of ownership structure, BKSH is positively related to the debt-equity ratio. The estimated impact is highly statistically significant for both measures of leverage. The results suggest that firms with a higher percentage share owned by financial institutions are financed heavily by debt because of the affiliated firm's relationship with the main bank. This shows that the main bank system in Japan has enabled corporations to obtain funds efficiently and invest in relatively risky projects. This system propelled the postwar high growth of the Japanese economy.

The ownership share of other affiliated firms, and foreign and domestic private individuals has an inverse relationship with market and book leverage. However, the estimated impact of private individuals' ownership on MLEV is statistically insignificant (but still negative). Although private and foreign individuals collectively hold smaller equity positions than stable investors, the size of their shareholdings and their influence appear to be on the rise. The ownership share of private and foreign individuals is consistently associated with a shift from bank debt to equity financing and the breakdown of banks' monopolistic power in the financial market.

Table 4: GMM results for impact of ownership structure

	BLEV		MLEV	
Dependent variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
LEV(-1)	0.271***	23.500	0.282***	13.384
LEV(-2)	0.111***	7.455	0.016**	1.938
BKSH	0.097**	2.362	0.570***	8.914
NBKSH	-0.438*	-1.736	-0.390**	-2.228
FRGN	-0.376***	-4.794	-0.803***	-4.470
PRVT	-0.777***	3.091	-0.160	-0.981
INSIDE	-0.212*	-1.648	0.020	0.204
GOVT	-0.085*	-1.782	-0.653***	-4.098
SIZE	1.691***	7.937	1.929***	9.586
ROA	-0.684***	-6.568	-0.021**	-2.264
TQR	0.563	1.458	-0.496***	-5.366
RISK	-0.759**	-2.599	-0.150**	-2.184
TANG	-0.439***	-9.264	-0.218***	-3.959
TAX	0.008**	1.921	0.002**	2.093
LIQR	-0.019***	-15.108	-0.018***	-3.246
HI	-0.414***	-7.693	-0.042**	-2.101
Industry dummies	Yes		Yes	
Period dummies	Yes		Yes	
Diagnostic tests				
J-stat. (p-value)	0.623		0.395	
Lag 2 serial corr. (p-value)	0.159		0.282	
DWH test stat. (p-value)	0.189		0.217	

Notes: See equation (3) for a detailed definition of the estimated model. Both estimations include time control and industries' dummy variables (not reported).
The J-statistic (p-value) is the probability value of the Sargan test for over-identified restrictions. The lag 2 serial corr. (p-value) is the probability value of the Arellano-Bond test indicating that the average autocorrelation in residuals of order 2 is 0. The Durbin-Wu-Hausman (DWH) test statistic is employed to test for the exogeneity of the regressors. *, **, and *** indicate statistical significance at a 0.10, 0.05, and 0.01 level of significance, respectively. N = 23,154.
Source: Authors' calculations.

With an increase in the ownership share of market investors, the firm's management faces more pressure, which prevents it from building its own empire at the expense of shareholders. The inverse relationship between NBKSH and leverage is consistent with the standard theoretical assumption that cross-shareholding in the Japanese corporate market is generally not intended for short-term gains in income, but is for long-term or stable holding. In such a situation, firms have enough internal funds to finance their operations and are less dependent on bank debt.

Managerial ownership (INSIDE) is negatively associated with BLEV but only marginally significantly. The result is in accordance with Jensen and Meckling's (1976) "convergence of interest" hypothesis, which suggests that managerial ownership serves to align the interests of managers and outside shareholders. Thus, when managerial ownership increases, it limits the risk of wasting free cash flows and managers make fewer decisions that might have a negative effect on the firm's value—the part of costs that they will absorb as shareholders increases with their share of capital. The government ownership ratio has a negative significant impact on both measures of leverage, suggesting that, as state ownership increases, there is more pressure on the firm's management to limit the wasting of free cash flows.

The results indicate a positive relationship between firm size and BLEV and MLEV that is statistically significant at 1 percent. This supports the theory that size is an inverse proxy for the probability of bankruptcy. The positive relationship suggests that larger firms are better able to raise debt and are less vulnerable to bankruptcy than smaller firms. The relationship between leverage and profitability is negative and statistically significant at 1 percent in the case of BLEV and at 5 percent for MLEV. This finding favors the pecking order theory rather than the static tradeoff model. The inverse relationship can be explained by the significant differences in the information cost between external and internal finance. When there is significant information asymmetry between insiders and outsiders, firms must depend on internal sources before seeking external finance.

The results do not reveal clearly the relationship between leverage and growth opportunities. When measured as MLEV, we find a negative relationship between leverage and growth opportunities that is statistically significant at 1 percent. However, when BLEV is considered the dependent variable, we find a positive but statistically insignificant relationship. The negative relationship is consistent with the signaling theory; this suggests

that, when the firm pursues a growth-oriented strategy and future prospects are not favorable, it will avoid debt financing and will sell stock to reduce its future liabilities and bring in new shareholders to share its higher expected future liabilities.

The relationship between risk and leverage is significant at 5 percent and is negative in both cases.[6] The negative sign implies that volatility is a proxy for the risk of a firm. The model indicates a negative relationship between leverage and tangibility that is statistically significant at 1 percent for both BLEV and MLEV. This is due partly to the institutional environment, which, in the case of firm bankruptcy, induces obstacles and lowers asset value. Such an effect might explain the existence of no relationship, but it is not very likely to cause a negative relationship. The theory should provide some additional explanation.

With regard to the debt tax shield variable, we find a positive relationship with leverage (consistent with corporate finance theory) that is statistically significant at 5 percent. The results suggest that the tax advantages of debt are attractive to firms in Japan—a company can reduce its after-tax cost of capital by increasing debt relative to equity, and thereby directly increasing its intrinsic value. The estimated relationship between liquidity and leverage is negative and significant at 1 percent in both cases, which is consistent with the pecking order theory. Liquid firms prefer internal equity and use less debt.

Many empirical studies have controlled for industry classification in their models (see Huang & Song, 2002; Frank & Goyal, 2003; Kim, Heshmati, & Aoun, 2006), but they do not provide explicit results. We have included dummy variables for 29 industries in our model and classified these industries into 30 economic groups based on the classification adopted by the Tokyo Stock Exchange. It is interesting to note that most of the dummies are statistically significant and their sign does not vary much across different measures of leverage.

The results for size, profitability, risk, tax, and liquidity are similar to those given in most other empirical studies, but ambiguous in the case of growth opportunities and the tangibility ratio. In the case of growth opportunities, the results are based on the definition of leverage.

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[6] An alternative measure of firm risk, the capital asset pricing model (CAPM) beta, is also used in the regression analysis. The estimated coefficient is negative and statistically significant at 5 percent for both measures of leverage. The risk of each firm is calculated using stock market monthly data on returns from 1987 to 2009. Using the past five years' monthly returns (60 observations), we estimate the CAPM developed by Sharpe (1964) and Lintner (1965) to compute the CAPM beta.

3.2. Changes in Ultimate Ownership and Capital Structure

Table 5 helps to assess the impact of change in ultimate control, based on the results for equation (4). The estimated impacts of governance structure, ownership concentration, and other control variables are similar to the results in Table 4 in terms of statistical significance and sign, but there are minor variations in magnitude.

Table 5: GMM results for impact of change in ultimate ownership

	BLEV		MLEV	
Dependent variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
LEV(-1)	0.271***	24.85	0.281***	13.431
LEV(-2)	0.110***	7.752	0.015***	1.873
BKSH	0.104**	2.490	0.579***	8.988
NBKSH	-0.419*	-1.651	-0.412***	-2.355
FRGN	-0.368***	-4.515	-0.816***	-4.563
PRVT	-0.767***	3.135	-0.180	-1.106
INSIDE	-0.219*	-1.702	0.031	0.320
GOVT	-0.064*	-1.782	-0.639***	-4.101
SIZE	1.688***	8.009	1.931***	9.190
ROA	-0.679***	-6.336	-0.019**	-2.198
TQR	0.564	1.408	-0.489***	-5.373
RISK	-0.739**	-2.387	-0.161***	-3.221
TANG	-0.454***	-9.287	-0.216***	-3.933
TAX	0.009**	1.952	0.003*	1.713
LIQR	-0.019***	-15.066	-0.018***	-3.242
HI	-0.487***	-5.030	-0.051**	-2.230
$UCT_{\tau=0}$	-1.559***	-3.598	-0.602**	-1.907
$UCT_{\tau=1}$	-1.192**	-2.261	-1.348**	-2.197
$UCT_{\tau=2}$	0.434	0.415	-0.796*	-1.708
Industry dummies	Yes		Yes	
Period dummies	Yes		Yes	
Diagnostic tests				
J-stat. (p-value)	0.474		0.188	
Lag 2 serial corr. (p-value)	0.241		0.169	
DWH test stat. (p-value)	0.389		0.416	

Note: See equation (4) for a detailed definition of the estimated model. Both estimations include time control and industries' dummy variables (not reported).
The J-statistic (p-value) is the probability value of the Sargan test for over-identified restrictions. The lag 2 serial corr. (p-value) is the probability value of the Arellano-Bond test indicating that the average autocorrelation in residuals of order 2 is 0. The Durbin-Wu-Hausman (DWH) test statistic is employed to test for the exogeneity of the regressors.
*, **, and *** indicate statistical significance at a 0.10, 0.05, and 0.01 level of significance, respectively. N = 23,154.
Source: Authors' calculations.

The results for the change in ownership confirm our earlier predictions. The estimated coefficient for the year of change and the first year after the change in control is negative and statistically significant. However, in the case of BLEV, the coefficient is positive and statistically insignificant even at 10 percent for the second year after the change in ultimate ownership. With regard to MLEV, leverage falls at all three points in time but the fall is higher in the first year after the change than in the other two periods. Overall, the results in Table 5 suggest that leverage measured either in terms of book value or market value falls in the year of change in control and in the subsequent period. Thus, change in ownership is followed by an alteration in the firm's capital structure.

3.3. Transfer of Control to Various Corporate Entities and Capital Structure

We now compare transfers to various corporate entities by estimating equation (5), employing the GMM two-step estimation method. This model takes into account information regarding the transaction parties involved, and includes all the control and governance structure variables, along with the ownership transfer dummies FIT, NFIT, and PFIT. To conserve space, Table 6 reports only the results for the impact of ownership transfer observed in three distinct periods. The estimated impacts of governance structure, ownership concentration, and other control variables are similar to the results in Table 4 in terms of statistical significance, sign, and magnitude. There is, however, a marked difference in the impact of change in ownership on capital structure measures among FIT, NFIT, and PFIT.

Overall, the results in Table 6 support the results obtained in the first stage by estimating equation (3). The impact of change in ultimate ownership is negative for transfers to private individuals and nonfinancial institutions and positive for transfers to financial institutions. Leverage falls in the year of change of control, but it increases in the subsequent two periods. The effect is much stronger in the case of MLEV. This is consistent with the premise of the main bank relationship with the affiliated firm.

We also find an inverse relationship between NFIT and PFIT and capital structure. For nonfinancial institutions, BLEV falls in the year of change and in the first year after the transfer of control; in the case of MLEV, capital structure is unaffected in the year of transfer but leverage falls in the subsequent two periods. Similarly, for transfers to private individuals, both BLEV and MLEV remain statistically the same as the pre-

transfer level in the year of change, and there is a significant decrease in the debt ratio in the first and second years after the transfer.

Table 6: GMM results for impact of change in ownership transfer to various corporate entities

	BLEV		MLEV	
Dependent variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
$FIT_{\tau=0}$	-1.215*	-1.813	-0.947*	-1.661
$FIT_{\tau=1}$	4.725***	5.199	5.452***	7.911
$FIT_{\tau=2}$	3.103*	1.796	3.506***	-7.979
$NFIT_{\tau=0}$	-0.733**	-2.046	0.259	0.765
$NFIT_{\tau=1}$	-0.055**	-0.123	-0.511**	-2.318
$NFIT_{\tau=2}$	0.495	0.448	-2.111***	-2.774
$PFIT_{\tau=0}$	0.379	1.378	0.080	0.285
$PFIT_{\tau=1}$	-0.244***	-2.781	-0.599**	2.289
$PFIT_{\tau=2}$	-0.197**	-2.242	-0.614***	-2.972
Industry dummies	Yes		Yes	
Period dummies	Yes		Yes	
Diagnostic tests				
J-stat. (p-value)	0.297		0.671	
Lag 2 serial corr. (p-value)	0.112		0.292	
DWH test stat. (p-value)	0.236		0.519	

Note: See equation (5) for a detailed definition of the estimated model. Both estimations include time control and industries' dummy variables (not reported).
The J-stat. (p-value) is the probability value of the Sargan test for over-identified restrictions. The lag 2 serial corr. (p-value) is the probability value of the Arellano-Bond test indicating that the average autocorrelation in residuals of order 2 is 0. The Durbin-Wu-Hausman (DWH) test statistic is employed to test for the exogeneity of the regressors. *, **, and *** indicate statistical significance at a 0.10, 0.05, and 0.01 level of significance, respectively. N = 23,154.
Source: Authors' calculations.

Tables 4, 5, and 6 also report the p-value of specification tests applied to the dynamic panel data model. In all three cases, the Sargan test (J-statistic) results do not reject the null hypothesis that the over-identified restrictions are valid. Similarly, in most cases, the null hypothesis of no second-order autocorrelation is not rejected. The Durbin-Wu-Hausman (DWH) test results for the exogeneity of regressors imply that the underlying models do not suffer from an endogeneity problem (for a detailed discussion, see Cameron & Trivedi, 2009). The DWH test is carried out to check if GOV causes an endogeneity bias. In sum, the specification tests support the overall validity of these models.

4. Robustness of Results

An additional potential concern associated with the Arellano and Bond (1991) GMM estimator is the weak instruments problem of instrumental variable estimators (see Wooldridge, 2002, for an illustration). Large finite sample biases can occur when the instrumental variables are weak, and this difficulty carries over into the GMM estimation of dynamic panel data models.[7] When the time series are persistent and the number of time-series observations is small, the first-differenced GMM estimator behaves poorly because, under these conditions, the lagged levels of the variables are only weak instruments for subsequent first-differences (see Bond & Windmeijer, 2001). Since the previously applied Sargan test does not reject the null hypothesis that the over-identification restrictions are valid, this problem is unlikely to affect our results.

The takeover decision also depends on the firm's leverage (Novaes & Zingales, 1995), and therefore we cannot completely rule out the possibility of endogeneity in the models. However, there is a broad consensus in the literature on panel data models that GMM accounts for endogeneity in such models.

Nonetheless, to explicitly address these two issues, we present a fixed-effects formulation of equations (3), (4), and (5) along with the following equation, which describes the impact of leverage on ownership structure. These are then estimated using the fixed-effects two-stage least-squares method (FE-2SLS).

$$GOV_{it} = \beta_0 + \beta_1 LEV_{i,t-1} + \beta_2 ROA_{it-1} + \beta_3 TQR_{it-1} + \beta_4 SIZE_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \quad (6)$$

LEV is the leverage of the firm, measured as BLEV or MLEV. GOV is the ownership structure and includes BKSH, NBKSH, FRGN, PRVT, INSIDE, and GOVT. SIZE and time dummies are included to account for the effect of economies of scale and time, respectively. ROA and TQR are included because of the consensus that the firm's ownership structure depends on the performance and investment opportunities available to it.[8]

Although a fixed-effects model that includes a lagged dependent variable as the regressor can lead to biased estimates, this approach still

[7] On weak instrument biases, see Nelson and Startz (1988, 1990) and Staiger and Stock (1997), among others. For a discussion in the context of panel data, see Blundell and Bond (1998).

[8] The industry dummy variables are dropped from the fixed-effects model because it is constant over time for each firm.

serves as a benchmark. The estimators are consistent as N or T approach infinity and can be used to verify the robustness of the GMM results.

In the first stage, we apply the Hausman (1978) specification test to evaluate the relationship between the individual-specific effect α_i and other explanatory variables. The test is used whether a fixed effects or random effects formulation is more appropriate for estimating these parameters. The chi-squared values computed are tabulated in Table 7.

The test results imply that the individual-specific effects are correlated with the right-hand side variables. The random-effects estimates appear to be significantly biased with a high probability. Therefore, the fixed-effects model seems more appropriate for estimating the model specified in (3), (4), (5), and (6).

Table 7: Hausman test results

	Chi-sq. stat.	**df**	**Prob.**	**Chi-sq. stat.**	**df**	**Prob.**
Panel 1: Model of impact of ownership structure on leverage						
Dependent variable	BLEV			MLEV		
Model 1 (equation 3)	340.647	35	0.000	181.483	35	0.000
Model 2 (equation 4)	364.105	38	0.000	189.004	38	0.000
Model 3 (equation 5)	339.512	44	0.000	164.270	44	0.000
Panel 2: Model of impact of leverage on ownership structure (equation 6)						
LEV is represented by	BLEV			MLEV		
BKSH (equation 6)	256.851	20	0.000	291.537	20	0.000
NBKSH (equation 6)	150.391	20	0.000	821.721	20	0.000
FRGN (equation 6)	328.621	20	0.000	338.592	20	0.000
PRVT (equation 6)	216.210	20	0.000	210.083	20	0.000
INSIDE (equation 6)	210.421	20	0.000	345.173	20	0.000
GOVT (equation 6)	301.003	20	0.000	109.007	20	0.000

Note: df = degrees of freedom (number of restrictions).
Source: Authors' calculations.

In the second stage, we estimate the fixed-effects specification of equation (6) and use the fitted GOV (denoted as $\overline{GOV}$) as an instrument for GOV in the system of equations specified in (3), (4), and (5). Subsequently, the fixed-effects models are estimated using equations (3), (4), and (5) for both measures of leverage. The results for the impact of ownership structure and other control variables are presented in Table 8.

Table 8: FE-2SLS results for impact of ownership structure

	BLEV		MLEV	
Dependent variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Intercept	18.018***	3.599	12.340***	3.136
LEV(-1)	0.118***	4.932	0.340***	3.341
LEV(-2)	0.744***	5.746	0.493***	79.720
BKSH	0.083**	2.127	0.578***	3.578
NBKSH	-0.404***	-2.499	-0.374***	-6.051
FRGN	-0.311**	-1.940	-0.808**	-1.932
PRVT	-0.792***	-5.158	-0.151	-1.059
INSIDE	-0.225***	3.048	0.019	0.196
GOVT	-0.066***	-6.750	-0.654***	-8.788
SIZE	1.565**	3.958	1.383**	2.307
ROA	-0.643***	-3.696	-0.031***	-2.912
TQR	0.499***	1.462	-0.514***	-5.491
RISK	-0.704**	-2.259	-0.184***	-4.535
TANG	-0.475***	-4.992	-0.237***	-6.445
TAX	0.009***	35.028	0.002***	5.934
LIQR	-0.017*	-1.685	-0.015***	-2.705
HI	-0.409***	-3.011	-0.047***	-3.290
Period dummies	Yes		Yes	
Diagnostic tests				
Adjusted R-sq.	0.686		0.713	
F-stat. (p-value)	0.000		0.000	
LM serial corr. test (p-value)	0.281		0.343	

Note: See equations (3) and (6) for a detailed definition of the estimated model. Both estimations include time control (not reported).
The LM serial corr. test (p-value) is the probability value of the Breusch-Godfrey test for second-order serial correlation. The null hypothesis is that the second-order residuals' correlation is 0.
*, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 level of significance, respectively. N = 23,154.
Source: Authors' calculations.

Examining the effect of ultimate ownership reveals that the signs and statistical significance of the regression coefficients are similar to those given in Table 4. Table 9 gives the results for the impact of change in ultimate ownership regardless of the identity of the transaction parties involved, based on an FE-2SLS specification.

Table 9: FE-2SLS results for impact of change in ultimate ownership

	BLEV		MLEV	
Dependent variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
C	18.207***	6.687	12.538***	3.376
LEV(-1)	0.264***	5.611	0.294***	7.665
LEV(-2)	0.013**	2.037	0.018***	3.537
BKSH	0.106**	2.059	0.575***	6.027
NBKSH	-0.406***	4.160	-0.408**	-2.073
FRGN	-0.389***	-9.752	-0.803***	-7.157
PRVT	-0.728***	-3.373	-0.220	-0.852
INSIDE	-0.213***	-6.336	0.044	0.751
GOVT	-0.054**	-1.937	-0.684**	-2.312
SIZE	1.649***	4.598	1.978***	5.961
ROA	-0.696***	-6.029	-0.021***	-5.460
TQR	0.516	0.365	-0.487***	-4.470
RISK	-0.748***	-4.470	-0.174***	-6.445
TANG	-0.417***	-4.118	-0.258***	-4.802
TAX	0.008*	1.643	0.003***	2.716
LIQR	-0.018***	-3.948	-0.017***	-5.299
HI	-0.443***	-3.753	-0.057***	-3.728
$UCT_{\tau=0}$	-1.496*	-1.725	-1.297*	1.681
$UCT_{\tau=1}$	-1.197***	-3.567	-1.385***	-4.646
$UCT_{\tau=2}$	0.402	0.012	-0.814**	-2.091
Period dummies	Yes		Yes	
Diagnostic tests				
Adjusted R-sq.	0.696		0.733	
F-stat. (p-value)	0.000		0.000	
LM serial corr. test (p-value)	0.238		0.436	

Note: See equations (4) and (6) for a detailed definition of the estimated model. Both estimations include time control (not reported).
The LM serial corr. test (p-value) is the probability value of the Breusch-Godfrey test for second-order serial correlation. The null hypothesis is that the second-order residuals' correlation is 0.
*, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 level of significance, respectively. N = 23,154.
Source: Authors' calculations.

For further insight into the impact of ownership change, in the third stage we estimate a more detailed model that includes information on the

entities to which ownership is transferred. The results are presented in Table 10. The estimated equation includes all the control and governance structure variables and period dummy variables (not reported) along with the ownership transfer dummies FIT, NFIT, and PFIT. The table reports only the results for the impact of ownership transfer observed in three distinct time periods.

Table 10: FE-2SLS results for impact of change in ownership transfer to various corporate entities

	BLEV		MLEV	
Dependent variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
$FIT_{\tau=0}$	-1.148**	-2.232	-0.097*	1.629
$FIT_{\tau=1}$	4.616**	2.797	5.321***	3.556
$FIT_{\tau=2}$	3.066**	2.324	3.365**	3.137
$NFIT_{\tau=0}$	-0.699***	-4.505	0.252	0.194
$NFIT_{\tau=1}$	-0.059**	-1.993	-0.512***	-4.036
$NFIT_{\tau=2}$	0.462	0.752	-2.103**	-1.952
$PFIT_{\tau=0}$	-0.316	-0.056	0.064	1.232
$PFIT_{\tau=1}$	-0.217**	-1.937	-0.612***	-3.043
$PFIT_{\tau=2}$	-0.184**	-1.981	-0.626**	-2.094
Period dummies	Yes		Yes	
Diagnostic tests				
Adjusted R-sq.	0.756		0.753	
F-stat. (p-value)	0.000		0.000	
LM serial corr. test (p-value)	0.146		0.648	

Note: See equations (5) and (6) for a detailed definition of the estimated model. Both estimations include time control (not reported).
The LM serial corr. test (p-value) is the probability value of the Breusch-Godfrey test for second-order serial correlation. The null hypothesis is that the second-order residuals' correlation is 0.
*, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 level of significance, respectively. N = 23,154.
Source: Authors' calculations.

In summary, the estimates yielded by the two-stage method are unchanged in terms of statistical significance, but there are minor deviations in the magnitude of impact. However, these are negligible and may have arisen because the industry-specific dummy variables were dropped. Therefore, the GMM estimation results can be used as benchmarks to evaluate the impact of ownership change on firm financing behavior. The fixed-effects specification results show that the GMM estimates are consistent and robust.

5. Concluding Remarks

Our study has shown that using GMM rather than other panel estimation methods has clear advantages in a model characterized by heteroskedasticity and endogeneity. Although the GMM estimator is more efficient than other estimators, it would not be asymptotically worse in the absence of heteroskedasticity. Nevertheless, the use of GMM comes at a price. The problem, as Hayashi (2001) points out, is that the optimal weighting matrix at the core of efficient GMM is a function of fourth moments, obtaining reasonable estimates of which would require very large samples. The consequence is that the efficient GMM estimator may have poor small-sample properties. In particular, Wald tests tend to over-reject the null hypothesis.

Since the results presented above are not completely free from the problems that generally arise in panel data estimation (even if using a more standard econometric model, estimation technique, and robustness tests), we cannot argue that the method avoids all problems. Thus, further tests are necessary to estimate more accurate results, but these results have several important implications.

First, firms with more concentrated ownership may prefer less debt as ownership concentration reduces the extent of agency costs between managers and shareholders and facilitates equity. Firms that lack the disciplinary role of ultimate owners are more inclined toward debt financing.

Second, firms with a higher percentage share owned by financial institutions are financed heavily by debt because of the affiliated firm's relationship with the main bank. The main bank system enables corporations to obtain funding efficiently and invest in relatively risky projects. The positive relationship between transfers to financial institutions and leverage suggests that unwinding the cross-shareholding between banks and corporations yields efficiency gains. While banks still hold significant equity positions and have large influence over corporations, both their shareholding and influence are declining with the changing relationship between financial institutions and their client firms in Japan.

Third, although private and foreign individuals still collectively hold smaller equity positions than stable investors, the size of their shareholdings and their influence appear to be on the rise. The ownership share of private and foreign individuals is consistently associated with a

shift from bank debt to equity financing and the breakdown of banks' monopolistic power in the financial market. Ownership transfer to other affiliated corporations, and to private and foreign individuals is invariably associated with high efficiency in expenditure and raising funds through equity financing. Mutual transfers among nonfinancial institutions do not have a significant positive impact on leverage.

Fourth, managerial ownership serves to align the interests of managers and outside shareholders. Thus, when managerial ownership increases, the risk of wasting free cash flows is limited and managers make fewer decisions that might have a negative effect on the firm's value. Government ownership is also associated with more pressure on the management to limit the wasting of free cash flows.

Finally, the relative power of stable and market investors to influence corporate behavior is undergoing an important change. The results provide clear evidence that changes in control are followed by improvements in the efficiency of fund raising. Changes in ultimate ownership also lead to major asset and capital restructuring in subsequent years.

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Annex

The Reforms Process in Japan

Between the 1950s and 1980s, rapid economic growth contributed to high returns on financial assets—especially on stocks—in Japan. The market bubble burst at the end of the 1980s, however, changed investment behavior along with the structure of the market, and led to the "lost" decade of the 1990s. During this period, all asset classes (except bonds) performed dismally as the interest rate fell to its minimum level and returns on stocks remained negative. The overall economy and the financial market in particular stumbled because of the slow pace of structural change and the substantial impact of massive bad loans.

Japan's "lost" decade is considered similar to the Great Depression that followed the 1929 stock market crash in the US. At the end of 1929, the Dow Jones industrial average stood at 164.58 and only after 16 years did the index reach 192.91. The performance of Japan's stock market after the market bubble burst mirrors the performance of the US market in the wake of the 1929 crash.

In order to restore economic growth and move toward a more efficient and competitive market-based system, the Japanese government introduced ambitious and wide-ranging reforms in the 1990s to remove inefficiencies and market distortions. These restructuring reforms were directed at strengthening the capital market. Measures included, among others, deregulating the banking sector, refining the interbank funding markets, opening up domestic financial markets to foreign investors, allowing domestic investors to participate in financial markets overseas, corporate governance, improving asset quality, consumer financing, legal reforms, prudential regulations, credit rating, and introducing a new mechanism to allow greater exchange rate flexibility. The financial sector was restructured and opened up to competition.

Prior to the adoption of the open-door policy in 1990, the financial system in Japan was characterized by a restricted flow of capital due to various regulations such as foreign exchange and foreign trade control laws, the foreign investment law, and the allocation of capital based on government policy rather than competitive market forces. A wide range of corporate governance reforms were carried out incrementally and numerous amendments made to the commercial codes and other related laws.

These reforms paved the way for drastic changes and restructuring activities in the corporate sector. This led to an increase in the number of firms listed on the stock exchange: the average rose to 99 new firms per year during 1997–2004 compared to 36 per year during 1990–96 and only 26 per year between 1981 and 1989. Similarly, 41 firms were delisted per year from the stock exchange during 1997–2004 compared to just four or five firms per year during the 1980s and early 1990s.

Firms rapidly sought to restructure their organization, behavior, and financial choices. Decentralization in business decisions was introduced and financial choices that had been dominated by indirect borrowing shifted from the debt market to the capital market. These changes were closely associated with changes in corporate boards, such as the introduction of an executive officers system and greater separation of monitoring and management functions. Merger and acquisition transactions increased from 252 per year in 1991–97 to 1,381 annually in 1998–2005.

The corporate governance structure also changed drastically. The main bank system was institutionally displaced and its scope became more limited. Cross-shareholding—one of the main features of corporate governance structures in the pre-bubble burst period—decreased significantly and the scope and role of private individuals and foreign institutional investors rapidly increased.

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Developments in Studies on Cross-Border Mergers and Acquisitions, 1996–2011

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Abstract

This paper analyzes the methodological and publication trends in the literature on cross-border mergers and acquisitions over three five-year periods, 1996–2001, 2001–06, and 2006–11. Based on a selection of 23 journals and a sample of 170 articles, we use advanced cross-tabulations to study the publication and methodological trends that have emerged in North America, Europe, and other regions. Our main findings are as follows. A+-rated journals tend to accept the use of regression as a key technique. Top-tier journals accept papers primarily in finance and accounting and international business. Researchers' interest in international business has increased at a rising rate, and increased at a falling rate in finance and accounting. The publication of conceptual quantitative articles has increased significantly by 45 percent over the 15-year period. About 98 percent of the total sample uses modeling as a methodology and is accepted by A+- and A-rated journals. Cross-sectional studies are more popular than longitudinal studies. The financial institutions industry has been studied the most in all parts of the world and at an increasing rate over the period under review. Researchers' interest in manufacturing industries has, however, declined over the 15 years in all regions.

Keywords: Cross-border mergers and acquisitions, content analysis, methodological developments, publication developments.

JEL classification: G34.

1. Introduction

Mergers and acquisitions (M&A) are a universal phenomenon with companies acquiring targets all over the world. Datta, Pinches, and Narayanan (1992) define mergers as "negotiation directly with the target firm's management and/or the board of directors and approved by them before going to a shareholder vote." Cross-border acquisitions are a vehicle for rapid development across national boundaries (see Hitt,

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Hoskisson, & Kim, 1997; Hitt, Harrison, Ireland, & Best, 1998; Nadolska & Barkema 2007). Global M&A activity in 2006 was USD 3.8 trillion—an increase of 37.9 percent compared to 2005 to a sum of 36,958 deals (Bernad, Fuentelsaz, & Gómez, 2010).

There is, however, a very limited body of M&A literature (Meglio & Risberg, 2010) and few studies have examined cross-border acquisitions as a group (see Haleblian, Kim, & Rajagopalan, 2006; Hitt, Ireland, & Harrison, 2001). This is one of the weaknesses of the existing M&A literature. To our knowledge, this article is the first systematic literature review of trends seen in the 15-year period 1996–2011. We take a sample of 170 conceptual quantitative journal articles on cross-border M&A. Our study tries to fill this gap in the literature and has three main objectives: (i) to analyze the publication trends in cross-border M&A research published from 1996 to 2011, (ii) to identify patterns in the methodological developments in the literature, and (iii) to suggest future directions for research based on our findings in the domain of cross-border M&A.

The remaining article is organized as follows. Section 2 presents a literature review that highlights the dearth of studies in this area. Section 3 defines the study's research questions. Section 4 describes the methodology used, sample selection, and coding with validity. Section 5 discusses the results and their implications. Section 6 concludes the study.

2. Literature Review

The dearth of literature on cross-border M&A is highlighted by Meglio and Risberg (2010), which is the only study closest to our research. The authors discuss the advantages and disadvantages of methodologies used in M&A studies. They advocate real-time longitudinal research because cross-sectional research has the drawback of relying on secondary data. Moreover, most existing M&A studies involve hypothesis and correlation testing. Haleblian, Devers, McNamara, Carpenter, and Davison (2009) find that the majority of acquisition research is cross-sectional and focuses on US corporations, using mainly quantitative secondary data, given the proliferation of databases. Generally, longitudinal M&A studies have been found to last four years (Greenwood, Hinings, & Brown, 1994).

Although studies on M&A efficiency have been published in top-tier management journals from 1970 onward (Meglio & Risberg, 2009), M&A scholars have shown little interest in qualitative research because of the scarcity of real-time studies; many of them are grounded in strategy or finance. Haleblian et al. (2006) and Hitt et al. (2001) focus on international

acquisition and conclude that only a small number of studies have examined cross-border acquisitions as a group.

Notably, Ellis, Moeller, Schlingemann, and Stulz (2011) find that M&A gains are determined by international factors or at least by country factors. Across all acquisitions, the acquisition year and the acquirer's industry generally explain the stock-price response better than the acquirer's country. Hence, we analyze time horizon, country, and industry to explore these trends.

As a unique literature review of cross-border M&A, we base our findings on a number of factors including the research methods used, respondent type, sample size, and statistical techniques. We also address the limitations and illustrate trends in the literature with respect to these factors across time and various geographical regions.

3. Research Questions

The study's research questions are as follows:

1. What developments have taken place in publication trends over the three five-year periods under review (1996–2011)?
2. What developments have taken place in methodological trends over the three five-year periods under review (1996–2011)?
3. What are the key criteria (in terms of methodology) that determine publication in top-tier journals?

4. Methodology and Sample Selection

This section describes the methodology and sample used.

4.1. Content Analysis Methodology

This study uses a content analysis methodology to analyze developments in the publication of M&A literature over the period 1996–2011. Kolbe and Burnett (1991) define content analysis as a research technique that is used to systematically appraise the symbolic content of all types of documented communication. It has also been explained as "any methodological measurement applied to text (or other symbolic materials) for social science purposes" (Shapiro & Markoff, 1997).

Content analysis has an edge over other qualitative methods such as literary interpretation and hermeneutics because it includes a qualitative as well as quantitative component (Duriau, Reger, & Pfarrer, 2007). It also helps researchers "step back from their individual trees in order to access the entire forest of knowledge generation within a discipline" (Williams & Plouffe, 2007). Content analysis is useful in analyzing secondary data because it helps reduce events into defined categories for better understanding (Harwood & Garry, 2003). Datta et al. (1992) argue that content analysis is particularly appropriate when a substantial body of empirical evidence is available.

In the preliminary sample selection process, we used the Science Direct database, which comprises 23 journals rated by Anne-Wil Harzing's Erasmus Journal Listing for April 2012. The keywords applied were "cross-border mergers and acquisitions" and "international mergers and acquisitions." The time period under review was divided into three five-year periods, 1996–2001, 2001–06, and 2006–11, similar to Page and Schirr (2008). Our analysis is restricted to trends in journal articles.

Initially, the total number of articles analyzed was 7,249. The articles were downloaded and tabulated in RefWorks and Microsoft Excel. RefWorks was used to export and save the search results from Science Direct into Microsoft Excel under various headings. Any duplicate data was deleted and only the necessary headings, i.e., each article's unique identification number, author (primary and secondary), title, publication year, and journal name were recorded. Out of 7,249, only 205 articles were relevant to cross-border M&A.

Table A1 (Annex) lists the journals that were sampled and indicates their ratings and the percentage of articles selected from each. The 205 relevant articles include empirical quantitative, empirical qualitative, and conceptual quantitative studies, but we have further restricted our analysis to 170 conceptual quantitative studies that use quantitative data or quantitative models.

It is important at this point to differentiate between empirical and conceptual research and between quantitative and qualitative research. Minor, Hensley, and Wood (1993), Aulakh and Kotabe (1993), and Dangayach and Deshmukh (2001) categorize research as either empirical or conceptual, while Li and Cavusgil (1995) classify it as either qualitative or quantitative. A qualitative study draws on socially observable facts based on words and performed in natural settings (Creswell, 1994; Plewis & Mason,

2005). Creswell (1994) defines a quantitative study as "composed variables, measured with numbers, and analyzed with statistical procedures."

Taking this further, Nakata and Huang (2005) and Page and Schirr (2008) propose four types of research: empirical quantitative, empirical qualitative, conceptual quantitative, and conceptual qualitative. Conceptual quantitative studies use quantitative data or quantitative models. Empirical qualitative studies use primary data, i.e., data collected through interviews, surveys, and observations (Workman, 1993). Empirical quantitative studies also use primary data but their findings are based on statistical analysis.

The relevant criteria for the final sample of articles were developed based on their abstracts. If the abstract alone did not adequately establish the study's relevance to cross-border M&A, the entire article was read. Advanced cross-tabulations were used to identify any methodological and publication trends in cross-border M&A. Table 1 gives the total number of studies and relevant studies.

Table 1: Total number of studies

Period	Total number of articles found	Total number of relevant articles
1996–2001	1,516	32
2001–2006	2,058	68
2006–2011	3,675	105
Total	**7,249**	**205**

4.2. Coding with Agreement

The final sample of 170 articles was read and coded for a period of inquiry starting from 1996 to 2011. Content analysis advocates coding to reduce the data and make it systematic and comparable by developing different classifications (Berg, 2004). All the data categories were defined, after which the data was entered and cleaned. The articles in the final sample were evaluated autonomously. Any differences of opinion that emerged while coding the articles were resolved based on the key terms used and a joint reassessment of the article in question.

In order to analyze trends in methodological developments, each article was coded based on the following 12 dimensions:

1. Research design

2. Sample size
3. Industry type
4. Statistical technique
5. Data source
6. Time frame: cross-sectional or longitudinal
7. Reliability, validity, and robustness estimates
8. Number of databases used
9. Number of years analyzed
10. Year data was collected minus year in which study was published
11. Country studied
12. Number of countries studied

Similarly, in order to analyze publication trends, each article was coded based on the following seven dimensions:

1. Discipline (Harzing's 2012 listing)
2. Number of authors
3. Location of authors
4. Number of institutions
5. Authorship type (academic/practitioner)
6. Number of authors' countries
7. Journal rating (Harzing's 2012 listing)

4.3. Reliability of Coding

Cohen's kappa was computed for 10 percent of the total sample based on two dimensions for all 170 articles. We obtained kappa coefficients of 0.87 and 0.85, respectively. Cohen's kappa is an index of inter-rater agreement between coders that controls for chance agreement, unlike percentage agreement (Cohen, 1960). The sample was coded by two independent coders, who, at the time of coding, were management doctoral students and had successfully completed their research methods and statistics coursework. The coders received an hour's training in coding procedures. A kappa value above 0.70 indicates acceptable inter-rater agreement (Miles & Huberman, 1994). Differences of opinion

between the two coders were resolved in conjunction with one of the authors. The coding process thus followed the rigorous procedure suggested by Duriau et al. (2007).

5. Results

Our analysis is divided into two main categories: publication trends and methodological developments. Of the total sample, 83 percent of the articles were classified as conceptual quantitative and the remaining 17 percent as empirical quantitative or empirical qualitative. We observed that the number of conceptual quantitative articles increased during 1996–2001 by 15 percent, in 2001–06 by 25 percent, and in 2006–11 by 60 percent.

5.1. Publication Trends

This section provides a systematic quantitative review of publication trends in cross-border M&A studies, based on our sample of 170 conceptual quantitative articles.

We find that 52 percent of the authors are located in North America, 32 percent in Europe, and 16 percent in areas other than North America and Europe (referred to as "other"). Nakata and Huang (2005) present similar findings, indicating that US-based researchers dominate the literature: they produce roughly two thirds of the articles (61 percent) published, either as single authors or co-authors (academics and practitioners). However, 2001 onward, authors in North America and Europe seem to increase at a decreasing rate, while those located in other parts of the world such as China and Japan increase at an increasing rate. This change could be attributed to increased M&A activity in China and Japan. Prather and Rueschhoff (1996) also suggest that authors' collaborations across different countries generate better-quality research than coauthors from the same country.

We observe that A-rated journals publish articles by academics and practitioners as well as collaborative articles by both (see Figure A1 in the Annex). About 55 percent of A-rated and 11 percent of A+-rated journals publish articles written in collaboration. Studies on cross-border M&A are accepted frequently by top-tier journals as opposed to unrated or unreported ones. Meglio and Risberg (2009) present similar findings for top-tier management journals from 1970 to date.

Analyzing research type against journal ratings, we find that 57 percent of A-rated and 24 percent of B-rated journals accept conceptual

quantitative studies on cross-border M&A. However, this figure is only 11 percent for A+-rated journals. Analyzing discipline against journal ratings, we find that 90 percent of A-rated journals prefer studies in finance and accounting. This implies that top-tier journals prefer finance and accounting articles primarily because they are quantitative studies. Figure A2 in the Annex shows that most research is carried out in finance and accounting and in international business.

2001 onward, studies in international business increase at a decreasing rate while those in finance and accounting increase at an increasing rate. This trend is expected to continue: Figure A3 in the Annex shows that top-rated journals tend to accept M&A studies in this discipline, indicating that researchers are more likely to work in finance and accounting and in international business.

From 1996 to 2011, finance and accounting gain pace among researchers with an increase from 9 percent to 43 percent over 15 years. This can be attributed to the preference of top-tier journals for publishing articles in finance and accounting. Although studies in international business also increase at an increasing rate, this increase occurs only for B-rated journals. The popularity of publication in B-rated journals can be attributed to the scarcity of real-time studies.

Articles coauthored by two and three researchers show an increasing trend. Between 1996 and 2011, the incidence of two authors per study increases continuously from 6 percent to 27 percent, while that of three authors per study increases from 6 percent to 24 percent. The incidence of four or more authors declines between 2001 and 2006. The increase in two authors per study can be attributed to top-tier journals' acceptance of collaborations.

Next, we analyze trends in the number of coauthors (two and three authors per study) against region (see Figure A4 in the Annex). Two-author studies increase from 45 percent to 79 percent between 1996 and 2001, along with research on Europe, but decline between 2001 and 2011, along with research on North America. The trend in three authors per study is similar for North America and Europe over the period 1996–2011, declining between 1996 and 2001 and then increasing from 2001 to 2011.

Authors located in regions other than North America and Europe comprise 16 percent of the sample—a substantial proportion when compared with North America and Europe. This implies that top-tier

journals publish articles by authors from other parts of the world, including those working in finance and accounting and in international business. Table 2 gives the simple averages of indicators relevant to the sample of 170 conceptual quantitative articles.

Table 2: Simple mean averages of dimensions studied for 170 conceptual quantitative articles

Indicator	Average
Sample size	2,572
Number of countries studied	12
How old is the data? (years)	18
Number of data sources	3
Number of authors' countries	1
Number of authors per study	2
Number of years studied	12

Overall, our findings on publication trends will help researchers determine which important factors to consider in order to increase their chances of being published in top-tier journals. These factors include: (i) conceptual quantitative studies in finance and accounting and international business, (ii) work carried out in collaboration, and (iii) two authors per study. The data shows that conceptual quantitative studies comprise 83 percent of the 206 shortlisted articles. Post-2001, A+-rated and A-rated journals show an increased rate of acceptance for research conducted in finance and accounting and international business. The rate of collaboration between academics and practitioners also increases after 2001, implying a rise in the importance of integrating the knowledge base on the academic and applied sides.

5.2. Methodological Developments

This section analyzes the methodological developments that have taken place in our sample of 170 conceptual quantitative studies over the three five-year periods. We cross–tabulate our analysis with journal ratings to further investigate the developments in cross-border M&A studies.

Figure A5 in the Annex shows that 70 percent of the data collected for conceptual quantitative studies on cross-border M&A is from databases, 11.2 percent is from banks, and the smallest amount is collected from international organizations and websites. We presume this is because

collecting international data is more difficult than domestic or publicly available data. Similarly, Figure A6 shows that most data collection relies on the use of databases. In 1996, 35 percent of the data collected was from databases compared with 59 percent after 2006. The contribution of indexes, e.g., the FTSE, NYSE, NASDAQ, and S&P, declined from 28 percent in 1996 to 7 percent in 2006, possibly because databases have become more easily available and already include the data provided by such indexes.

Sample sizes (500 or above) are seen to increase over 1996–2011. Studies using one to three databases use larger samples (301–500 or more) than those that draw on more than three databases. Ideally, the greater the number of databases, the larger should be the sample. However, we find the opposite: studies using seven databases tend to use a sample of 0–100. Further analysis shows that A-rated journals prefer studies that use one to three databases, increasing from 36 percent to 53 percent between 1996 and 2011. The number of years studied (time period analyzed) in articles on cross-border M&A decreases between 1996 and 2011, while the sample size increases to 500 and above. Hence, the number of years studied decreases with a parallel increase in sample size.

Top-tier journals tend to publish articles that are based on modeling as a research design. This trend increases by 22 percentage points for A-rated journals between 1996 and 2001, after which it declines by 5 percentage points. B-rated journals, on the other hand, decline by 29 percentage points to 19 percent between 1996 and 2001, after which their preference for studies that use modeling increases by 6 percentage points. A+-rated journals show a remarkable preference for research that incorporates modeling, with the trend increasing by 13 percentage points from 1996 to 2011.

Regression emerges as the most popular statistical technique used, accounting for 75 percent among academics, 7 percent among practitioners, and 17 percent among collaborators. Blalock (1969) presents similar findings and argues that regression coefficients are the law of the social sciences. Meglio and Risberg (2010), however, find that most M&A research uses correlation testing as the main statistical technique. Figure A7 in the Annex presents the overall distribution of statistical techniques used in our sample of 170 studies. Figure A8 in the Annex shows that, over the years, the use of descriptive statistics increases to 24 percent, with regression increasing from 12 percent to 36 percent between 1996 and 2011. This noticeable rise could be attributed to top-tier journals' growing preference for regression-based research.

We also find that 12 percent of the sample studies are longitudinal and 88 percent are cross-sectional; Haleblian et al. (2009) present similar results. The bulk of M&A research is cross-sectional and focuses on large publicly traded US corporate entities, using mainly quantitative secondary data (Haleblian et al., 2009). On average, longitudinal M&A studies have a four-year time horizon (Greenwood et al., 1994).

Our results show that 45 percent of the sample articles focus on financial institutions. The overall distribution of this focus is such that, between 2006 and 2011, 18 percent of the research concerned North America and 15 percent analyzed the financial industry in Europe. "Other" regions accounted for 13 percent from 2006 to 2011. This implies that the financial industry has received the most attention in the last 15 years and at an increasing rate.

Figure A9 in the Annex shows that studies on the European financial industry increased from 8 percent to 15 percent between 1996 and 2006. Other regions also show an increasing trend—from 2 percent to 13 percent between 1996 and 2011. Studies on North America follow a similar trend, increasing from 4 percent to 18 percent from 1996 to 2001. Figure A9 also shows that only 4 percent of the sample articles focus on the telecommunications industry. Although no research was conducted on the North American telecommunications industry between 1996 and 2006, we do note a significant increase of 25 percent from 2006 to 2011.

Other regions follow a similar trend, with the percentage rising from 0 to 25 percent from 1996 to 2011. Europe shows an increase from 8 percent to 33 percent in this period. Overall, the telecommunications industry emerges as an area of research in all regions over the three five-year periods. It is useful to note that M&A activity in Europe rose substantially because of the continuous increase in GDP per capita from USD 19,535.31 in 1996 to USD 34,923.04 in 2011.

Figure A10 in the Annex shows that researchers' interests have shifted to financial institutions and telecommunications from technology and manufacturing firms. This trend applies to all three regions. In North America, research on technology increased from 1 to 2 percent between 1996 and 2011, while that on manufacturing firms declined from 2 to 1 percent. In Europe, research on manufacturing firms also declined from 2 to 1 percent in this period. In other regions, research on technology firms declined from 3 to 2 percent and that on manufacturing firms declined from 2 to 1 percent over 2001–11.

We find that all three types of authorship—academics, practitioners, and collaborators—prefer to carry out research on the financial industry, accounting for 44 percent, 88 percent, and 86 percent of their categories, respectively. Studies that report the robustness of their results increase from 19 percent to 70 percent over 1996–2011, although the methods used to determine robustness are not given. Studies reporting the reliability and validity of their results follow an increasing trend from 1996 to 2001, after which the trend declines. The number of years studied decline over time, but this is offset by the use of larger samples. Researchers now prefer using a 0–10-year period rather than 15 years or more. This is especially true after 2001, when we see a marked increase in the use of 0–5-year studies, i.e., from 22 percent to 55 percent.

5.3. Discussion

Our aim is to assess the following: (i) publication patterns in cross-border M&A studies, (ii) methodological developments over the period 1996–2011, (iii) the key criteria that determine publication in top-tier journals, and (iv) suggestions for future areas of research on cross-border M&A. Our results show that the bulk of cross-border M&A studies are produced by US-based researchers—a trend that is expected to continue because the acquisition activity in a particular country offers more scope for knowledge and is more likely to produce a momentum in research (Collins & Hitt, 2006). Further, it implies that M&A studies in the US will increase, given the low information cost.

The publication of conceptual quantitative articles has increased significantly (by 45 percent) over 15 years, with a growing focus on financial institutions and the telecommunications industry. Post-2001, however, "other" industries appear to have received more attention.

The results for publication and methodological trends indicate that the following characteristics determine publication in top-tier journals: conceptual quantitative studies, especially in finance and accounting and international business; the use of modeling as a methodology and regression as a statistical technique; work carried out in collaboration; and two authors per study. Aulakh and Kotabe (1993) and Sin, Cheung, and Lee (1999) stress on the importance of collaborative studies across national boundaries, which, they argue, also bring in complementary skills.

What do these findings imply for academics and practitioners? First, the study has analyzed a large number of published journal articles

(170). Second, the large sample size helps in developing meaningful conclusions about cross-border M&A. Third, this study is the first in its field to synthesize research findings on the methodological developments and publication trends in cross-border M&A studies. Finally, it helps identify important attributes that account for publication in top-tier journals. Unfortunately, there are no other content analysis-based studies on cross-border M&A with which we can compare our results; this demonstrates the need for further research on M&A activity.

5.4. Limitations and Future Scope

To the best of our knowledge, this is the first content analysis of cross-border M&A, which limits the ability to generalize our findings. Generalizing the results would require replication of this study using the same methodology. This would allow researchers to determine whether our results can be generalized under a different framework. Future research could also focus on more than one database. We have relied on one database—Science Direct—for the sample selection, which is a sufficiently comprehensive source of business articles. However, the article weights are not homogenous for each journal, which may have biased the results.

There are several important avenues for further research in this area. The results show that cross-sectional studies are more popular than longitudinal ones in cross-border M&A research primarily because the latter are time-consuming. One contribution of this study is that it assesses the requirements of editors and editorial boards, who have a crucial role to play in determining what is published in journals. Their preference for cross-sectional studies over in-depth qualitative inquiries appears to be an obstacle for real-time (longitudinal) studies. To improve the quality of research, serious reflection is needed within the academic community, including editors, reviewers, scholars, and universities.

Although this study analyzes the publication and methodological trends in cross-border M&A research over three five-year periods, there is scope for future research on trends across three decades. Another avenue for research is the inclusion of empirical quantitative and qualitative studies in the sample; this would help researchers analyze trends in primary data on cross-border M&A and make it easier to generalize their findings. Future research could also be directed toward analyzing trends in authorship collaboration, methodology, databases, and topics.

6. Conclusion

The aim of this study has been to show which methodological developments and publication trends characterize research on cross-border M&A and to identify potential directions for further research. Meglio and Risberg (2010) conclude that it is complicated, if not ambiguous, to identify the impact of M&A over a short period, and suggest using other methodologies than those currently used. This paper fills a gap in the literature by helping researchers interested in cross-border M&A assess which critical factors determine publication in top-tier journals.

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Annex

Table A1: Articles by journal and journal rating

Journal name	No.	Percent	Rating
Journal of Corporate Finance	21	12	A
Journal of Banking and Finance	66	39	A
Journal of International Money and Finance	2	1	A
International Journal of Industrial Organization	3	2	A
Long-Range Planning	1	1	A
Research Policy	4	2	A
Journal of Financial Economics	19	11	A+
International Business Review	12	7	B
International Financial Markets, Institutions and Money	3	2	B
Journal of World Business	7	4	B
Journal of International Management	6	4	B
European Management Journal	4	2	B
International Review of Financial Analysis	4	2	B
Journal of Accounting and Public Policy	1	1	B
Scandinavian Journal of Management	4	2	B
Journal of Asian Economics	3	2	Not rated
Telecommunications Policy	1	1	Not rated
Journal of Multinational Financial Management	1	1	Not rated
Quarterly Review of Economics and Finance	1	1	Not rated
Global Finance Journal	4	2	Not rated
Journal of Economics and Business	1	1	Not rated
Journal of Energy, Finance and Development	1	1	Not reported
Journal of Air Transport Management	1	1	Not reported
Total	**170**	**100**	

Source: Erasmus Journal Listing, 1 April 2012.

Figure A1: Authorship type with respect to journal rating

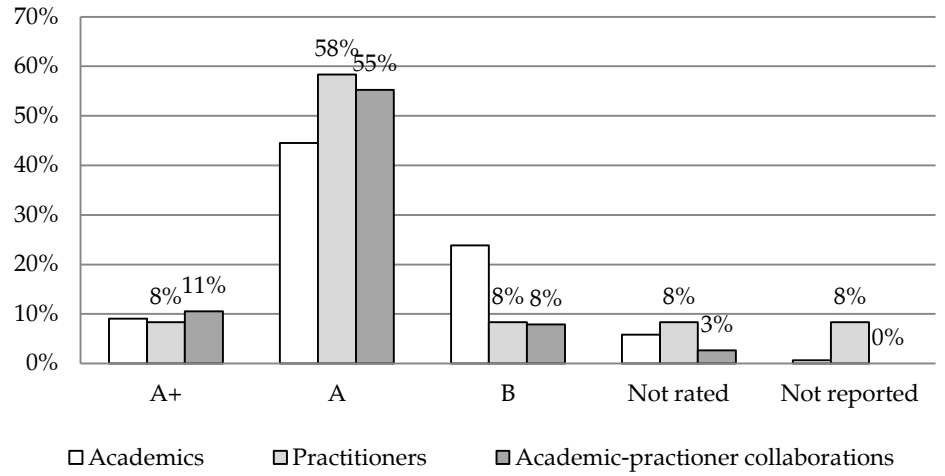

Figure A2: Trends in discipline

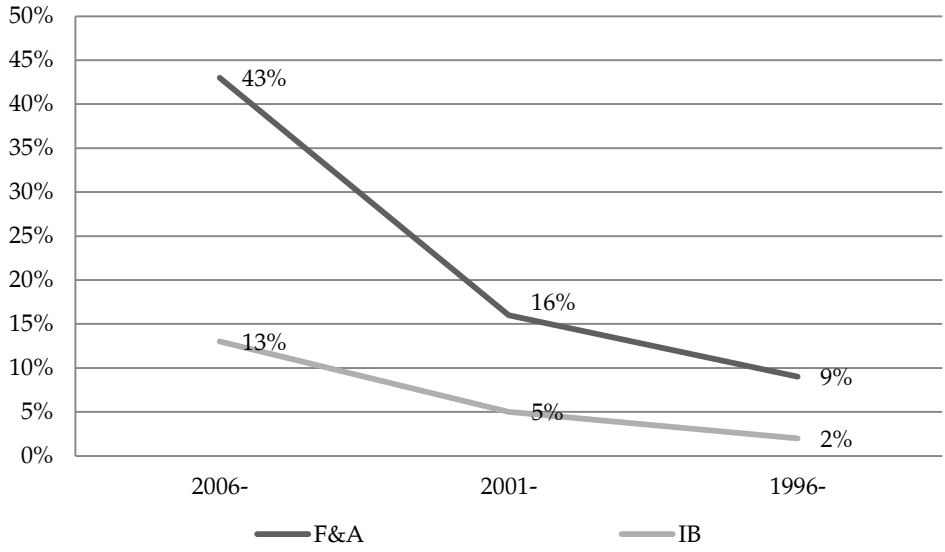

Figure A3: Trends in discipline with respect to journal rating

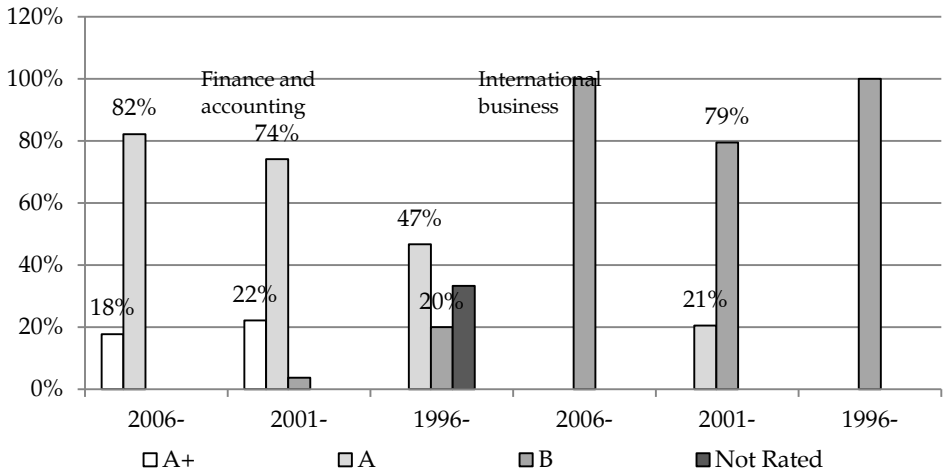

Figure A4: Trends in authors per study with respect to region studied

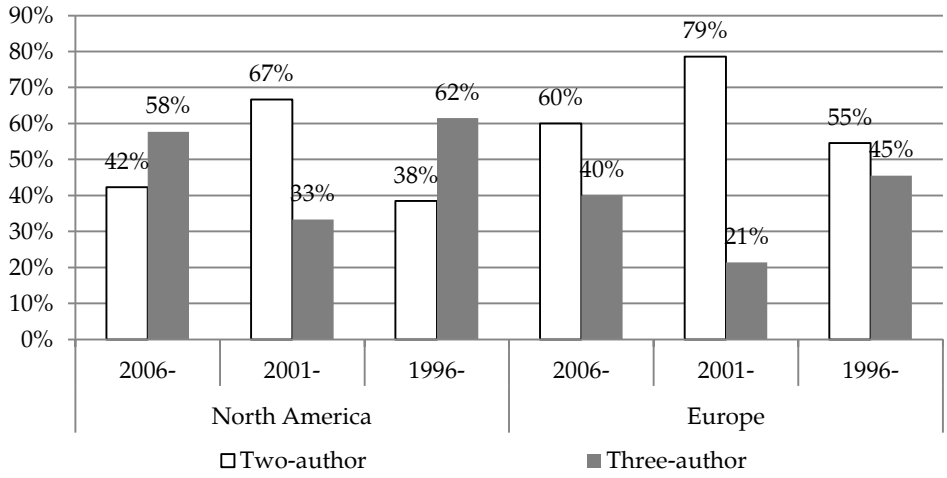

Figure A5: Overall distribution of data sources

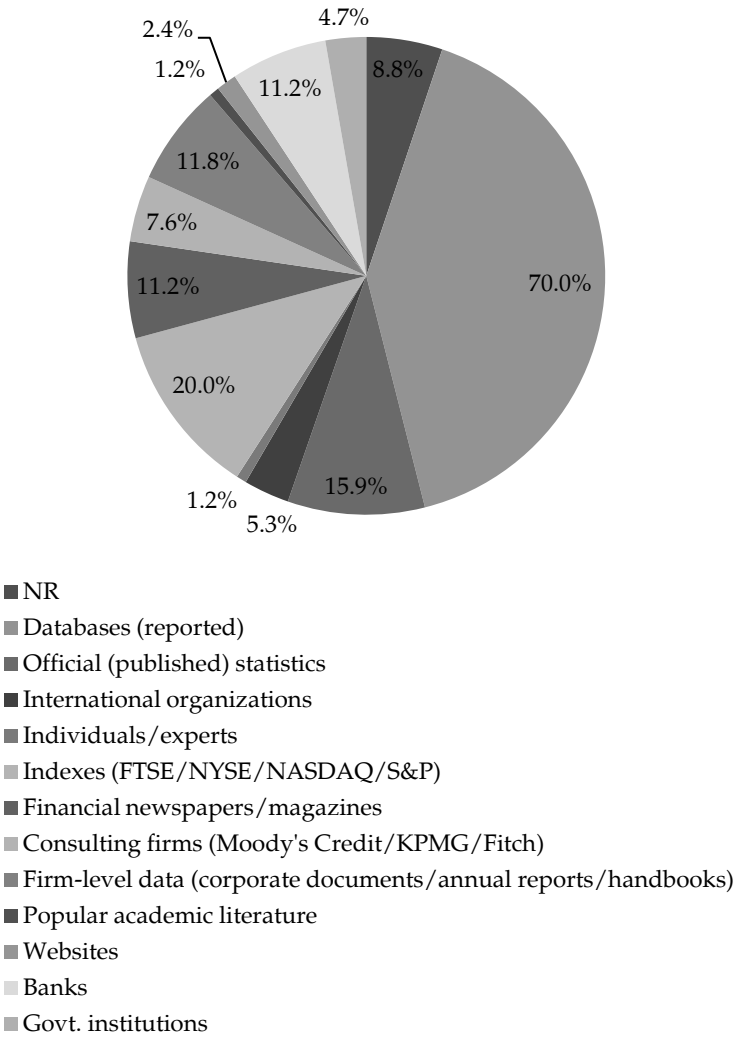

Figure A6: Trends in data sources used

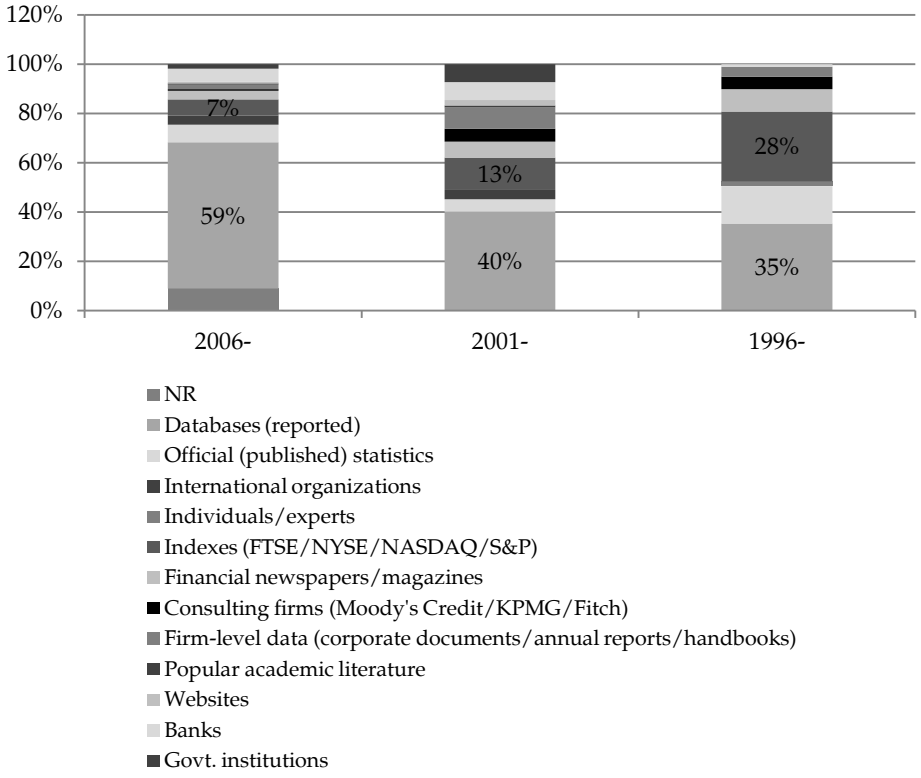

Figure A7: Overall distribution of statistical techniques

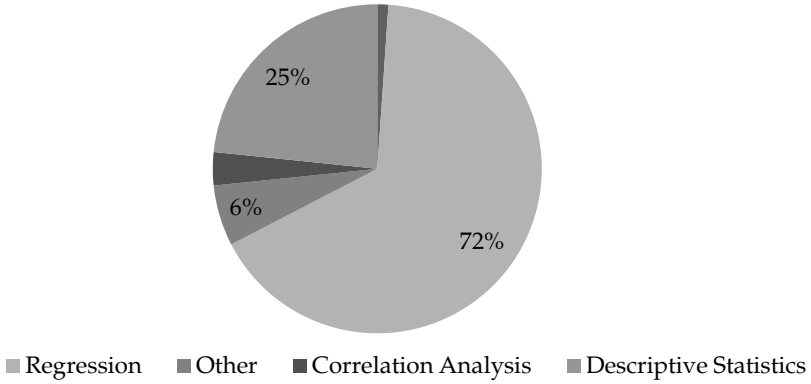

Figure A8: Trends in statistical techniques used

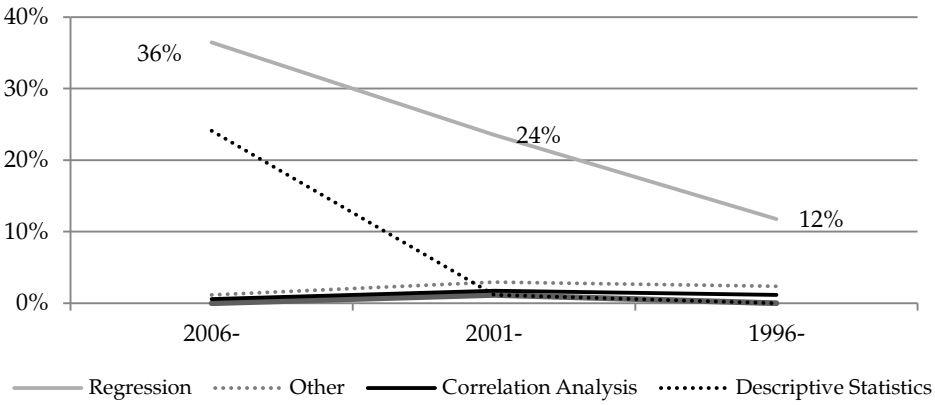

Figure A9: Trends in financial institutions with respect to region

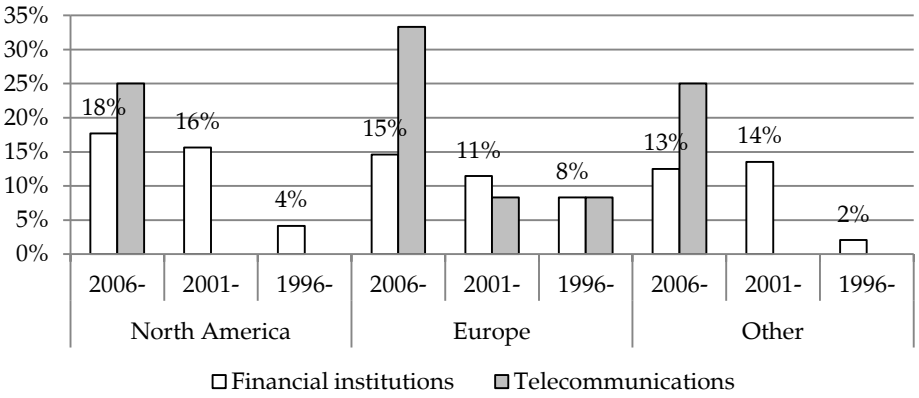

Figure A10: Trends in manufacturing industry studied with respect to region

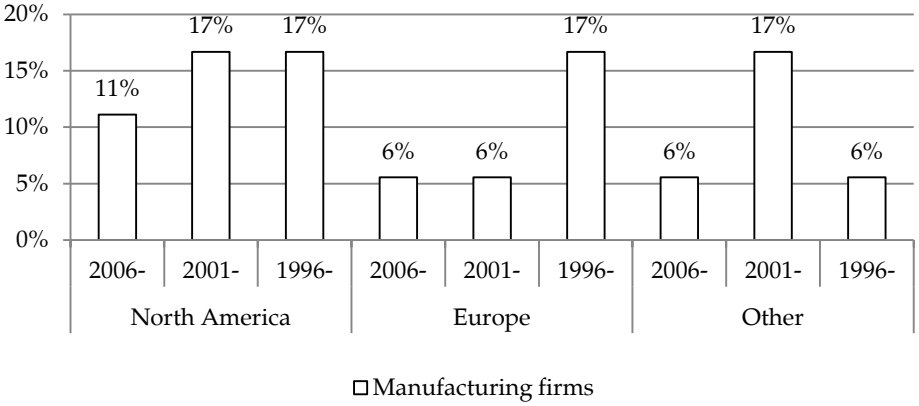

Table A2: Publication trends in conceptual quantitative studies

								By year within region								
		By year			By region			NA			Europe			Other		
Trend	**Total**	**2006**	**2001**	**1996**	**NA**	**Europe**	**Other**	**2006**	**2001**	**1996**	**2006**	**2001**	**1996**	**2006**	**2001**	**1996**
Total studies	170	102	42	26	68	71	51	31	24	13	34	22	15	23	22	6
Authorship type																
Academics	76%	46%	17%	14%	33%	29%	22%	15%	10%	8%	15%	8%	7%	10%	8%	4%
Practitioners	6%	4%	2%	1%	4%	2%	3%	1%	1%	0%	1%	1%	1%	1%	2%	0%
Collaboration	17%	11%	5%	1%	5%	11%	5%	2%	3%	0%	5%	5%	1%	2%	3%	0%
Authors per study																
Single author	16%	8%	5%	3%	6%	8%	4%	2%	4%	0%	2%	4%	2%	8%	3%	0%
Two authors	46%	27%	12%	6%	15%	21%	14%	6%	6%	3%	11%	6%	4%	8%	5%	1%
Three authors	35%	24%	5%	6%	16%	12%	10%	9%	3%	5%	7%	2%	3%	5%	3%	3%
Four or more authors	4%	1%	2%	0%	2%	2%	3%	1%	2%	0%	1%	1%	0%	1%	2%	0%
Journals (highest-rated)																
Journal of Banking and Finance	39%	25%	10%	4%	13%	16%	11%	6%	5%	2%	9%	5%	2%	5%	5%	1%
Journal of Corporate Finance	12%	10%	2%	1%	5%	4%	4%	4%	1%	0%	4%	0%	0%	2%	1%	0%
Journal of Financial Economics	11%	8%	4%	0%	8%	3%	2%	5%	2%	0%	2%	1%	0%	1%	1%	0%
Journal of World Business	4%	4%	0%	0%	1%	1%	1%	1%	0%	0%	1%	0%	0%	1%	0%	0%
International Business Review	7%	5%	2%	0%	1%	4%	3%	0%	1%	0%	3%	1%	0%	1%	2%	0%
Others	26%	8%	7%	11%	14%	15%	11%	2%	6%	6%	2%	6%	7%	4%	4%	3%
Journal rating																
A+	11%	7.6%	3.5%	0.0%	8%	3%	2%	5%	2%	0%	2%	1%	0%	1%	1%	0%
A	57%	35%	16%	6%	22%	25%	18%	11%	9%	2%	12%	9%	4%	8%	9%	1%
B	24%	15%	5%	4%	8%	10%	7%	2%	3%	2%	6%	2%	2%	4%	3%	1%
Not rated	6%	2%	1%	4%	3%	3%	4%	0%	0%	3%	0%	1%	2%	2%	0%	2%

								By year within region								
		By year			By region			NA			Europe			Other		
Trend	**Total**	**2006**	**2001**	**1996**	**NA**	**Europe**	**Other**	**2006**	**2001**	**1996**	**2006**	**2001**	**1996**	**2006**	**2001**	**1996**
Not reported	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	1%	2%	0%	0%
Location of authors																
North America	61%	34%	16%	11%	29%	22%	16%	11%	11%	7%	11%	0%	22%	5%	8%	13%
Europe	38%	25%	9%	4%	11%	38%	10%	5%	0%	1%	0%	0%	4%	6%	4%	9%
Other	18%	18%	0%	0%	6%	0%	9%	5%	0%	1%	5%	0%	5%	6%	4%	8%
No. of author's countries																
1	67%	8%	20%	12%	29%	25%	19%	12%	11%	6%	9%	9%	6%	1%	3%	2%
2	30%	27%	5%	4%	11%	15%	10%	6%	3%	2%	9%	4%	2%	5%	5%	1%
3	3%	24%	0%	0%	1%	1%	1%	1%	0%	0%	1%	0%	0%	7%	3%	0%
4 or more	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Discipline																
Finance and accounting	68%	43%	16%	9%	30%	25%	18%	16%	8%	6%	14%	7%	4%	10%	7%	2%
Organizational behavior/organizational studies, human resource management, industrial relations	2%	0%	1%	1%	1%	2%	1%	0%	1%	0%	0%	1%	1%	0%	1%	0%
Gen. and strat.	1%	0%	1%	0%	1%	1%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Economics	5%	1%	1%	2%	2%	4%	3%	0%	1%	1%	0%	1%	2%	1%	1%	1%
International business	21%	13%	5%	2%	0%	0%	0%	2%	4%	1%	5%	2%	2%	2%	4%	0%
Management information systems, knowledge management	1%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%

Note: Category counts that exceed the column total are not mutually exclusive.

Table A3: Methodological trends in conceptual quantitative studies

								By year within region								
		By year			By region			North America			Europe			Other		
	Total	**2006-**	**2001-**	**1996-**	**N. Am.**	**Eur.**	**Oth.**	**2006-**	**2001-**	**1996-**	**2006-**	**2001-**	**1996-**	**2006-**	**2001-**	**1996-**
Total studies	170	102	42	26	68	71	50	31	24	13	34	22	15	22	22	6
Total studies	100%	60%	25%	15%	40%	42%	31%	18%	15%	8%	20%	13%	9%	15%	13%	3%
Empirical quantitative	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Empirical qualitative	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Conceptual qualitative	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Conceptual quantitative	100%	60%	25%	15%	40%	42%	31%	18%	15%	8%	20%	13%	9%	15%	13%	3%
Data source																
Not reported	9%	9%	0%	0%	1%	2%	2%	1%	0%	0%	2%	0%	0%	2%	0%	0%
Databases (reported)	70%	39%	18%	13%	34%	30%	21%	15%	11%	8%	13%	10%	7%	8%	9%	4%
Official statistics	16%	6%	4%	6%	9%	8%	7%	1%	2%	5%	2%	2%	3%	1%	3%	3%
International organizations	5%	3%	2%	0%	1%	3%	2%	0%	1%	0%	1%	2%	0%	1%	1%	0%
Experts	1%	0%	0%	1%	1%	1%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%
Indexes	20%	4%	8%	9%	9%	9%	8%	1%	4%	5%	1%	4%	5%	1%	5%	2%
Financial magazines	11%	2%	4%	5%	6%	6%	6%	2%	2%	2%	1%	2%	4%	2%	3%	1%
Consulting firms	8%	1%	4%	3%	4%	4%	4%	0%	2%	1%	0%	2%	2%	1%	2%	1%
Firm-level data	12%	2%	7%	2%	3%	5%	4%	0%	3%	0%	1%	2%	2%	0%	4%	0%
Popular literature	1%	1%	1%	0%	1%	1%	1%	0%	1%	0%	1%	1%	0%	0%	1%	0%
Websites	2%	1%	2%	0%	1%	2%	1%	0%	1%	0%	1%	1%	0%	1%	1%	0%
Banks	11%	2%	6%	1%	4%	4%	7%	0%	4%	0%	1%	3%	1%	3%	4%	0%
Government institutions	5%	2%	3%	0%	3%	1%	3%	1%	2%	0%	0%	1%	0%	1%	2%	0%

		By year			By region			By year within region								
								North America			Europe			Other		
	Total	2006-	2001-	1996-	N. Am.	Eur.	Oth.	2006-	2001-	1996-	2006-	2001-	1996-	2006-	2001-	1996-
Sample size																
Not reported	6%	5%	1%	1%	1%	2%	2%	0%	1%	1%	2%	0%	0%	2%	0%	0%
0-100	25%	11%	8%	6%	8%	13%	8%	2%	5%	1%	4%	4%	5%	3%	5%	0%
101-300	21%	9%	5%	6%	9%	8%	7%	2%	2%	5%	4%	3%	2%	2%	0%	5%
301-500	8%	5%	1%	1%	4%	4%	4%	2%	1%	1%	2%	1%	1%	2%	1%	1%
501 and above	40%	29%	9%	2%	18%	15%	11%	11%	6%	1%	8%	5%	1%	5%	4%	2%
Population	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	0%	0%	0%	0%	1%	0%
Statistical techniques																
Nor reported	1%	0%	1%	0%	1%	0%	0%	1%	0%	0%	0%	1%	0%	0%	0%	0%
Regression	72%	61%	72%	36%	24%	12%	33%	32%	25%	12%	15%	13%	6%	11%	12%	10%
Other	6%	2%	6%	1%	3%	2%	2%	4%	1%	0%	1%	2%	1%	0%	1%	1%
Correlation analysis	4%	1%	4%	1%	2%	1%	2%	1%	1%	1%	1%	1%	1%	0%	1%	1%
Descriptive statistics	25%	40%	25%	24%	1%	0%	6%	7%	6%	6%	0%	0%	0%	5%	1%	0%
Reliability and validity																
Reliability not reported	94%	59%	21%	13%	36%	38%	29%	18%	11%	7%	20%	11%	8%	15%	11%	3%
Reliability reported	6%	1%	3%	0%	4%	4%	1%	1%	3%	1%	0%	2%	1%	0%	1%	0%
Validity not reported	92%	59%	19%	14%	34%	36%	27%	18%	11%	6%	20%	25%	8%	15%	10%	2%
Validity reported	7%	1%	5%	2%	6%	5%	4%	1%	4%	2%	0%	4%	1%	0%	2%	2%
Robustness not reported	40%	18%	9%	12%	15%	16%	14%	5%	4%	6%	5%	4%	7%	6%	5%	3%
Robustness reported	59%	42%	15%	3%	25%	25%	17%	14%	10%	1%	15%	9%	2%	9%	8%	0%
Industry																
Not reported	41%	29%	7%	5%	15%	15%	10%	7%	3%	5%	9%	4%	1%	5%	3%	2%

								By year within region								
		By year			By region			North America			Europe			Other		
	Total	2006-	2001-	1996-	N. Am.	Eur.	Oth.	2006-	2001-	1996-	2006-	2001-	1996-	2006-	2001-	1996-
Financial institutions	45%	26%	13%	6%	21%	19%	16%	10%	9%	2%	8%	6%	5%	7%	8%	1%
Nonfinancial institutions	2%	1%	1%	1%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
Pharmaceutical	4%	1%	2%	1%	2%	2%	3%	1%	1%	1%	1%	1%	1%	1%	2%	0%
Technology	6%	2%	4%	1%	2%	2%	5%	2%	0%	1%	1%	0%	1%	2%	3%	0%
Telecommunications	4%	3%	1%	1%	2%	4%	2%	2%	0%	0%	2%	1%	1%	2%	0%	0%
Manufacturing	7%	2%	2%	3%	5%	3%	3%	1%	2%	2%	1%	1%	2%	1%	2%	0%
Oil and petroleum	5%	2%	1%	2%	3%	1%	3%	1%	1%	1%	1%	0%	1%	2%	1%	0%
Services	6%	2%	2%	2%	3%	3%	4%	1%	1%	1%	1%	1%	1%	1%	2%	1%
Mining	2%	1%	0%	1%	2%	1%	1%	1%	0%	1%	1%	0%	1%	1%	0%	0%
Retail	2%	0%	1%	1%	2%	1%	1%	0%	1%	1%	0%	1%	1%	0%	1%	0%
Other	4%	1%	2%	1%	2%	1%	2%	1%	0%	1%	1%	0%	1%	1%	1%	0%
Time horizon																
Cross-sectional	11%	6%	3%	2%	4%	6%	5%	1%	2%	1%	2%	2%	2%	2%	2%	1%
Longitudinal	88%	54%	21%	14%	36%	36%	25%	17%	12%	7%	18%	11%	7%	12%	7%	5%
Difference between data collected and published																
0-5 years	55%	32%	13%	9%	21%	26%	19%	10%	8%	4%	13%	8%	5%	11%	5%	3%
5-10 years	34%	20%	9%	5%	16%	12%	10%	7%	5%	4%	6%	4%	3%	2%	3%	5%
10-15 years	4%	2%	2%	0%	2%	1%	1%	1%	1%	0%	1%	1%	0%	0%	1%	0%
15 and above	1%	1%	0%	0%	0%	1%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Number of data sources																
1-3 databases	32%	19%	9%	4%	14%	15%	5%	9%	4%	2%	7%	5%	2%	2%	2%	1%
3-6 databases	16%	3%	8%	5%	9%	6%	8%	1%	5%	3%	0%	4%	3%	1%	3%	4%

								By year within region								
		By year			By region			North America			Europe			Other		
	Total	2006-	2001-	1996-	N. Am.	Eur.	Oth.	2006-	2001-	1996-	2006-	2001-	1996-	2006-	2001-	1996-
7 databases	7%	1%	3%	3%	5%	4%	4%	0%	2%	2%	1%	2%	1%	1%	1%	2%
Number of countries studied																
10-20	11%	5%	4%	3%	5%	8%	6%	1%	3%	2%	3%	2%	3%	2%	3%	1%
20-30	5%	2%	3%	0%	2%	4%	2%	1%	1%	0%	2%	2%	0%	1%	1%	0%
30-40	3%	1%	2%	0%	2%	3%	2%	0%	2%	0%	1%	2%	0%	1%	1%	0%
40 and above	6%	19%	1%	1%	2%	3%	1%	1%	1%	0%	1%	1%	1%	1%	0%	0%
Number of years studied																
10-20	24%	15%	5%	4%	12%	8%	7%	6%	3%	2%	5%	2%	1%	4%	2%	1%
20-30	9%	7%	2%	1%	4%	2%	4%	3%	1%	0%	1%	1%	0%	2%	2%	0%
30-40	2%	2%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%
40 and above	2%	2%	1%	1%	2%	3%	1%	1%	1%	0%	1%	1%	1%	1%	0%	0%

Note: Category counts that exceed the column total are not mutually exclusive.

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The Volatility Effect of Single-Stock Futures Trading on the Pakistani Stock Market

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Abstract

The impact of single-stock futures on spot market volatility is still debated in the finance literature. The aim of this study is to analyze the effect of the introduction of single-stock futures on the volatility of the Karachi Stock Exchange (KSE). We examine changes in the level of volatility and structure after the introduction of single-stock futures, evaluating 24 companies listed on the KSE. The study applies the F-test to determine differences in variance as a traditional measure for volatility and uses GARCH (1,1) as an econometric technique for detecting time-varying volatility. The results show that there is no effect on the volatility level but that changes occur in the structure of volatility after stock futures trading.

Keywords: Single-stock futures, derivatives, volatility.

JEL classification: G10, G13, G17

1. Introduction

Stock market volatility has been a vital area of research for the last three decades. Volatility is a risk measure and is widely used in finance studies, given researchers' wide interest in risk assessments of securities or markets. There has been extensive debate on derivatives trading (index futures and index options) and its impact on the underlying spot market. The general perception about derivatives is that they increase stock prices but there is no consensus due to the mixed empirical evidence.

The impact of the introduction of derivatives securities (futures and options) on the underlying spot market is a less researched area, but there is little consensus among researchers and practitioners on this issue. Given the differences in theoretical frameworks and empirical findings, there is no unanimous conclusion that futures trading stabilizes or destabilizes the spot market.

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Future contracts are introduced into the stock market to manage and minimize risk in the underlying spot market. Single-stock futures (SSFs) are contracts that are traded on stock exchanges; they represent future commitments to buy or sell shares (of any specific listed company) at a fixed rate. SSFs are derivatives and their price depends on ordinary shares. As these contracts expire, the holder buys at a predetermined price from the seller. This type of physical delivery contract is called a deliverable futures contract. The determination of gain or loss is done on the expiration of the contract. The difference between the spot and futures price is the actual gain or loss of the contract. Cash-settled futures contracts are also now available in which the daily settlement of contracts is carried out by a stock exchange.

The link between the spot and futures market can be explained by the cost-of-carry concept, which Strong (2005) defines as the "net cost incurred for carrying an asset forward in time." There are two types of net costs: carrying returns (dividends) and carrying charges (interest). The fair value of a futures contract is determined by the spot price of the underlying asset and the cost of carry. The futures contract price is a function of and dependent on the underlying spot price. It is plausible that a reciprocal relation exists between the two markets.

The introduction of SSFs provides an opportunity to reinvestigate futures trading comprehensively. Stock futures offer a direct assessment of the probable impact on underlying shares. The market-wide impact of futures trading can be assessed through index futures, whereas a company-wide impact can be assessed through SSFs.

2. Contextual Analysis

The Pakistani stock market comprises three stock exchanges, of which the Karachi Stock Exchange (KSE) is the largest and oldest; it is also the most liquid and active exchange in Pakistan. The KSE was established in 1947 and provides products such as ready market, index futures, and stock futures. Trading in stock futures started on 1 July 2001 and index futures started on 1 April 2008. The Pakistani stock market has faced many problems in development, as have other developing countries. In the last few years, the KSE has witnessed extraordinary volatility and is considered one of the most volatile markets in the world. Stock futures trading in Pakistan began with ten companies in 2001 and increased to 46 companies in 2008 (Khan, Shah, & Abbas, 2011).

2.1. Significance of the Study

Traditionally, futures markets are considered more volatile than spot markets. The close link between the two markets creates the possibility of risk transfer from one to the other. The literature has documented both increases and decreases in volatility, with some studies presenting mixed results. This lack of consensus means that further research is necessary. Specifically, SSFs in Pakistan have received little attention.

This study aims to fill this gap in the literature. Existing studies on the volatility effect of SSFs on the underlying spot market tend to focus on developed countries, with few studies having been conducted on a developing country such as Pakistan. Thus, we aim to add a developing country perspective to this area of research. Additionally, we analyze company-wide impacts rather than market-wide impacts, and so present a direct evaluation of the possible effects. The study's results could prove useful to various stakeholders, such as practitioners, academics, investors, and regulators.

2.2. Problem Statement

Futures markets are considered more volatile than spot markets, and thus can be a source of volatility for spot markets as futures trading can increase volatility in the underlying spot market. Research is needed to investigate comprehensively whether stock futures increase or decrease spot market volatility, especially in the context of Pakistan.

2.3. Aim of the Research

Our aim is to determine the impact of introducing SSFs on the volatility of securities. Specifically, we intend to:

1. Study changes in the volatility level after the introduction of SSF trading in Pakistan
2. Investigate changes in the volatility structure after SSF trading in Pakistan

2.4. Study Delimitations

This study investigates only the Pakistani context. The sample firms were included on the basis of the data available. The study spans the period 1 July 2001 to 31 December 2010.

3. Literature Review

3.1. Derivatives Markets

Over the years, two views have emerged with respect to derivatives markets to clarify why derivatives trading can affect spot market volatility. This discussion has focused on arbitrage activities, which link the derivatives market with the spot market. These contrasting views depend on the assumptions regarding arbitrageurs. A key issue in derivatives trading is whether it brings informed or uninformed traders to the stock market. One view is pro-derivatives: it states that derivatives trading brings informed traders to the market and that these traders lead to greater efficiency and lower volatility in the underlying market. The second view is anti-derivatives: it holds that derivatives trading brings in speculators who are involved in massive and irrational speculative activities (Robbani & Bhuyan, 2005).

Derivatives markets have several advantages over trading in spot markets. The main benefits are low transaction costs, high leverage, and greater liquidity. Futures trading allows investors market-wide exposure with low transaction exposure. Investors take large positions in futures trading compared to the spot market. The disadvantage of this high degree of leverage provided by futures trading is that it can attract uninformed traders or speculators to both markets, who may then increase the volatility of the underlying market for short-term profit. Futures markets are affected by speculation due to the low transaction costs involved. Uninformed traders or irrational speculators trading in futures can destabilize the underlying spot market—the destabilizing effect of the futures market.

Robbani and Bhuyan (2005) differentiate between informed and uninformed traders. Informed traders carry out arbitrage activities while uninformed traders are involved in speculative activities. An increase in informed traders will increase trading volumes and lead to lower volatility in the underlying spot market. This reflects the pro-derivatives view or the stabilizing effect of futures trading, and holds if no trading volume is transferred to the futures market. If the trading volume is diverted, it can lead to low trading volumes and increased volatility in the spot market.

Faff and Hillier (2005) find that, given new financial innovations such as derivatives products, informed traders may be attracted to the

futures market due to the low transaction costs and high leverage involved. Trading volumes are diverted to the futures market and lead to the destabilization of the spot market.

In their pioneering work on SSFs, Peat and McCorry (1997) present the opposite view to futures trading that leads to market stabilization or destabilization. They argue that, with the advent of stock futures, if the market moves toward stabilization or completion, there will be an increase in share prices, resulting in a low required rate of return, an increase in trading volume, and a decrease in spot market volatility. If the market is destabilized after the advent of stock futures, there will be a decrease in share prices, resulting in higher required returns, a decrease in trading volume due to the migration toward the futures market, and an increase in spot market volatility.

3.2. Decreased Volatility Due to Futures Trading

Elfakhani and Chaudhury (1995) study the effect of the introduction of options on the Canadian spot market. They note that both total and systematic risk decreased in the early 1970s due to options trading. In the late 1980s, near the time of the market crash of 1987, the systematic risk associated with the underlying individual equity shares increased due to the listing of options contracts. They conclude that options listing has a stabilizing effect on the underlying spot market, except in the case of the market crash of 1987.

Chatrath, Ramchander, and Song (1995) test the hypothesis that options trading increases spot market volatility in the US market. Their results show that, while options trading reduces volatility in the spot market, increased volatility in the spot market increases the volatility of options trading. Overall, options trading reduces risk in the underlying market. McKenzie, Brailsford, and Faff (2001) find a significant reduction in unconditional volatility and a decline in systematic risk. There is slower incorporation of information in prices, old news has a shorter impact, and the persistence of shocks has a smaller effect.

Bologna and Cavallo (2002) attempt to determine whether stock index futures contracts (SIFCs) reduce the volatility of the stock market. They observe a reduction in volatility and an increase in spot market efficiency. This is accompanied by a decrease in unconditional volatility. Their results show that new information is incorporated more rapidly in prices (more clustering) but that this impact does not last long (less

persistence). The persistence of shocks (ARCH + GARCH term) also declines between the pre- and post-period, which supports the stabilizing hypothesis of futures trading.

Ang and Cheng (2005) investigate whether financial innovations can improve market efficiency. They test for market efficiency by applying the "specific announcement of news." If there are only a few excess unexplained post-listing price changes for SSF firms, then the market is deemed efficient. Their results show that the market becomes efficient after SSF trading. They attribute this efficiency to increased trading in the futures market, high leverage, and low transaction costs, which benefit arbitrageurs rather than speculators.

Mazouz and Bowe (2006) investigate the volatility effect of SSF contracts on the London stock exchange and find a reduction in unconditional volatility and systematic risk. With futures trading, current news is incorporated into prices more rapidly, while old news has a shorter impact and a lower shocks effect. Drimbetas, Sariannidis, and Porfiris (2007) report the effect of index futures contracts on the underlying equity market in Greece, using the FTSE/ASE-20 as the underlying index for the period 1997–2005. They adopt an exponential GARCH model for their volatility analysis and find a reduction in volatility post-futures trading with no change in the structure of volatility. However, unconditional volatility decreases after the introduction of futures.

De Beer (2008) investigates the SSF effect on the South African stock market. The volatility of the underlying equity market is reduced and there is no change in systematic risk. There is faster incorporation of fresh news, while old news has a shorter impact and smaller shocks effect.

Khan (2006) studies the impact of futures trading on spot volatility in Pakistan. His results show that the spot market leads the futures market in incorporating new information. The futures market is not responsible for volatility in the spot market. He concludes that volatility in the futures market is due to the outgrowth of the spot market. In a later study, Khan and Hijazi (2009) examine SSF trading and share price volatility in Pakistan and find a reduction in stock price volatility after the introduction of futures trading. However, there is a positive relation between spot volume and spot volatility, which supports the stabilizing effect of futures trading.

3.3. Increased Volatility Due to Futures Trading

Peat and McCorry's (1997) study is one of the first empirical studies to look at the role of SSFs in the Australian spot market. They base their study on the existing literature concerning the impact of the introduction of options and SIFCs on the underlying equity market. They test the complete markets theory, the diminishing short sales theory, and the improved information environment hypothesis. Their results contradict earlier findings on the introduction of derivatives trading. Previous studies had argued that the market becomes complete after the introduction of derivatives trading. The introduction of options leads to a reported increase in price and volume but a decrease in volatility. They also argue that there is no effect on price but an increase in volume and volatility.

Smit and Nienaber (1997) look at futures trading activity and stock price volatility in South Africa (futures trading activity refers to volume and open interest on the stocks). Their regression analysis results show that greater activity in futures leads to more volatility in the underlying spot market. Swart (1998) examines the impact of index futures on the volatility and liquidity of the underlying Johannesburg Stock Exchange, and finds that the increase in volume and volatility is due to an increase in index futures trading.

Butterworth (2000) supports the argument that futures trading has changed the structure and level of volatility in the spot market. There is less volatility clustering but more volatility persistence in returns following the introduction of futures trading. There is a considerable increase in the constant term but a huge rise in the unconditional variance in the variance equation used. He concludes that futures have a beneficial effect on the spot market.

Faff and Hillier (2005) analyze complete markets, the improved information environment, and the diminishing short sales theory in the context of the introduction of options in the UK. They construct a sample of 86 companies involved in options trading over the period 1978–99. The price effect is tested using an event-study methodology. Abnormal returns are calculated using a market model. Positive abnormal returns arise with the introduction of options trading but there is no visible pattern over the sample period. The volume effect is estimated using dummy variable regression and indicates a rise in the level of trading volume, following the introduction of options trading. The volatility effect is also measured using dummy variable regression, and shows a rise in the level of volatility post-options trading.

Bae, Kwon, and Park (2004) study the effect of futures trading on stock market efficiency and volatility in the Korean context. Their sample consists of the KOSPI-200 and a control sample over the period 1990–98. The authors use dummy variable regression to show the destabilizing effect on and increase in volatility of the underlying spot market. Aitken and Segara (2005) study the initiation impact of Australian warrants on the underlying individual equity shares. The returns on shares decline after the introduction of warrants, and both the volume and volatility of the spot market rises.

Ahmad, Shah, and Shah (2010) assess the impact of futures trading on spot price volatility in Pakistan. The returns show both clustering and persistence. They find that the KSE-100 predicts both the spot and futures markets. However, these markets do not Granger-cause each other or the market index. All the markets are found to be highly volatile, which is the reason for the increased volatility. Consequently, the authors support the destabilizing hypothesis of futures trading in contrast to previous studies on Pakistan.

3.4. Mixed Evidence of Futures Trading

Oehley (1995) investigates the impact of the introduction of SIFCs on the underlying market index in South Africa, but the study's results do not provide any evidence that futures trading increases volatility. The general increase in share market volatility is explained by the 1987 market crash.

Darrat and Rahman (1995) look at US evidence on futures trading and its impact on share price volatility. They report that futures trading does not increase the volatility of the underlying equity market. There is evidence of spike volatility in the sample period, but it is not attributed to futures trading. Instead, the authors attribute the volatility in stock prices to the over-the-counter index and term structure.

Parsons (1998) studies futures trading and its impact on the cash (spot) market in the context of South Africa. The results indicate no increase in the volatility of the underlying indexes, which supports the stabilizing effect of futures trading. Vanden Baviere and De Villiers (1997) examine stock price volatility after the introduction of index futures and find no evidence for its impact on the increased volatility of firms that constitute the market index.

Lee and Tong (1998) analyze the emergence of individual stock futures (ISF) contracts in the Australian equity market. They report no associated increase in trading volumes and no effect on volatility, and suggest that the increase in volume is due to the greater participation of firms because futures trading has expanded investment opportunities and reduced risk. Dennis and Sim (1999) compute the impact on volatility of the introduction of ISF contracts on the Sydney Futures Exchange. Their findings show that trading in the spot market (rather than the futures market) has a large effect on spot market volatility. Consequently, ISF contracts have a minor effect on the volatility of the cash market.

Kruger (2000) looks at index futures and stock price volatility in South Africa, and suggests that futures trading does not increase the volatility of equity indices. As the date of expiration of a futures contract approaches, there is an increase in futures trading. Hung, Lee, and So (2003) examine the impact of SSF contracts listed on foreign stock exchanges on the underlying domestic equity markets. They find evidence that SSF contracts listed in foreign countries lead to increasing volatility in the underlying domestic equity market. Moreover, daily shocks to foreign-listed SSF firms increase the conditional volatility in their home underlying equity market. A reduction in conditional volatility is seen to be the result of a high variable and predictable activity across days. There are no differences in unconditional volatility between the pre- and post-futures period. There is slower incorporation of information in prices, and old news has a shorter impact and smaller shocks effect.

Using a GARCH model, Mazouz (2004) studies the effect of introducing equity options on the NYSE, but finds they have no effect on either unconditional or conditional volatility. Kumar and Mukhopadhyay (2004) examine the impact of futures trading on the underlying Indian equity market: index futures trading has no effect on the average and additional level of volatility. New information is incorporated in prices but old information and shock effects are less persistent.

Robbani and Bhuyan (2005) determine the volume and volatility effect of futures and options trading on the US stock market index. They investigate 30 companies that form part of the DJIA index over the period 1989 to 1994. Using the t-test, F-test, Wilcoxon signed rank test, Parkinson's estimator, and GARCH model for time-varying volatility, they find that the returns of all the underlying firms showed no effect as a result of derivatives trading. However, the trading volume of 23 companies increased post-derivatives trading. There was also an increase

in conditional volatility post-futures and options trading, but no increase in unconditional volatility. There was faster incorporation of fresh news, while old news had a longer impact and greater shocks effect.

Chau, Holmes, and Paudyal (2005) study the impact of cross-border and domestic listing of SSF contracts on underlying market volatility and feedback trading in the UK. They report an improvement in market efficiency, reduced volatility in the underlying market, and a small decrease in the level of feedback trading. They are obvious differences among industries in terms of market dynamics. The positive impact on the underlying market from the pre- to post-futures period is not related to futures trading. A constant component is used to model the serial autocorrelation present in the possible market inefficiency; the improvement in efficiency is due to a reduction in this component.

Clarke, Gannon, and Vinning (2007) analyze the introduction of warrants in the Australian stock market and find no subsequent difference in volatility. Khan et al. (2011) look at SSF trading and its impact on stock prices. Both traditional and econometric analyses yield mixed results. The GJR-GARCH analysis shows a limited and fractional decrease in volatility both for SSF firms and the control sample. Thus, this partial reduction can be attributed to other market-wide factors but not to futures trading.

The majority of existing studies suggest, therefore, that derivatives trading has no effect on the volatility of the underlying spot market. Most SSF studies focus on the US, UK, Australia, and South Africa and find mixed evidence for volatility. Previous research on derivatives trading (warrants, options, and SIFCs) also yields varied and indecisive results. In Pakistan, most studies have focused on futures trading and only some on SSFs. Generally, however, there is no conclusive study on futures trading.

4. Theoretical Framework

The complete markets hypothesis, diminishing short sales restrictions hypothesis, and improved information environment hypothesis (see Ross, 1977; Miller, 1977; Detemple & Seldon, 1991; Figlewski & Webb, 1993) all provide a conceptual framework for determining the impact of options on the underlying spot market.

The theory of complete markets (Ross, 1977; Arditti & John, 1980) holds that the introduction of options increases opportunities for investors in terms of risk/return patterns. Options provide favorable and

attractive positions for investors. Expanding and improving the opportunity set increases the demand for shares and, as a result, increases equilibrium prices.

Under the diminishing short sales theory, the introduction of options can complete markets by allowing short positions. These synthetic short positions allow investors who have a negative view of shares to trade based on information they were not allowed to share previously in the absence of options. Informational efficiency is restricted by short-sales constraints and negative information cannot be incorporated into prices (Miller, 1977). In this situation, only optimistic investors will buy shares, leading to an imbalance in supply and demand and an increase in equilibrium prices. This imbalance is corrected through arbitrage and there is a decrease in prices.

The improved information environment hypothesis comprises several dimensions, one of which opposes the short-sales hypothesis, stating that informed traders with negative information will trade and earn profits from their better information. Another dimension states that the introduction of derivatives trading increases analysts' and media coverage, changing the investment mix (insider traders, speculators, uninformed traders) in underlying stock.

The vast majority of studies on the impact of derivatives trading on the underlying equity market are based on futures, with few focusing on the introduction of SSF trading. Most studies on derivatives trading and their impact on the underlying spot market are based on options. Both SSFs and options belong to the same category of derivatives and have similar characteristics but with different patterns of returns and leverage; we assume these theories to hold for both.

5. Research Methodology

5.1. Data and Sample

Our sample was filtered based on the following criteria: (i) any SSFs delisted during the sample period were excluded from the analysis, and (ii) a stock must have 500 days of spot price data both pre- and post-event. The sample period of analysis was based on previous studies, where it ranged from three months to three years. To avoid any bias, we selected two-year pre- and post-event data for SSFs.

Trading in ISFs on the KSE commenced in July 2001. The study's sample period begins on 1 July 2000 and ends in December 2010. Khan et al. (2011) use data on 46 single-stock firms, ending in June 2008. We have selected 24 firms for our study. The daily closing share prices were obtained from the KSE's online database for a period of one year prior to a year after the listing of each stock. This yielded more than 500 daily observations per stock for each of the subperiods.

5.2. Hypothesis

The study is based on the following hypotheses:

- H0: The introduction of SSFs has no impact on the underlying volatility.
- H1A: The introduction of SSFs has either a positive or negative impact on the underlying volatility.

5.3. Data Analysis Techniques

5.3.1. Calculation of Returns

We use the following formula to calculate the returns on each stock:

$$R_{it} = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

where R_{it} is the return on security i in period t, P_t is the closing price of security i on day t, and P_{t-1} is the closing price of security i on the day $t-1$.

5.3.2. Volatility Effect

Volatility is a statistical measure used to capture the tendency of a security or market to rise or fall sharply over a period of time. It is widely used in finance studies as a proxy for assessing the risk of any security or market. Volatility is measured in standard deviations, as a variance, or beta. According to the framework provided by major theories, the probable effect of stock futures trading on the underlying spot market is as follows:

	Expected change in underlying spot market		
Characteristic	Complete markets theory	Diminishing short sales restriction theory	Improved information environment hypothesis
Volatility	Lower	Lower	Lower

Source: Clarke, Gannon, and Vinning (2007).

We first apply the F-test for differences in variance in a preliminary investigation of volatility. We then use a generalized autoregressive conditional heteroskedastic (GARCH) model to capture the changes in conditional volatility.

5.3.3. F-Test of Difference in Variance

Variance is a measure of volatility. The larger the variance among returns, the higher will be the volatility and the riskier the security or market. It is calculated as the mean sum of squares of the difference between the values and means of a securities sample. The F-test is a traditional measure used to examine changes in volatility (unconditional variances). It is applied to the ratio of pre-SSFs versus post-SSFs.

$$\text{F-test} = \frac{S_1^2}{S_2^2} \quad S_1^2 = \text{pre-event variance} \quad S_2^2 = \text{post-event variance}$$

5.4. Autoregressive Conditional Heteroskedasticity (ARCH)

The assumptions of OLS regression are: the expected value of the residuals will be zero, constant variance of residual terms, and no autocorrelation in the data series. The constant variance assumption (error terms) is also known as homoskedasticity. The basis of ARCH/GARCH modeling is the violation of the homoskedasticity assumption. The ARCH effect occurs in time series that do not have a constant variance (heteroskedastic).

ARCH is a condition in which the variance of the error terms in one period is dependent on the variance of the error terms in the previous period. In this situation, the hypothesis test of regression coefficients and their standard errors will be invalid. ARCH/GARCH modeling does not consider heteroskedasticity a problem to be corrected; rather, it includes the variance in the model (Engle, 2001). ARCH/GARCH models correct any OLS deficiencies by meeting the required assumptions. GARCH models have a constant unconditional variance, and are conditionally heteroskedastic and mean reverting.

Engle's (1982) ARCH models are designed particularly for modeling and forecasting conditional volatility; later, Bollerslev (1986) introduced the GARCH model. In the ARCH model, the dependent variable's variance is included as a function of the independent variable and its past values. In the GARCH (p, q) model, conditional volatility (variance) is a function of the lagged terms of conditional variance and past squared error terms.

Engle (2001) states that the standard GARCH (*p*, *q*) has two standard terms. The first term (*p*) indicates the number of ARCH terms (autoregressive lags included in the model) and the second term (*q*) indicates the GARCH terms (number of moving average lags). GARCH (1,1) refers to first-order ARCH and GARCH terms. GARCH models also capture volatility clustering, which, according to Engle (1993), represents high volatility followed by more tranquil periods of low volatility.

5.5. GARCH (1,1) Model

The basic GARCH (1,1) specification (mean equation) is as follows:

$$y_t = \alpha + \beta y_{t-1} + \varepsilon_t \ldots \varepsilon_t(o, h_t)$$

where y_t is the return on the security, α is a constant, βy_{t-1} is the autoregressive coefficient and explanatory (lagged) variable, and ε_t is the residual term.

The variance equation is written as:

$$h_t = \omega + \alpha\varepsilon_{t-1}^2 + \beta h_{t-1} \ldots \omega > 0,\ \alpha > 0,\ \beta \geq 0$$

The unconditional constant variance of the error term is

$$\text{var}(\varepsilon_t) = \frac{\omega}{1 - \alpha - \beta}$$

h_t is the conditional variance in period *t*, ω is a constant (long-term average), $\alpha\varepsilon_{t-1}^2$ is the news coefficient, and the ARCH (1) term βh_{t-1} is the persistence coefficient (old news and GARCH (1) term). The variance equation consists of three terms: a constant (ω), information on previous-period volatility (ARCH term), and the forecasted variance of the last period (GARCH term).

Current asset price is explained by the autoregressive component of the mean equation. In the variance equation, the error terms are modeled as time varying rather than constant. The parameters of GARCH (1,1) show that current volatility is a function of past squared error terms and an autoregressive component of the conditional variance. Engle (2001) states that, for a mean-reverting variance process, the parameters estimated from the GARCH model should be positive and their value should not be greater than 1.

De Beer (2008) argues that the GARCH equation has two main effects: the impact of recent information on the market (ARCH effect) and that of old information on the market (GARCH effect). It is important, statistically, to know whether recent news is more important than old news. Current and lasting impacts are measured by changes in the size of the ARCH and GARCH effects. Volatility persistence can be measured by adding the two effects. A sample will exhibit volatility clustering and persistence if both the ARCH and GARCH terms are significant. This clustering and persistency process shows that, if there is a shock to stock prices, it will persist for many successive periods. A shock to share prices will last for a short period if the ARCH and GARCH terms are insignificant.

In the same way, an increase (decrease) in ARCH (1) from the pre-event subsample to the post-event sample will be associated with faster (slower) dissemination of information (news) on the stock prices. If there is an increase (decrease) in GARCH (1) from the pre-event subsample to the post-event sample, then old news will have a long-lasting effect on share prices. The autoregressive root, which is the sum of the ARCH and GARCH values, represents the tendency of specific stock to reflect the impact of the shock in its price. The root shows the persistence of shocks.

The ARCH (1) and GARCH (1) effects are tested separately for the pre-event and post-event subsamples. Changes in the unconditional variance can be measured by introducing a dummy variable into the conditional variance equation. The dummy variable for the pre-event is 0 and for the post-event is 1. Futures trading will increase (decrease) volatility if there is a significant positive (negative) dummy variable coefficient.

The variance equation including the dummy variable is written as:

$$h_t = \omega + \alpha\varepsilon_{t-1}^2 + \beta h_{t-1} + \delta D_F$$

$$\text{var}(\varepsilon_t) = \frac{\omega + \delta}{1 - \alpha - \beta}$$

where δ is the coefficient and D_F is the dummy variable.

6. Results and Discussion

6.1. Descriptive Analysis

Table 1 gives the descriptive statistics for pre- and post-event individual shares.

Table 1: Descriptive statistics

Firm		Mean	Median	SD	Skewness	Kurtosis	JB (p-value)
ENGRO	Pre-	-0.001	-0.002	0.029976	-0.128	11.56474	0.000
	Post-	0.000997	0.000614	0.024221	-0.004	6.013720	0.000
FABL	Pre-	0.002103	0.001458	0.027585	-0.471	7.949325	0.000
	Post-	0.001521	0.001356	0.029189	-1.262	10.15042	0.000
FFBL	Pre-	0.003289	0.000000	0.041945	0.345826	7.808736	0.000
	Post-	0.001407	0.000000	0.025513	0.339097	4.134581	0.000
FFC	Pre-	0.000	0.000000	0.027886	-1.666	43.28937	0.000
	Post-	0.002134	0.001447	0.020634	-0.270	5.836772	0.000
HUB	Pre-	0.000635	0.000000	0.030108	0.139531	6.856852	0.000
	Post-	0.001552	0.001992	0.027161	-0.744	9.792955	0.000
KESC	Pre-	0.001173	0.000000	0.034128	1.215301	8.635981	0.000
	Post-	-0.002	0.000000	0.029418	0.819180	8.233262	0.000
LUCKY	Pre-	0.002804	0.000000	0.028679	0.347713	3.876507	0.000002
	Post-	0.002092	0.002304	0.027287	-0.051	3.494917	0.069852
MPLF	Pre-	0.003163	0.000000	0.032238	0.377267	3.523883	0.000152
	Post-	-0.001	0.000000	0.027643	-0.069	3.532435	0.042739
NML	Pre-	0.001104	0.000000	0.037895	-0.988	12.99042	0.000
	Post-	0.001639	0.000000	0.033319	0.335330	4.906277	0.000
PIA	Pre-	-0.002	0.000000	0.030568	-0.061	4.965522	0.000
	Post-	0.002502	0.000000	0.042873	0.974915	7.807721	0.000
PIOC	Pre-	0.003450	0.000000	0.032683	0.104470	5.874602	0.000
	Post-	-0.002	-0.002	0.029352	-0.086	3.034602	0.723754
PSO	Pre-	0.000637	0.000275	0.027285	-0.123	10.57158	0.000
	Post-	0.001362	0.000623	0.026797	-0.095	5.823495	0.000
PTCL	Pre-	0.000	0.000000	0.022892	0.125436	8.996783	0.000
	Post-	0.001181	0.000000	0.024341	-0.142	7.297403	0.000
SNGP	Pre-	0.000303	0.000000	0.035134	0.280865	10.54835	0.000
	Post-	0.002487	0.000000	0.029891	-0.185	7.444145	0.000
SSGP	Pre-	0.001921	0.000000	0.025665	0.237348	4.508559	0.000
	Post-	0.000	-0.002	0.025778	0.055356	3.496147	0.067755
TELE	Pre-	0.000688	0.000000	0.030216	0.259989	4.657943	0.000
	Post-	-0.001	-0.004	0.035922	-0.886	14.22332	0.000
ABL	Pre-	-0.002	-0.001	0.030599	-0.280	4.571490	0.000
	Post-	0.001883	0.000000	0.026991	-0.066	4.254456	0.000
NETSOL	Pre-	-0.001	-0.002	0.052528	-13.231	250.2266	0.000
	Post-	-0.003	-0.005	0.047136	0.745493	9.684422	0.000
FCCL	Pre-	-0.001	0.000000	0.026065	-0.124	3.794509	0.000738
	Post-	-0.002	-0.003	0.041262	0.012739	8.917209	0.000
CSAP	Pre-	0.000109	-0.001	0.028581	-0.817	7.022855	0.000
	Post-	-0.002	-0.003	0.034682	-2.018	23.96737	0.000
ATRL	Pre-	0.000624	0.000000	0.030562	-0.820	7.005381	0.000
	Post-	-0.002	0.000	0.037650	-1.764	14.90924	0.000
PRL	Pre-	-0.003	-0.002	0.026916	-0.224	4.243145	0.000
	Post-	0.001151	-0.001	0.028255	0.032965	2.669006	0.305289
PICT	Pre-	-0.002	-0.001	0.030599	-0.280	4.571490	0.000
	Post-	0.001883	0.000000	0.026991	-0.066	4.254456	0.000
WTL	Pre-	0.000779	-0.003	0.027665	0.308685	4.098218	0.000
	Post-	-0.002	0.000000	0.053642	0.112598	7.240552	0.000

Source: Authors' calculations.

We now look at the behavior of the data with respect to normality. In the majority of cases, the Jarque-Berra (JB) statistics show that the returns are not normal. In the post-event period, PIOC and PRL exhibit a normal distribution. All the shares show excess kurtosis; positive excess kurtosis indicates the leptokurtic behavior of returns. Negative skewness prevails in most cases. Financial data usually exhibit nonnormal behavior, which is also evident in this series. The ADF test is applied to check for a unit root (which would indicate that the series is nonstationary and could lead to spurious results). All the returns are, however, stationary at level (see Table 2).

Table 2: Stationary of returns

	Full period		Pre-		Post-	
Firm	**t-statistic**	**Prob.***	**t-statistic**	**Prob.***	**t-statistic**	**Prob.***
ENGRO	-29.4449	0.0000	-20.6093	0.0000	-20.9949	0.0000
FABL	-27.6713	0.0000	-20.5057	0.0000	-18.6759	0.0000
FFBL	-33.0237	0.0000	-24.2463	0.0000	-21.5013	0.0000
FFC	-33.7869	0.0000	-25.3862	0.0000	-21.4462	0.0000
HUB	-30.2433	0.0000	-21.2833	0.0000	-21.3392	0.0000
KESC	-25.0637	0.0000	-17.3946	0.0000	-18.3587	0.0000
LUCKY	-29.1649	0.0000	-21.1245	0.0000	-19.9003	0.0000
MPLF	-29.709	0.0000	-21.2602	0.0000	-20.7242	0.0000
NML	-29.981	0.0000	-22.0648	0.0000	-19.9915	0.0000
PIA	-33.8942	0.0000	-25.7774	0.0000	-23.2023	0.0000
PIOC	-26.6361	0.0000	-19.2042	0.0000	-18.5536	0.0000
PSO	-31.438	0.0000	-21.7735	0.0000	-22.6163	0.0000
PTCL	-32.0945	0.0000	-23.7087	0.0000	-21.765	0.0000
SNGP	-31.9307	0.0000	-22.0872	0.0000	-23.2462	0.0000
SSGP	-26.737	0.0000	-18.8382	0.0000	-18.9401	0.0000
TELE	-28.2739	0.0000	-20.6682	0.0000	-19.4902	0.0000
ABL	-26.8719	0.0000	-18.0994	0.0000	-20.2883	0.0000
NETSOL	-25.5238	0.0000	-18.6514	0.0000	-17.5892	0.0000
FCCL	-25.0909	0.0000	-20.1877	0.0000	-18.7955	0.0000
CSAP	-25.9801	0.0000	-20.1524	0.0000	-17.1362	0.0000
ATRL	-23.5107	0.0000	-18.7351	0.0000	-15.2765	0.0000
PRL	-23.4802	0.0000	-17.4566	0.0000	-15.8312	0.0000
PICT	-26.8719	0.0000	-18.0994	0.0000	-20.2883	0.0000
WTL	-32.3585	0.0000	-22.1253	0.0000	-23.0351	0.0000

Source: Authors' calculations.

To determine the conditional volatility, we apply the ARCH LM test to detect the ARCH effect (Table 3). It is necessary for the series to exhibit an ARCH effect, so that GARCH (1,1) is applied. The data comprises 41 shares over two years with pre- and post-event data on SSF firms from 1 July 2001 to 31 December 2010. Out of the 41 shares, 27

exhibited the ARCH effect but three companies were excluded because of GARCH assumption violations. The final sample consists of 24 shares.

Table 3: Pre-diagnostic ARCH LM test

No.	Name	F-statistic	Prob.
1	ENGRO	28.76	0.00
2	FABL	4.11	0.04
3	FFBL	14.12	0.00
4	FFC	145.90	0.00
5	HUB	88.88	0.00
6	KESC	100.90	0.00
7	LUCKY	35.06	0.00
8	MPLF	27.01	0.00
9	NML	40.61	0.00
10	PIA	25.43	0.00
11	PIOC	9.74	0.00
12	PSO	17.90	0.00
13	PTCL	27.24	0.00
14	SNGP	4.24	0.04
15	SSGP	91.37	0.00
16	TELE	3.33	0.07
17	ABL	5.31	0.02
18	NETSOL	7.17	0.01
19	FCCL	122.85	0.00
20	CSAP	6.20	0.01
21	ATRL	150.87	0.00
22	PRL	66.36	0.00
23	PICT	20.25	0.00
24	WTL	174.51	0.00

Source: Authors' calculations.

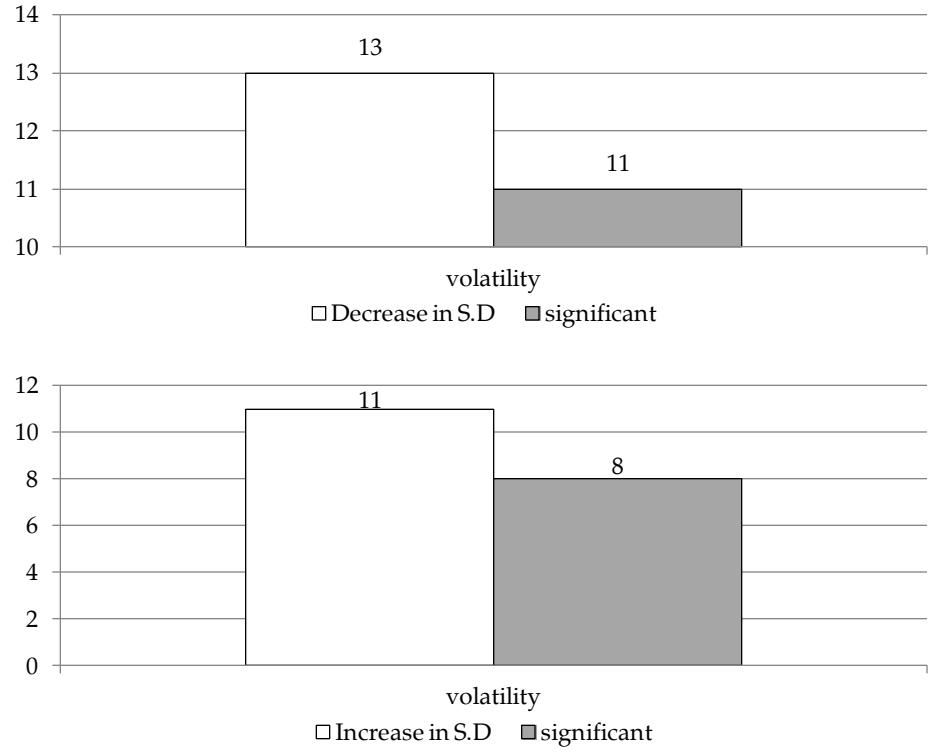
Table 4 gives the results of the F-test, showing differences in variance.

Table 4: F-test for differences in variance

	Change in standard deviation			
Name	**Pre-SSF**	**Post-SSF**	**Change**	**P-value**
ENGRO	0.00090	0.00059	-0.00031	0.0000
FABL	0.00076	0.00085	0.00009	0.1035
FFBL	0.00176	0.00065	-0.00111	0.0000
FFC	0.00078	0.00043	-0.00035	0.0000
HUB	0.00091	0.00074	-0.00017	0.0108
KESC	0.00116	0.00087	-0.00030	0.0005
LUCKY	0.00082	0.00074	-0.00008	0.1333
MPLF	0.00104	0.00076	-0.00028	0.0003
NML	0.00144	0.00111	-0.00033	0.0021
PIA	0.00093	0.00184	0.00090	0.0000
PIOC	0.00107	0.00086	-0.00021	0.0083
PSO	0.00074	0.00072	-0.00003	0.3437
PTCL	0.00052	0.00059	0.00007	0.0853
SNGP	0.00123	0.00089	-0.00034	0.0002
SSGP	0.00066	0.00066	0.00001	0.4610
TELE	0.00091	0.00129	0.00038	0.0001
ABL	0.00094	0.00073	-0.00021	0.0026
NETSOL	0.00096	0.00120	0.00024	0.0059
FCCL	0.00068	0.00170	0.00102	0.0000
CSAP	0.00082	0.00120	0.00039	0.0000
ATRL	0.00093	0.00142	0.00048	0.0000
PRL	0.00072	0.00080	0.00007	0.1394
PICT	0.00094	0.00073	-0.00021	0.0026
WTL	0.00077	0.00288	0.00211	0.0000
	Decrease in SD		**Increase in SD**	
	13		11	
	s	ns	s	ns
	11	2	8	3

Note: s = significant, ns = not significant.
Source: Authors' calculations.

Figure 1: Changes in volatility



6.2. F-test Analysis

The results indicate a greater decrease in volatility after SSF trading, which reflects the stabilizing effect of futures trading. Table 5 shows individual companies' response to futures trading. These are categorized into five different patterns and interpreted. Table 6 summarizes the GARCH (1,1) analysis for our sample.

Table 5: Individual firms' response to SSF trading

	ARCH-GARCH effects	Companies
-	Decrease in ARCH	ENGRO, FFC, SNGP, CSAP, FCCL, NETSOL, ABL
+	Increase in GARCH	
+	Increase in AR root	
	Interpretation	Slower incorporation of news
		Large impact of old news on volatility
		Long period of volatility
+	Increase in ARCH	FABL, HUB, LUCKY, MPLF, PIOC, PSO, PTCL, TELE
-	Decrease in GARCH	
-	Decrease in AR root	
	Interpretation	Faster incorporation of news
		Small impact of old news on volatility
		Short period of volatility
-	Decrease in ARCH	FFBL, KESC, SSGP
+	Increase in GARCH	
-	Decrease in AR root	
	Interpretation	Slower incorporation of news
		Large impact of old news on volatility
		Short period of volatility
+	Increase in ARCH	NML
-	Decrease in GARCH	
+	Increase in AR root	
	Interpretation	
		Faster incorporation of news
		Small impact of old news on volatility
		Long period of volatility
+	Increase in ARCH	PIA, WTL, PICT, PRL, ATRL
+	Increase in GARCH	
+	Increase in AR root	
	Interpretation	Faster incorporation of news
		Large impact of old news on volatility
		Long period of volatility

Source: Authors' calculations.

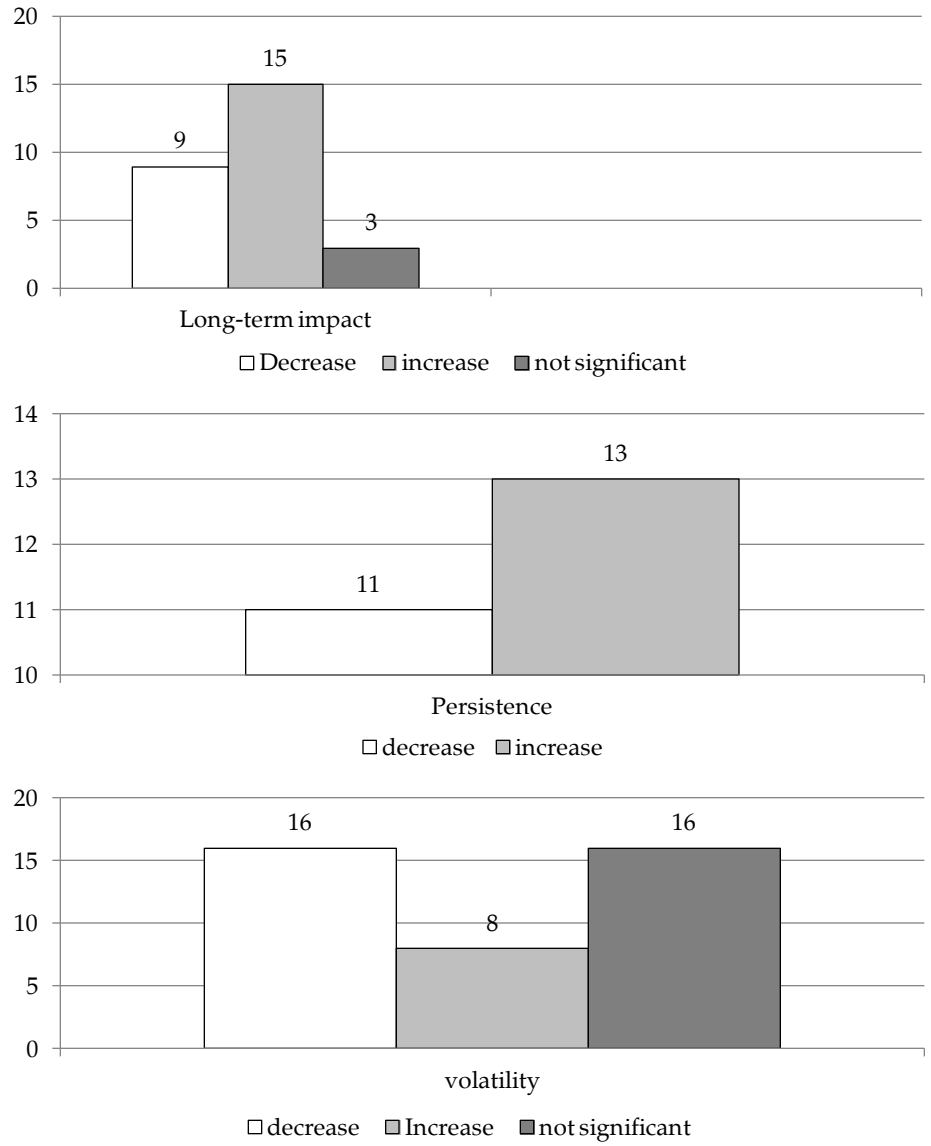
Table 6: Summary of GARCH (1,1) analysis

No.	SSF	DF	ARCH	GARCH	AR root
1	ENGRO	-	-	+	+
2	FABL	-	+	-	-
3	FFBL	-	-	+	-
4	FFC	-	-	+	+
5	HUB	-	+	-	-
6	KESC	-	-	+	-
7	LUCKY	-	+	-	-
8	MPLF	-	+	-	-
9	NML	-	+	-	+
10	PIA	+	+	+	+
11	PIOC	-	+	-	-
12	PSO	+	+	-	-
13	PTCL	+	+	-	-
14	SNGP	-	-	+	+
15	SSGP	-	-	+	-
16	TELE	+	+	-	-
17	WTL	+	+	+	+
18	PICT	-	+	+	+
19	PRL	-	+	+	+
20	ATRL	-	+	+	+
21	CSAP	+	-	+	+
22	FCCL	+	-	+	+
23	NETSOL	+	-	+	+
24	ABL	-	-	+	+

Spot volatility				Dissemination rate				Long-term impact				Persistence of shocks	
Decrease		Increase		Decrease		Increase		Decrease		Increase		Decrease	Increase
16		8		10		14		9		15		11	13
s	ns	s	ns	s	ns	s	ns	s	ns	s	ns		
3	13	5	3	9	1	14	-	8	1	13	2		

Note: s = significant, ns = not significant.
Source: Authors' calculations.

Figure 2: Long-term impact, persistence, and volatility



6.3. GARCH (1,1) Analysis

The majority of firms experienced a statistically significant decrease in volatility, with only five shares showing a statistically significant increase. Fourteen shares showed a significant increase in the rate of news incorporation, compared to nine shares that showed a significant decrease in the dissemination rate. Similarly, there was a significant increase in the

long-term impact of 13 shares with eight showing a decrease in the impact of old news. The increased incorporation of news in prices and the long-term impact of old news led to an increase in persistence of the shock effect for 13 shares. The ARCH LM test is reapplied to check the remaining ARCH effect. We find that, for all the shares, no ARCH effect is left over.

Table 7: Post-diagnostics for ARCH LM test

	Full		Pre-		Post-	
Name	**F-statistic**	**Prob.***	**F-statistic**	**Prob.***	**F-statistic**	**Prob.***
ENGRO	0.28363	0.5945	0.101817	0.7498	0.270438	0.6033
FABL	8.12E-05	0.9928	0.056489	0.8122	0.270438	0.6033
FFBL	0.500265	0.4795	0.714687	0.3983	0.043029	0.8358
FFC	0.011526	0.9145	0.002426	0.9607	0.145052	0.7035
HUB	0.092346	0.7613	0.110351	0.7399	0.132487	0.716
KESC	0.297581	0.5855	0.387924	0.5337	0.005348	0.9417
LUCKY	0.018597	0.8916	0.12658	0.7222	0.069259	0.7925
MPLF	0.038806	0.8439	0.006397	0.9363	0.059263	0.8078
NML	2.27312	0.132	1.121221	0.2902	1.030216	0.3106
PIA	0.825346	0.3638	0.377225	0.5394	0.365154	0.5459
PIOC	0.020692	0.8856	0.011685	0.914	0.16592	0.6839
PSO	0.009179	0.9237	0.068158	0.7941	0.460655	0.4976
PTCL	0.001008	0.9747	0.001533	0.9688	0.002449	0.9605
SNGP	0.60092	0.4384	0.720607	0.3964	0.012194	0.9121
SSGP	0.054115	0.8161	0.073785	0.786	0.029758	0.8631
TELE	0.112181	0.7377	1.17E-05	0.9973	0.051665	0.8203
WTL	0.862318	0.3533	0.116504	0.733	0.742151	0.3894
PICT	0.521795	0.4702	0.498874	0.4803	0.00585	0.9391
PRL	0.006386	0.9363	0.047317	0.8279	1.114346	0.2917
ATRL	0.000899	0.9761	0.088883	0.7657	0.000747	0.9782
CSAP	0.05644	0.8123	0.292578	0.5888	0.025685	0.8727
FCCL	2.606255	0.1068	0.140523	0.7079	10.10767	0.1600
NETSOL	0.008391	0.927	0.076264	0.7825	0.005595	0.9404
ABL	1.904208	0.1679	0.128298	0.7204	1.465631	0.2266

Source: Authors' calculations.

6.4. Discussion

This study has applied traditional measures of volatility (F-test) as well as econometric techniques (GARCH modeling). Both analyses showed

that, in the majority of cases, futures trading had a mixed effect on volatility. One can, therefore, reasonably conclude that SSF trading leads to lower spot market volatility. The results are contrary to the complete markets theory, the diminishing short sales restriction theory, and the improved information environment hypothesis, which state that a decrease in volatility follows derivatives trading.

Our findings are in line with Chau et al. (2005) and Hung et al. (2003). With respect to changes in the structure of volatility, the increased rate of news transmission into share prices is followed by long periods of excessive price movement, leading to an extended period of volatility. Futures trading thus attracts both informed and uninformed traders. The faster incorporation of news in share prices attracts informed traders, while the larger contribution of old news to volatility shows that uninformed traders are attracted to the futures market. The increase in the ARCH and GARCH terms results in the extended period of volatility (persistence of shocks effect).

7. Conclusion and Recommendations

SSFs have a mixed effect with respect to the level of volatility. SSF contracts alter the structure of volatility with an increase in the ARCH term, GARCH term, and autoregressive term. The increase in the ARCH and GARCH terms suggests that SSFs attract both informed and uninformed investors, which leads to an increase in the persistence of shocks effect. Consequently, this study is in line with most existing studies, which also report no effect. The persistency of shocks effect implies that strict regulations are needed with respect to futures trading.

This study could be extended by analyzing the impacts of "good" and "bad" news on volatility post-stock futures trading. Asymmetric models such as T-GARCH and E-GARCH could be applied. A sector-wise analysis could also be conducted to analyze the effect of stock futures on the underlying spot prices of the specific sector.

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Assessing the Impact of Training on Employees' Performance in Commercial Banks in Urban Lahore

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Abstract

Training helps meet specific skill deficits in employees' performance. Successful organizations and managers realize the importance of human resources; trained human resources are key to maintaining a competitive advantage in today's constantly changing global environment. An efficiently implemented training program leads to better employee performance. This study aims to test for important training-related variables that significantly affect the performance of bank employees in urban Lahore. Using earlier studies on training and job performance, we identify key variables and analyze them through a questionnaire-based survey carried out among 75 local consumer bank employees at various managerial levels. It is evident from our findings that a proper needs assessment, the extent of a training program's effectiveness, investment by the host organization, and the provision of training programs all significantly affect employees' job performance. This study provides managers with an insight into important aspects of designing training programs to ensure higher employee productivity.

Keywords: Job performance, training, needs assessment.

JEL classification: M10, M53.

1. Introduction

Commercial banks undertake the business of risk. In recent years, globalization has led to a huge change in the financial sector worldwide. Although developing countries have not yet fully accommodated all the changes in the financial world, they have begun to cater for recent developments in the money and capital markets. Financial liberalization is an important concept in this regard. This study attempts to analyze urban Lahore's foreign and local commercial banks on the basis of their human resource activities, which play an important role in the development of the economy's banking sector.

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Financial institutions today face huge organizational responsibilities in order to cope in a competitive environment, where they must ensure that they sustain their own existence, and maintain and improve the quality of their services over time. The core activities of all financial institutions are the same and they compete largely on the basis of their human resource activities. Pakistan's banking sector has broadened in the past few years with the entry of many new foreign financial institutions, especially after 9/11. Foreign banks have found a number of opportunities in the country, and the inflow of foreign aid has been important in this regard.

This study aims to analyze the key training factors that lead to improved job performance among employees. Job performance can be enhanced by multiple factors including increased levels of pay or by nonmonetary incentives such as advanced education, among others.

Training is the process of providing employees with specific skills or helping them correct deficiencies in their performance. Development, on the other hand, is the effort to provide employees with abilities the organization will need in the future (Reed & Vakola, 2006). They are usually carried out when employees have a skill deficit or when an organization brings about a change in its system and employees are required to learn new skills (Roberson, Culik, & Pepper, 2001). In the banking industry, training programs may be conducted not only to meet skill deficits or to bring about systemic change, they can also be used as an effective tool by the organization to implement new policies issued by higher authorities or by the central bank.

Successful organizations and managers realize the importance of human resources—trained human resources are key to maintaining a competitive advantage (Schonewille, 2001). Such organizations consider employee training an investment rather than an expense. Every organization wants its employees to be up to date and have the best skills, so that their training can keep pace with the organization's changing environment. Consistent quality of product and services is critical to an organization's survival in a competitive environment. It is, therefore, vital for an organization to design cost-effective training programs for its employees from time to time.

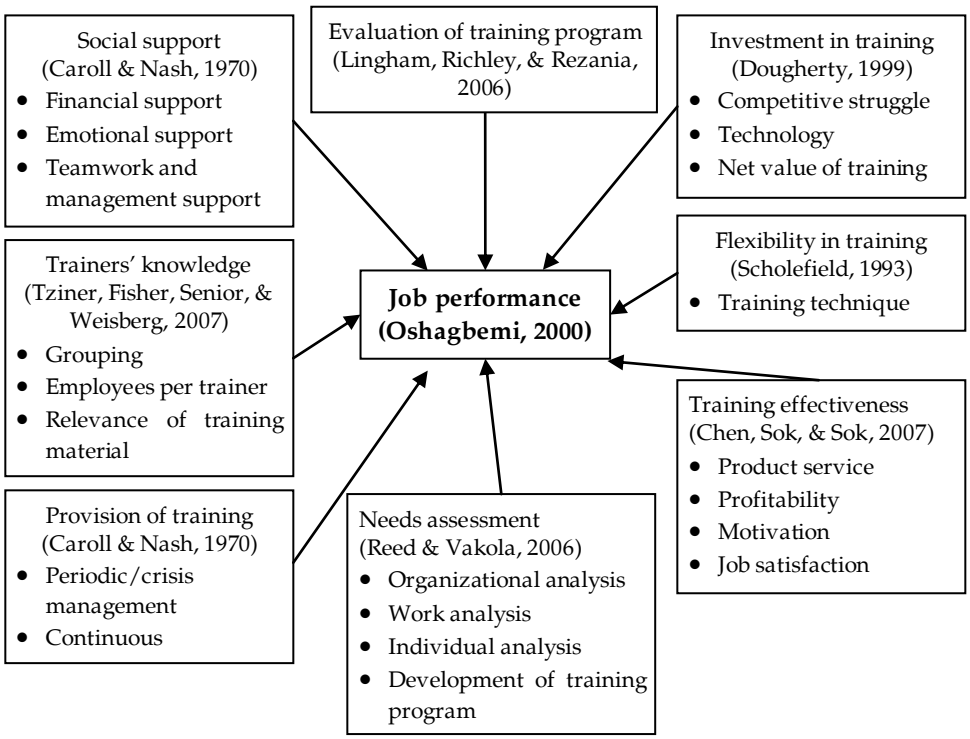
Training and motivation are interlinked concepts (Mann, 1996). Whatever the process adopted, the ultimate aim is to enhance the technical and personal skills of an individual employee while also developing his/her

management skills. The appropriate amount of opportune training and development leads to increased employee productivity, knowledge, and loyalty to the organization (organizational commitment) and contributes to its betterment (Analoui, 1994). An effective needs assessment along with an efficiently launched training program can help refine the organization's objectives, putting it in a better position to analyze its employees' capabilities and direct them accordingly (Tziner, Fisher, Senior, & Weisberg, 2007).

1.1. Theoretical Framework

Figure 1 illustrates factors identified in the literature that contribute to better job performance.

Figure 1: Factors contributing to job performance



1.2. Study Objective

Our objective is to test the proposition that training-related variables—for example, effective needs assessment, training program evaluation, investment in training, educational needs, flexibility in training, provision of training, incentives, social support, transfer of knowledge,

leadership qualities, training opportunity, trainer's knowledge, training effectiveness, know-your-customer policy, negotiation skills, total quality management, behavioral skills, and emotional intelligence—have a significant or insignificant impact on employees' job performance.

2. Review of the Literature

Training is defined as the systematic acquisition of skills, rules, concepts, or attitudes that result in improved job performance (Goldstein, 1993). The closer a training program is to organizational goals, the more effective it is considered. Bozionelos and Lusher (2002), Stevens (1996), Stumpf (1998), and Arnone (1998) define training as the process of creating a design that meets an organization's needs, targets its participants, and provides a feedback system to redesign and adjust further iterations of the program based on organizational and participant perspectives and needs. This is a broader definition since it accounts for the entire training process, specifically the four-phase approach modeled by Lingham, Richley, and Rezania (2006). This includes: (i) designing the training initial program, (ii) launching and evaluating the initial program, (iii) designing quantitative measures based on feedback from Phase II, and (iv) ongoing training and evaluation.

McClelland (1994) argues that content is more important than applicability in any training program, suggesting that training evaluation is the most ignored part of the process. The study identifies budgetary and other constraints that may cause trainers and program designers to employ standardized, commercially available evaluation instruments that have many disadvantages. Among these are that standardized instruments are neither comprehensive nor focused on areas of critical content that would be either necessary or desirable.

Evaluation is related to efficiency, effectiveness, and impact (Rossi & Freeman, 1989). McCoy and Hargie (2001) argue that no one model of evaluation is complete and suited to all situations; each has its strengths and weaknesses. The key aim of evaluating a training program is to analyze the extent to which its objectives match the organization's goals and objectives. Once the program has been evaluated thoroughly, the key factors that contribute to its success or failure can be identified as its positive and negative features. The organization will then able to assess how successful its investment in that program has been, and what else it needs to add to improve it according to the needs of individual employees (Philips, 1996). By gaining organizational satisfaction among individual employees, it will be easier for the organization to retain them.

Pfeffer (2000) shows that training can be a source of competitive advantage in numerous industries. Given that the world market structure is competitive, continuous improvement is imperative for organizations. Training and learning are the key organizational ongoing processes that contribute to growth. White and Mackenzie-Davey (2003) support this argument, and indicate that training has become part of organizational learning and change, employee evaluation, and career development.

Training effectiveness can be analyzed through various factors, including product service, institution profitability, work motivation, work efficiency, individuals' ability and knowledge, smaller wastage of resources, and level of job satisfaction (Drucker, 1995). An effective training program leads to an improvement in the quality of services.

In the current "global environment," with employees being tasked to take on new challenges and responsibilities, it has become increasingly important to train managers as leaders (Black & Gregersen, 2000). At the center of this environment is the need to help individuals learn in order to meet both organizational targets and personal objectives. The implications for the training and development sector has therefore taken on a new significance with over one third of the educational budget in Fortune 500 companies being spent on employee development at the middle and upper levels (Klein, Astrachan, & Kossek, 1996).

An educated and well-trained work force is considered essential to maintaining a business firm's competitive advantage in a global economy. Training can prove a powerful agent in facilitating a firm's expansion and developing its capabilities, thus enhancing profitability (Cosh, Duncan, & Hughes, 1998).

3. Research Methodology

Since this is a primary study, data was collected using a questionnaire designed to ensure high-quality results while minimizing the chances of bias. The survey was conducted at various managerial levels at banks in urban Lahore.

3.1. Sample

Our study population consisted of employees of urban banks in Lahore who had (i) previously undergone a training program and (ii) were familiar with the outcomes of that program. Moreover, of the urban banks considered, we shortlisted those that could be surveyed easily. The areas

under consideration included the Defence Housing Authority, the Lahore Cantonment, Gulberg, and the Upper Mall. The study's reference period is April 2008.

Although the actual sample size was 100, our study is based on data generated from 75 questionnaires. The target sample size could not be achieved due to insufficient time and because the questionnaire was too long, which discouraged most respondents from completing it.

3.2. Hypothesis

We test the following hypotheses:

- Training effectiveness has a significant/insignificant impact on job performance.
- Investment in training has a significant/insignificant impact on job performance.
- Effective needs assessment has a significant/insignificant impact on job performance.
- Provision of training has a significant/insignificant impact on job performance.
- Educational needs have a significant/insignificant impact on job performance.
- Evaluation of training has a significant/insignificant impact on job performance.
- Flexibility of training has a significant/insignificant impact on job performance.
- Incentives have a significant/insignificant impact on job performance.
- A know-your-customer policy has a significant/insignificant impact on job performance.
- Leadership qualities have a significant/insignificant impact on job performance.
- Negotiation skills have a significant/insignificant impact on job performance.
- Social support has a significant/insignificant impact on job performance.
- Total quality management has a significant/insignificant impact on job performance.

- Trainer's knowledge has a significant/insignificant impact on job performance.
- Training opportunity has a significant/insignificant impact on job performance.
- Training effectiveness has a significant/insignificant impact on job performance.
- Transfer of knowledge has a significant/insignificant impact on job performance.

3.3. Data Analysis

The data was analyzed using stat graphics software. Multiple regression models were established based on the data obtained through the questionnaire survey. An initial model was developed using all the independent variables, but many insignificant variables were dropped to obtain a final significant model. All the hypotheses were tested at a 0.05 level of significance. P-values were used to test for the significance of variables.

The general form of the multiple regression equation is:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_n X_n \quad (1)$$

where X_1 is evaluation of training program, X_2 is investment in training, X_3 is flexibility in training, X_4 is provision of training, X_5 is needs assessment, X_6 is training effectiveness, X_7 is social support, and X_8 is trainer's knowledge.

3.4. Theoretical Justification of Variables

A training needs assessment is considered to have a positive relationship with employee job performance. An effective needs assessment followed by the launch and evaluation of a training program is also considered to have a positive relationship with job performance, and implies that the trainer has been able to analyze employees' strengths and weaknesses. Needs assessments are carried out at three levels: (i) organizational, (ii) work, and (iii) individual.

Investment in training is also an important variable—the more a bank invests in its training programs, the better it can train its employees to handle potential problems and policy changes by the central bank. More efficient employee performance will thus enhance the bank's problem solving ability. Investment in training is thus considered to have a positive relationship with job performance.

Training techniques are important components of the training process. Some techniques are considered more effective than others, and generally require an employee's practical participation in a real-life situation rather than theoretical teaching, which may not be as suited to all circumstances.

Provision of training is an important variable—the more chances an employee is given to undertake training programs, the better his/her job performance will be. Training provision is generally of two types: (i) need-based training, which is geared toward crisis management; and (ii) continuous training that goes hand in hand with an employee's normal work routine. Institutions such as banks need to ensure the provision of both types of training since both can be used to enhance employees' skills and efficiency.

Evaluation of the training process is important because it helps the organization assess how far the training matched its needs and whether it has improved its employees' performance and skills. Better, more effective evaluations enable the organization to restructure its policies as required by identifying the program's weaknesses and helping them improve employees' performance more efficiently.

The training process can also be used to enhance employees' educational skills in the short and long term. Our study, however, shows that training caters for short-term educational needs rather than long-term needs. This implies that, while training can help address short-term skill deficiencies, in the long term, employees' education levels need to be improved in order to improve their job performance. The study is used to give a clearer picture of this argument.

Monetary and nonmonetary incentives along with social support from peer groups and supervisors encourage employees to undertake training programs. The training, in turn, helps employees improve their job performance.

Trainers' knowledge is an important factor contributing to employees' job performance. A trainer's choice of the type of grouping is also an important factor. Heterogeneous groups of trainees as opposed to homogeneous groups allow for greater improvement. This depends only on how the trainer perceives the training process, and is expected to have a positive relationship with employees' job performance.

The transfer of knowledge comprises (i) the transfer of knowledge from trainer to trainees, and (ii) from trainees to the workplace. The more effective the transfer process, the better employees' performance will be.

4. Statistical Analyses

4.1. Descriptive Statistics

The fieldwork for this study was conducted in natural settings. Almost 85 percent of the total sample population comprised males. All the bank employees surveyed were aged between 24 to 35 years, and the duration of their work experience varied from one to five years, implying that all the data was collected from the same group of people. An important point to note here is that the information above is based on only 60 percent of the entire sample since almost 40 percent of the respondents were reluctant to provide personal information.

4.2. Tests of Significance of Regression, Parameters, and Regression Equation for Initial Model

The initial model incorporates 15 independent and one dependant variable, i.e., job performance. Based on the data collected, we have developed the model shown in Table 1 below.

Table 1: Multiple regression analysis – initial model

Parameter	Estimate	Standard error	t-statistic	p-value
Constant	-0.14973	1.068610	-0.140120	0.8898
Training effectiveness	0.19800	0.146993	1.346980	0.1911
Evaluation of training	0.00665	0.126097	0.052715	0.9584
Flexibility in training	0.06691	0.167701	0.398999	0.6936
Investment in training	0.10967	0.116683	0.939920	0.3570
Needs assessment	0.24211	0.139524	1.735270	0.0961
Provision of training	0.11529	0.118943	0.969293	0.3425
Social support	-0.14437	0.124032	-1.163940	0.2564
Trainers' knowledge	0.21655	0.157118	1.378290	0.1814

Analysis of variance

Source	Sum of squares	Degrees of freedom	Mean square	F-ratio	p-value
Model	4.91293	8	0.307058	2.96	0.0088
Residual	2.38682	23	0.103775	-	-
Total (corr.)	7.29975	39	-	-	-

R-squared	67.3027 percent
R-squared (adjusted for DF)	44.5567 percent
Standard error of est.	0.322141
Mean absolute error	0.195561
Durbin-Watson statistic	2.502110

Source: Authors' calculations.

The results of this regression were not sufficiently reliable or consistent with our expectations based on the literature review. We therefore developed a final model by running the regressions a second time, but dropping a number of insignificant variables.

4.3. Final Model

All the variables that were insignificant and whose signs were not consistent with our expectations were dropped. The final regression equation is thus as follows:

> Job performance = 0.316977*effectiveness of training + 0.196026*investment in training + 0.287705*needs assessment + 0.22946*provision of training

Table 2: Final model

Parameter	**Estimate**	**Standard error**	**t-statistic**	**p-value**
Training effectiveness	0.316977	0.095599	3.31570*	0.0021
Investment in training	0.196026	0.083303	2.35317*	0.0242
Needs assessment	0.287705	0.094842	3.03351*	0.0045
Provision of training	0.229460	0.078897	2.90835*	0.0062
Analysis of variance				
Source	**Sum of squares**	**Degrees of freedom**	**Mean square**	**F-ratio**	**p-value**
Model	700.002	4	175	1,708.2	0.0000
Residual	3.68808	36	0.102477	-	-
Total (corr.)	703.390	40	-	-	-

R-squared	99.4759 percent
R-squared (adjusted for DF)	99.4322 percent
Standard error of est.	0.320073
Mean absolute error	0.240137
Durbin-Watson statistic	2.243710

Source: Authors' calculations.

The model's p-value as shown in the analysis of variance is 0.0000, i.e., less than 0.01, which implies that a statistically significant relationship exists for the variables under consideration at a 99 percent confidence interval. If we analyze the individual p-values of all the variables included in the model, we find that they are all significant since their p-values are less than 0.01, except for that of investment in training, which is greater than 0.01 but less than 0.05, which still makes it statistically significant. A p-value of 0.024 is not so large that it should allow us to ignore as important a variable as investment in training, which is of great significance in the banking sector.

The R-squared statistic indicates that the fitted model explains almost 99.5 percent of the variability in job performance. All the other variables were dropped because they appeared to be insignificant in this study, probably because of the sample size.

The signs and magnitudes of the variables given above are in line with the expected results. Training effectiveness has a significant impact on employees' job performance. It has a positive relationship with the job performance variable, implying that the more effective a training program and the more consistently a trainer succeeds in training an organization's employees, the better their job performance will be.

Investment in training is also an important variable as evident from our findings. The more banks invest in their training programs, the better they can train their employees to handle potential problems and policy changes. The more efficient the performance of their employees, the better the banks' problem solving abilities will be. This justifies the positive significant relationship between investment in training and employees' job performance.

Training needs assessment was expected to have a positive relationship with employees' job performance. An effective needs assessment followed by the launch and evaluation of a training program

enhances job performance, and implies that the trainer has been able to analyze employees' strengths and weaknesses. Our results are as expected, as evident from the final model.

Provision of training also has a significant positive relationship with job performance, implying that managers can only expect better performance from their employees if they are willing to provide the latter with the necessary skills through training programs.

5. Conclusion

As we have shown, training addresses specific skill deficits in the performance of employees. Successful organizations that wish to maintain a competitive advantage in the global environment employ training as a tool to keep pace with the changing organizational environment. The efficient implementation of training programs leads to better employee performance.

This study has tested the significance of training-related variables that affect the performance of bank employees in urban Lahore. Using earlier studies on training and job performance, we have identified a number of key variables that were further analyzed through a questionnaire survey carried out among 75 local consumer bank employees at various managerial levels. We developed two competing econometric models of job performance—using alternative specifications of variables and econometric approaches— and consolidated these to determine the relative strengths of the independent variables.

The initial model included variables such as effective needs assessment, evaluation of training program, investment in training, flexibility in training, provision of training, social support, transfer of knowledge, leadership qualities, trainer's knowledge, and training effectiveness. Our findings based on the final model showed, however, that proper needs assessment, effectiveness of training program, investment in training, and provision of training all significantly affect employees' job performance. The study's results provide managers an insight into important aspects of designing training programs to ensure an increase in the productivity of employees.

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The Impact of Dividend Policy on the Relationship Between Institutional Ownership and Stock Price Volatility: Evidence from Pakistan

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Abstract

This study aims to determine the effects of dividend policy on the relationship between institutional ownership and stock price volatility, based on a sample of 36 firms listed on the Karachi Stock Exchange over a seven-year period (2005–11). We use a fixed-effects model applied to panel data to investigate this relationship and find that institutional ownership has a negative relation with stock price volatility and a positive relation with the dividend payout ratio. The results also show that dividend payouts significantly affect the relationship between institutional ownership and stock price volatility. The mediating role of dividend policy between institutional ownership and stock price volatility reveals that institutional investors prefer to invest in low-volatility dividend-paying stock.

Keywords: Dividend policy, institutional ownership, stock price volatility, Pakistan.

JEL classification: G30, G35.

1. Introduction

As active investors, institutions spend a huge amount on equity trading in the hopes that active investment will prove profitable (French, 2008). The most important question in corporate finance is whether a change in institutional ownership will affect stock returns. Institutional owners, having better information, will reduce the stock volatility, but a number of studies show a positive relation between the two.

Chen and Hong (2006) show that institutional owners are more well-informed investors than other equity traders. If institutional investors incorporate the information they have into stock trading, they are likely to be in a position to affect stock prices (El-Gazzar, 1998; Loderer, Cooney, & van Drunen, 2012). Similarly, if they buy a particular security, they will

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likely create an upward movement in the supply curve and thus affect the stock return (Sias, Starks, & Titman, 2006).

Dividend policy plays a prominent role in determining the direction of the relationship between institutional ownership and stock price volatility. Institutional ownership is negatively related to stocks on which no dividend is paid and positively to stocks on which a dividend is paid (Rubin & Smith, 2009). Institutional investors make investments on behalf of other investors; under the institutional preference hypothesis, they prefer to invest in nondividend-paying stock, which is characterized by low price volatility. However, Grinstein and Michaely (2005) find that institutional investors do invest in dividend-paying stock. The institutional turnover hypothesis also shows that institutional owners rotate their stock portfolios more regularly than others, which increases stock volatility (Karpoff, Malatesta, & Walkling, 1996).

The central objective of a dividend policy is to maximize shareholders' wealth (Arnold, 2008). According to the agency theory, agency cost is reduced by the payment of dividends, which encourages managers to pay more dividends rather than investing in less profitable projects. The literature also finds that institutional owners maintain close relations with managers to keep themselves apprised of firms' prospects, which results in less stock variance (Jensen & Meckling, 1976); Easterbrook, 1984; Ryan & Schneider, 2002).

Pakistan is an emerging country with high-risk and high-return stock markets where investors look for greater market premiums (Nishat, 1999). Insider trading by brokers makes stock prices more volatile (Khwaja & Mian, 2005) while government reforms in the 1990s opened up local markets to foreign investors, leading to increased stock volatility. The reforms pertaining to dividend policy included the following: shifting from cash dividends to stock dividends, tax exceptions for right/bonus shares, and tax seals on cash dividends. Studies on Pakistan have focused on the relationship between dividend policy and stock price volatility (see, for example, Nazir, Nawaz, Anwar, & Ahmed, 2010; Nishat & Bilgrami, 1994; Nishat & Irfan, 2001; Rashid & Rehman, 2008). However, no study investigates the impact of institutional ownership on stock price volatility.

This study focuses on the relation between institutional investors and stock price volatility by looking at the mediating impact of dividend policy. Its main objectives are:

- To determine the impact of institutional ownership on dividend policy in Pakistan
- To assess the impact of institutional ownership on stock price volatility in Pakistan
- To investigate the impact of dividend policy on the relationship between institutional ownership and stock price volatility in Pakistan

To our knowledge, this is the first study on Pakistan that provides empirical evidence for the impact of institutional ownership on stock price volatility. Its findings could, therefore, prove useful to researchers, individual investors, and institutional investors.

2. Literature Review

Almost all existing studies on this topic have established the significant and positive link between institutional investors and variations in stock prices (see, for example, Dennis & Strickland, 2002; Sias, 1996; Xu & Malkiel, 2004). Institutional portfolio earnings are normally greater than individual portfolio earnings, and stock return volatility therefore increases with an increase in the level of institutional owners (Karpoff, 1987; Rubin, 2007). However, Rubin and Smith (2009) argue that the association between institutional investors and variations in stock prices depends significantly on firms' dividend payments. They establish a constructive association for dividend-paying stocks and an unconstructive one for stocks on which no dividend is paid.

West (1988) notes that having more price information decreases stock price instability. Since institutional owners are more knowledgeable than individual owners (see Bartov, Radhakrishnan, & Krinsky, 2000; Alangar, Bathala, & Rao, 1999; Szewczyk & Tsetsekos, 1992), they are likely to make fewer errors in evaluating their information (Sias, 1996). Nondividend firms are subject to less variation in stock prices, given the strong relation between information and institutional owners (Khang & King, 2006; Li, Ortiz-Molina, & Zhao, 2008).

Managers and optimistic traders may decide to concentrate first and foremost on information that yields returns in the short term rather than the long term (De Long & Shleifer, 1991; Froot & Obstfeld, 1992). Dividend announcements are trustworthy, voluntarily observable, and short-term, i.e., announced quarterly. Investors need not wait long for these announcements to translate into stock prices (Lakonishok, Shleifer, & Vishny, 1992), in turn, directing institutions to pursue and trade on them.

In addition, managers who are concerned about their professional reputation (see Scharfstein & Stein, 1990; Shiller, Fischer, & Friedman, 1984) are likely to follow information that may be unfairly interpreted. Moreover, dividend-paying firms are likely to have fewer information irregularities than nondividend payers (Khang & King, 2006; Li et al., 2008). These concerns make institutions trade in a similar way on receiving news concerning dividend-paying firms.

Although many researchers have explored the relationship between dividend policy and the instability of share prices (see Allen & Rachim, 1996; Hussainey, Oscar Mgbame, & Chijoke-Mgbame, 2011; Nazir et al., 2010; Asghar, Shah, Hamid, & Suleman, 2011), their conclusions are not necessarily consistent. Baskin (1989) establishes a considerably negative relationship between dividend yield and stock price instability (see also Hussainey et al., 2011).

In view of their fiduciary obligations, institutional investors may be restricted from selecting unstable stocks (Sias, 1996; Bohl & Brzeszczynski, 2006). Their accountability as fund managers, their constant requirement for liquidity, and the stress of meeting their clients' interests may discourage them from investing in riskier stocks. Arbel, Carvell, and Strebel (1983) note that an increase in institutional trading decreases stock instability rather than increasing it. Yang (2002) finds that foreign institutional investor trading stabilizes market prices in Taiwan, while Bohl and Brzeszczynski (2006) establish a similar relationship for Poland.

Numerous studies show that institutional investors' individual dealings have a direct effect on prices. For instance, Keim and Madhavan (1997) assess the trades for 21 organizations over 26 months and find that institutional investors generally purchase stocks at a 0.31 percent premium and sell them at a 0.34 percent discount relative to the preceding day's close. Chan and Lakonishok (1995) assess the trades of 37 investment managers over 18 months and show that their individual trades have both temporary as well as longer effects. If, as the model of trades in these studies suggests, the trades of individual institutional investors have a certain price effect, collective institutional trading will also have a subsequent price effect, that is, it will mirror the increasing effect of the individual institutional investors' trades.

On the other hand, under economies of scale, institutional investors are expected to be more well-informed than other traders. If trading by institutional investors discloses information, then institutional trading will

influence prices (Easley & O'Hara, 1987; Kyle, 1995). A number of empirical tests propose that the information exposed during trading is mainly accountable for stock price changes (see Scholes, 1972; French & Roll, 1986; Barclay, Litzenberger, & Warner, 1990). If the information that arises in the course of trading is the most important cause of stock price changes, and institutional investors are more likely to be informed than individual investors, collective institutional trading will, subsequently, have return effects.

The literature reviewed above indicates the knowledge gap on stock price volatility in Pakistan, especially with regard to empirical evidence on the relationship between institutional ownership and stock price volatility. This study is the first of its type to look at the impact of institutional ownership on stock price volatility based on the mediating effect of dividend policy.

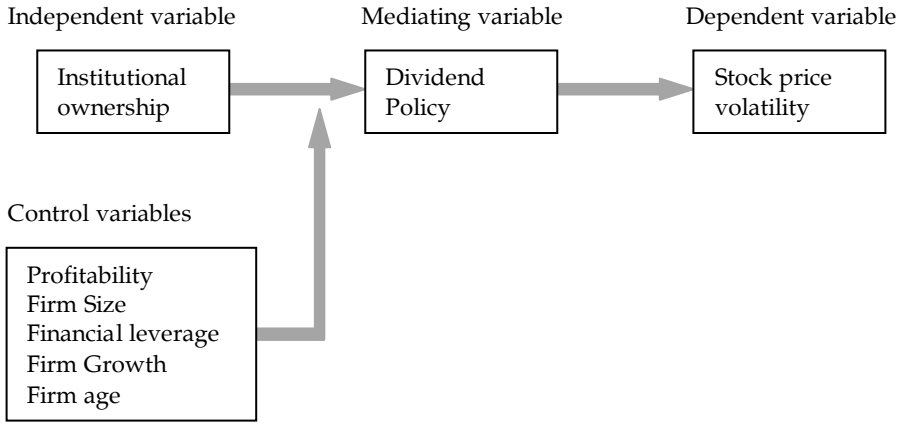
3. Framework and Methodology

This section describes the conceptual framework used, the variables employed, and the methodology applied.

3.1. Conceptual Framework

Based on the literature survey above, we develop the following conceptual model (Figure 1).

Figure 1: Schematic model for conceptual framework



3.2. Variables

We take stock price volatility as the dependent variable; risk is used as a proxy for stock price volatility and is measured as the standard deviation of the daily return on a stock for a given year (see Azzam, 2010; Bennett, Sias, & Starks, 2003; Ferreira & Matos, 2008; Gompers, Ishii, & Metrick, 2003). Dividend policy is the mediating variable, where the dividend payout ratio (dividend per share/earnings per share) is used as a proxy for dividend policy (see Azzam, 2010; Nazir et al., 2010). Institutional ownership is the independent variable, where we consider institutional owners to be those with a share of 5 percent or more (see Azzam, 2010; Demsetz & Villalonga, 2001).

Many other factors affect stock price volatility, including profitability (Azzam, 2010; Rubin & Smith, 2009), firm size (Azzam, 2010; Nazir et al., 2010), firm age (Pastor & Veronesi, 2003), financial leverage (Azzam, 2010; Nazir et al., 2010; Pastor & Veronesi, 2003), and firm growth (Azzam, 2010; Pastor & Veronesi, 2003; Rubin & Smith, 2009). These are taken as control variables in this study. Table 1 summarizes the variables above and their expected interrelationship.

Table 1: Summary of variables

Variable	Abbreviation	Definition/calculation	
Dependent variables			
Stock price volatility	Vlt	Standard deviation of the daily return on a stock for a given year	
Mediating variable			
Dividend payout ratio	DPO	Dividend per share/earnings per share	-
Independent variable			
Institutional ownership	Inst	5% of shares or more	-
Control variables			
Return on assets	ROA	Net profit/total assets	-
Firm size	Size	Log of total assets	-
Financial leverage	FL	Total liabilities/shareholders' equity	+
Growth	M/B	Market price per share/book value per share	+
Firm age	Age	Age of firm in 2011	-

3.3. Study Hypotheses

We base this study on the following hypotheses:

- H1: Institutional ownership has a significant impact on stock price volatility.
- H2: Institutional ownership has a significant impact on dividend policy.
- H3: Dividend policy has a significant impact on stock price volatility.
- H3: Dividend policy has a significant impact on the relationship between institutional ownership and stock price volatility.

3.4. Methodology

This study is a time-series cross-sectional study (see Baltagi, 2009; Wooldridge, 2001) that aims to determine the impact of institutional ownership on stock price volatility, given the mediating effect of dividend policy. Our sample is drawn from firms listed on the Karachi Stock Exchange with the assumption that listed firms present their profits to stakeholders to make their shares more attractive (Lazaridis & Tryfonidis, 2006). The sample has been drawn on the basis of the following criteria:

- The sample firms must have 5 percent or more institutional owners.
- The firms must be profitable firms in the period covered by the study.
- The firms must have paid dividends in the period covered by the study.

The study covers a period of 10 years from 2003 to 2012. The final sample comprises 400 firm-year observations for 40 firms.

We have used SPSS (20.0) for analysis purposes and described the data with the help of Durrheim (2002). Correlation analysis is used to determine the degree of association among the different variables (see Bailey, 2007). A fixed-effects model is used to determine the intercept differences of the sample companies. The model assumes that the explanatory variables are related to each firm's own effect. The variable η_i is taken as the dummy variable to determine the particular effect of each firm, and λ_t is used as a dummy variable for time, which remains constant across firms but varies over time (see Park, 2005).

The following models are used for regression analysis:

$$Vlt = \beta_0 + \beta_1 Inst_i + \beta_2 Size_i + \beta_3 Levrg_i + \beta_4 ROA_i + \beta_5 Age_i + \beta_6 M/B_i + \eta_i + \lambda_i + \varepsilon_{it} \quad (1)$$

$$DPO = \beta_0 + \beta_1 Inst_i + \beta_2 Size_i + \beta_3 Levrg_i + \beta_4 ROA_i + \beta_5 Age_i + \beta_6 M/B_i + \eta_i + \lambda_i + \varepsilon_{it} \quad (2)$$

$$Vlt = \beta_0 + \beta_1 DPO_i + \beta_2 Size_i + \beta_3 Levrg_i + \beta_4 ROA_i + \beta_5 Age_i + \beta_6 M/B_i + \eta_i + \lambda_i + \varepsilon_{it} \quad (3)$$

$$Vlt = \beta_0 + \beta_1 DPO_i + \beta_2 Inst_i + \beta_3 Size_i + \beta_4 Levrg_i + \beta_5 ROA_i + \beta_6 Age_i + \beta_7 M/B_i + \eta_i + \lambda_i + \varepsilon_{it} \quad (4)$$

4. Results and Discussion

4.1. Descriptive Statistics

Table 2 gives the mean values, range, and standard deviations of the different variables. Stock price volatility for the sample firms has a mean of 0.648 with a standard deviation of 0.346. The dividend payouts variable has a mean value of 37.1 percent and a standard deviation of 21.3 percent. The institutional owners variable has a mean percentage share of 38.1 percent.

Table 2: Descriptive statistics

Variable	Range	Mean	Std. deviation
Vit	1.166	0.648	0.246
DPO	3.543	0.371	0.476
Inst	0.743	0.381	0.213
ROA	0.730	0.214	0.229
Size	1.940	0.337	0.399
FL	1.120	0.523	0.229
M/B	43.460	2.771	3.678
Age	32.000	13.602	12.432

Source: Author's calculations.

As a proxy for profitability, return on assets has a mean of 21.4 percent with a standard deviation of 22.9 percent. The size of the firm is measured by the log of total assets, i.e., the value of firm size is 0.337. Financial leverage, measured by total liability/total assets, has a mean value of 52.3 percent with a standard deviation of 23.1 percent. The market-to-book value is used as a proxy for growth and has a mean value of 2.771. The mean age of the firm up to 2011 is 13.602 years with a standard deviation of 2.432.

4.2. Correlation Results

The correlation results for the different variables are given in Table 3. The correlation between the dividend payout ratio and stock price volatility is -0.053 (p <= 0.01), showing that dividend payments decrease with stock price volatility in Pakistan. The results also show that institutional ownership has a correlation coefficient of -0.160 (p <= 0.05) with stock price volatility. This negative relationship implies that firms with greater institutional ownership have low stock price volatility.

The correlation between stock price volatility and return on assets is also negative and significant, showing that firm profits decrease with stock price volatility. The correlation between financial leverage and stock price volatility is 0.129 (p <= 0.05), implying that firms with high liabilities face greater stock price volatility. Firm age has a negative correlation coefficient of -0.012 (p <= 0.05) with dividend policy. Firm size and market-to-book value have no significant relationship with stock price volatility.

The correlation between institutional ownership and the dividend payout ratio is 0.143 (p <= 0.05), implying that firms with a greater share of institutional ownership pay higher dividends. Return on assets has a coefficient of 0.211 (p <= 0.05) with the dividend payout ratio, showing that firms with greater profitability pay higher dividends. The correlation between financial leverage and the dividend payout ratio is -0.191 (p <= 0.01), indicating that firms with a high debt burden pay low or no dividends. Firm age has a positive correlation with the dividend payout ratio, implying that mature firms pay more dividends than newly established ones. Firm size and the market-to-book value have no significant relationship with the dividend payout ratio.

Table 3: Correlation results

Var.	Vlt	DPO	Inst	ROA	Size	FL	M/B	Age
Vlt	1.000							
DPO	-0.053**	1.000						
Inst	-0.160*	0.143*	1.000					
ROA	-0.311*	0.211*	0.115**	1.000				
Size	0.011	0.130	-0.112	-0.075*	1.000			
FL	0.129*	-0.191**	-0.022**	-0.222**	0.051**	1.000		
M/B	0.132	0.194	0.024**	0.0655*	0.011**	-0.014*	1.000	
Age	-0.012*	-0.016	0.011	0.024	0.132	-0.122	0.145**	1.000

Note: ** = significant at 1%, * = significant at 5%.
Source: Author's calculations.

4.3. Regression Results

4.3.1. Relationship Between Institutional Ownership and Stock Price Volatility

Model 1 in Table 4 shows the impact of institutional ownership on stock price volatility. Institutional ownership has a beta estimate of -0.433 with t = -4.211 and a p-value of 0.002. This shows that institutional ownership has a negative impact on stock price volatility. Pastor and Veronesi (2003), Lin et al. (2008), and Rubin and Smith (2009), among others, also find a negative relationship between stock institutional ownership and stock price.

The reason for this negative relationship is that many firms in Pakistan are small and depend heavily on institutional investors for financing. Since institutional investors commonly have more information on the business environment, they carry out more informed trading, leading to more informative, and thus more stable, stock prices (West, 1988). The prudent-man rule also prevents institutional owners from investing in risky or more volatile stock (Oak & Dalbor, 2008).

Return on assets (coefficient = -0.012; t = -2.161, p-value = 0.041) has a significantly negative impact on stock volatility. Rubin and Smith (2009) and Azzam (2010) also find a negative relation between profitability and stock price volatility, implying that highly profitable firms face lower stock price volatility due to low uncertainty in their business operations. Financial leverage (coefficient = 0.216, t = 5.072, p-value = 0.000) has a significantly positive relationship with stock price volatility. Pastor and Veronesi (2003) and Azzam (2010) also report a positive relationship between financial leverage and stock price volatility. Greater firm liabilities decrease the profit margin and thus create uncertainty about the firm, which results in stock price volatility.

Table 4: Model 1 estimates: Dependent variable = Vlt

Variable	Estimates	t	Sig.
Inst	-0.433***	-4.211	0.002
DPO			
ROA	-0.012**	-2.161	0.041
FL	0.216***	5.072	0.000
Size	-0.009***	-3.570	0.006
M/B	-0.334	0.145	0.488
Age	-0.231**	-3.046	0.019
R sq.	0.311		
F-stat	6.863		
F sig.	0.000		

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%.
Source: Author's calculations.

Firm size has a negative relationship with stock volatility (coefficient = -0.009, t = -3.570, p-value = 0.006). This result is consistent with Sias (1996) and Azzam (2010), showing that large firms in Pakistan face less price volatility. The market-to-book value has a positive and significant impact on stock price volatility (coefficient = 0.334; t = 2.145, p-value = 0.028). This positive relation indicates that growing firms face high stock price volatility due to high risk (Pastor & Veronesi, 2003; Rubin & Smith, 2009). Firm age (coefficient = -0.231, t = -3.046, p-value = 0.019) has a negative and significant impact on stock volatility. Pastor and Veronesi (2003) also find a negative relation between the age of the firm and stock price volatility. Younger firms face greater uncertainty and are thus subject to more volatile stock prices as against mature firms, which face less stock price volatility due to lower uncertainty in their business operations.

4.3.2. Relationship Between Institutional Ownership and Dividend Policy

Model 2 in Table 5 shows the impact of institutional ownership on the dividend payout ratio. Institutional ownership has a beta estimate of 0.573 with t = 3.254 and a p-value of 0.003. This shows that institutional ownership has a positive and significant effect on dividend policy. A number of studies report finding a positive relationship between institutional ownership and dividend policy (see Dhaliwal, Erickson, & Trezevant, 1999; Allen, Bernardo, & Welch, 2000; Short, Zhang, & Keasey, 2002; Mirza & Afza, 2010; Afza & Mirza, 2011). Institutional owners use dividend payments as a means of monitoring managers by forcing them to

distribute the free cash flow in the form of dividends if there is no profitable investment opportunity, thus reducing any agency cost. Furthermore, since many Pakistani firms are small, they do not have access to the capital market and have to attract institutional investors by paying high dividends (Mirza & Afza, 2010).

Table 5: Model 2 estimates: Dependent variable = DPO

Variable	Estimates	t	Sig.
Inst	0.573***	3.254	0.003
DPO			
ROA	0.025**	2.566	0.016
FL	-0.332***	4.623	0.000
Size	0.015	0.252	0.443
M/B	-0.211**	-2.061	0.029
Age	0.119**	2.402	0.021
R sq.	0.255		
F-stat	5.172		
F sig.	0.000		

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%.
Source: Author's calculations.

Return on assets (coefficient = 0.025, t = 2.566, p-value = 0.016) has a significant and positive impact on dividend policy, showing that high-profit firms in Pakistan pay higher dividends (Ahmad & Javid, 2009; Afza & Mirza, 2011). Financial leverage (coefficient = -0.332, t = 4.623, p-value = 0.000) has a significant and negative relationship with dividend policy. Aivazian, Booth, and Cleary (2003) and Afza and Mirza (2011) also report a negative relationship between financial leverage and the dividend payout ratio. This negative relationship shows that firms with a high debt percentage pay low or no cash dividends in Pakistan.

Firm size has an insignificant relationship with the dividend payout ratio (coefficient = 0.015, t = 0.252, p-value = 0.443). This result is in line with Afza and Mirza (2011) who also find a negative relationship between firm size and dividend payouts. This implies that firms' size has no effect on their dividend behavior in Pakistan. The market-to-book value has a negative and significant impact on dividend policy (coefficient = -0.211, t = 2.061, p-value = 0.029), showing that growing firms pay no dividends because they use their cash reserves for further investment (see Ahmad & Javid, 2009). Firm age (coefficient = 0.119, t = 2.402, p-value = 0.021) has a

positive and significant impact on dividend policy, implying that mature firms have excess cash reserves and thus can pay higher dividends to keep their market price stable.

4.3.3. Relationship Between Dividend Policy and Stock Price Volatility

Model 3 in Table 6 shows the impact of the dividend payout ratio on stock price volatility. The dividend payout ratio has a beta estimate of -0.093 with t = -3.262 and a p-value of 0.007, implying that it has a negative impact on stock price volatility. This negative relationship shows that Pakistani firms that pay dividends present a positive picture of their firm's performance, thus reducing the uncertainty of their stock prices. Baskin (1989), Allen and Rachim (1996), Nazir et al. (2010), and Hussainey et al. (2011) also find a negative relationship between dividend payouts and stock price volatility, contrary to Asghar et al. (2011), who find a positive relation between dividend payouts and stock price volatility in Pakistan.

Table 6: Model 3 estimates: Dependent variable: Vlt

Variable	Estimates	t	Sig.
Inst			
DPO	-0.093***	-3.262	0.007
ROA	-0.033**	-2.561	0.023
FL	0.254**	2.314	0.029
Size	-0.010**	-3.002	0.011
M/B	-0.114	-0.262	0.413
Age	-0.201***	-3.971	0.000
R sq.	0.269		
F-stat	6.143		
F sig.	0.000		

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%.
Source: Author's calculations.

Return on assets (coefficient = -0.033, t = -2.561, p-value = 0.023) has a significantly negative impact on stock volatility, consistent with Rubin and Smith (2009) and Azzam (2010). Financial leverage (coefficient = 0.254, t = 2.314, p-value = 0.029) has a significantly positive relationship with stock price volatility, in line with Pastor and Veronesi (2003) and Azzam (2010).

Firm size has a negative relationship with stock volatility (coefficient = -0.010, t = -3.002, p-value = 0.011), consistent with Sias (1996)

and Azzam (2010). The market-to-book value has an insignificant impact on stock price volatility (coefficient = 0.114, *t* = 2.262, p-value = 0.023). This positive result is in line with Pastor and Veronesi (2003) and Rubin and Smith (2009). Firm age (coefficient = -0.201, *t* = -3.971, p-value = 0.000) has a negative and significant impact on stock volatility, consistent with Pastor and Veronesi (2003).

4.3.4. Effect of Dividend Policy on Relationship Between Institutional Ownership and Stock Price Volatility

Model 4 in Table 7 shows the mediating role of dividend policy in the relationship between institutional ownership and stock price volatility. The dividend payout ratio has a beta estimate of -0.085 with *t* = -2.970 and a p-value of 0.009. This shows that dividend payouts have a negative impact on stock price volatility. Institutional ownership also has a negative and significant effect on stock price volatility, but the beta estimate of -0.433 with *t* = -4.211 and a p-value of 0.002 in model 1 decreases to a beta estimate of -0.234 with *t* = -2.017 and a p-value of 0.043. This shows that dividend policy partially mediates the relationship between institutional ownership and stock price volatility.

Table 7: Model 4 estimates: Dependent variable = Vlt

Variable	Estimates	t	Sig.
Inst	-0.234**	-2.017	0.043
DPO	-0.085***	-2.970	0.009
ROA	-0.017**	1.963	0.050
FL	0.154**	2.001	0.044
Size	-0.003**	-2.555	0.018
M/B	0.006	-0.153	0.132
Age	-0.114*	-1.179	0.087
R sq.	0.117		
F-stat	4.255		
F sig.	0.000		

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%.
Source: Author's calculations.

Return on assets (coefficient = -0.017, *t* = -1.963, p-value = 0.050) has a significantly negative impact on stock volatility. Financial leverage (coefficient = 0.154, *t* = 2.001, p-value = 0.044) has a significantly positive relationship with stock price volatility. Firm size has a negative

relationship with stock volatility (coefficient = -0.003, t = -2.555, p-value = 0.018). The market-to-book value has an insignificant relationship with stock price volatility (coefficient = 0.006, t = -0.153, p-value = 0.132). Firm age (coefficient = -0.114, t = -1.179, p-value = 0.087) has a negative impact on stock volatility. The significance level of all these control variables has decreased from that found in model 1.

Rubin and Smith (2009) and Azzam (2010) also report that dividend policy significantly affects the relationship between institutional ownership and stock price volatility. Rubin and Smith find a positive relationship between the two; Azzam, however, reports a negative relationship between institutional ownership and stock price volatility for dividend-paying stock. Our results also show a negative relationship between institutional ownership and stock price volatility for dividend-paying stock in Pakistan.

These findings are contrary to the institutional preference theory, which holds that institutional owners prefer to invest nondividend-paying firms with low price volatility. We find that institutional owners prefer to invest in dividend-paying stocks with stabilized prices. West (1988) and Pastor and Veronesi (2003) also show that nondividend firms face more stock price volatility. Our results indicate that institutional owners compel firms to make dividend payments; this signals better performance, which, in turn, stabilizes firms' stock prices.

5. Conclusion

This study has attempted to determine the effect of dividend policy on the relationship between institutional ownership and stock price volatility, using a sample of 104 nonfinancial firms listed on the Karachi Stock Exchange over a period of seven years (2005-2011). The effect of dividend policy on the relationship between institutional ownership and stock price volatility was investigated through panel data regression using a fixed-effects model. Stock price volatility was taken as the dependent variable, institutional ownership as the independent variable, dividend payouts as the mediating variable, and return on assets, firm size, financial leverage, firm growth, and firm age as control variables.

Our first hypothesis concerned the relationship between institutional ownership and stock price volatility. The results showed that institutional ownership has a negative and significant impact on stock price volatility, implying that institutional owners avoid investing in volatile

stock. Furthermore, institutional owners in Pakistan are market makers and more informed traders, and thus help stabilize stock prices.

The second hypothesis deals with the relationship between institutional ownership and dividend policy. The results revealed that institutional owners have a positive and significant relationship with dividend policy: since many Pakistani firms are small, they attract big investors by paying dividends.

The third hypothesis pertains to the relationship between dividend policy and stock price volatility. The results showed that dividend policy has a negative and significant impact on stock price volatility, showing that dividend payments reduce the uncertainty in stock prices. Finally, the fourth hypothesis deals with the effect of dividend policy on the relationship between institutional ownership and stock price volatility. Our results provide significant support for this hypothesis: the mediating role of dividend policy between institutional ownership and stock price volatility reveals that institutional investors prefer to invest in low-volatility dividend-paying stock.

Practically, these results suggest that firms can use dividend policy as a tool for reducing stock price volatility. Furthermore, regulators of the stock market must take into consideration the important role of institutional ownership in the market environment and stability. This study is limited to nonfinancial firms in Pakistan, but could be expanded to financial firms as an avenue for further research.

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A Note on the Information Content of Corporate Dividend Policy

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1. Introduction

This note discusses the significance of the information content of dividends, which is reflected through the market price reactions to a firm's dividend decisions. Informational asymmetries are the main reason for signaling whereby firm managers are likely to have better information than external participants, implying that their financial decisions will tend to convey the firm's future prospects to the market. An efficient signaling equilibrium is that optimal combination of signaling costs and agency costs that minimizes any dissipative costs. An important consideration is the preference of the investor for dividend income versus capital gains due to the higher tax differential in the case of dividends.

There are two major types of asymmetric information: adverse selection and moral hazard. In adverse selection, the managers of a company have more information on hand relating to the firm's future prospects and current situation than outsiders or external investors. This may lead them to exploit their advantage at the cost of others. For example, they may choose to manage the amount of information released to investors, thus affecting the latter's decision to make a certain investment. This can affect investors' ability to make good investment decisions.

Signaling is one mechanism that can be used to resolve the problem of adverse selection. Another mechanism used to control this problem is financial reporting, which credibly converts inside information into public information. The other issue arising from asymmetric information is moral hazard, which is initiated by the separation of ownership and control in most medium and large businesses. Shareholders cannot necessarily observe the extent and quality of top managerial effort made directly on their behalf. Managers may, therefore, take advantage of this and compromise on the quality of their effort.

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Additionally, managers may blame any erosion of firm performance on factors beyond their control. In such cases, there are implications for investors. One effective solution to the problem of moral hazard is accounting net income, which can be incorporated into managerial compensation contracts, thus helping to motivate managers' performance. Net income can also help inform securities and managerial labor markets. Thus, if managers shirk their duties, they will have to endure a decline in income, reputation, and market value over a certain time period. The rest of this note summarizes some of the empirical findings on the relevance of dividends.

2. Impact of Dividend Announcements on Share Prices

Lang and Litzenberger (1989) analyze the impact of dividends on share prices. They test the implication that overinvestment problems are likely to be more obvious in firms experiencing decreasing investment opportunities and, therefore, higher prices will accompany a dividend increase announcement by such firms. They suggest that, in response to a dividend change, the market return is larger for firms that are likely to overinvest compared to those that are likely to maximize their value.

Howe, He, and Kao (1992) assess Lang and Litzenberger's (1989) propositions to determine if these findings hold for a larger set of infrequent cash expenditures, i.e., tender offer share repurchases and specially designated dividends (SDDs). They analyze the effect of one-time cash distributions or infrequent cash distributions to see if a market reaction to an extended set of transactions is explained by the free cash flow hypothesis. Their results suggest that firms may attempt to send a signal to the market when their shares are undervalued. Most such signals are made through repurchase announcements or SDDs.

Brous and Kini (1994) strongly support the signaling hypothesis in their explanation of the content of SDD announcements; the other two hypotheses—including the free cash flow hypothesis and wealth transfer effect—yield insignificant results. Their results also indicate significant and positive stock price reactions to SDD announcements and a positive relationship with the announcement period for abnormal stock returns. They conclude that information about future earnings is conveyed through SDD announcements.

Divecha and Morse (1983) establish two effects that could explain market reactions to dividend policy: the information effect and the tax

effect. The information effect demonstrates that, other factors held constant, security returns realized on the announcement day are actually an outcome of dividend changes. To examine the tax effect, the study divides the sample into two portfolios with respect to the direction of the change in dividend payout ratio. The authors report that the investor's tax-paying preference forces them to react against higher dividends and favor a lower dividend instead.

Miller and Rock (1985) and Bhattacharya (1979) support the idea that the existence of asymmetric information can explain the signaling equilibrium, but their contributions—despite having a strong theoretical standing—do not illustrate in depth how dividends act as a strong source of information. Instead, they look at the properties of dividends that arise from signaling models. Both studies argue that, since individuals outside the firm have less information about its cash flows compared to the firm's managers, the latter have reason to clearly signal that information to investors.

Miller and Modigliani (1961) explain that dividends are irrelevant to predicting the firm's value. This idea is, however, only applicable when markets are perfectly efficient and prices reflect all the information available. From a more realistic viewpoint, when there are information asymmetries and corporate insiders tend to have more information than common investors, the information content of dividends (ICD) hypothesis[1] applies whereby we conclude that stock price movements are a positive function of cash dividends. "Information content" here simply refers to the signal that a dividend announcement is provided to market participants, triggering them to revise their expectations of the stock's intrinsic value.

Further research in this context by Bhattacharya (1979) has developed a counterpart of the ICD hypothesis. This holds that dividends are a source of eliminating asymmetric information from the market and bear a cost for the firm; this can also be referred to as the "signal value."

Eades (1982) introduces the signal value into his analysis and presents two important relationships that help in further testing: one, that the signal value is a positive function of the company's true value and, two, that it has a negative relationship with the risk component of the company's value. Since the dividend yield is negatively related to the company's specific risk (β), he applies a simple regression model to test

[1] Rise in stock price due to dividend signal.

this relationship by taking the dividend yield as the dependant variable and β as the independent variable. The results, by and large, do not accept the null hypothesis, i.e., that the dividend yield is independent of the risk coefficient and that there is a significant negative relationship. However, one weakness of this testing approach is that β incompletely represents the firm's risk because it omits the residual component of risk, which also appears to be included as an independent variable. One important remark here is that a change in the level of dividends signals two important clues to the market: the firm's expected ending period value and its risk coefficient.

Some researchers have studied the impact of insider trading on ICD. Similar to dividend announcements, insider trading is an established signal to the market (John & Lang, 1991). This activity (either buying or selling shares immediately prior to dividends) has a strong signaling effect and cannot be neglected. The resulting stock price response is related to factors such as the direction of dividend change, the direction of insider trading, and the nature of firm technology.

Asquith and Mullins (1983) find that the announcement effect of dividend initiations is positive. The signaling theory clarifies that excess returns are due to increased dividend announcements by firms (for details, see Laub, 1976). Stratifying the data with respect to insider trading activity reveals that the announcement day returns associated with insiders engaged in buying stocks are greater than the returns in which insiders are found selling stocks. Therefore, in the case of firms with net insiders selling, the stock price response is negative.

Other signaling predictions are that dividend increases accompanied by no unusual insider trading should cause no price change or that dividend increases accompanied by unusual insider selling should signal bad news and elicit a negative stock price reaction. Easterbrook (1984) criticizes the dividend signaling hypothesis on several grounds, asking what dividends actually signal, how they do so, and why they should be counted as better signals than other, apparently cheaper, methods such as audited reports. His argument is interesting as, on the surface, the message conveyed by dividends is often ambiguous. According to Easterbrook, this ambiguity is rooted in the modern corporate structure whereby managers assume the role of imperfect agents for outsider shareholders. This leads to dividend policies designed to minimize the sum of capital and agency costs.

Previous empirical studies conducted to address ICD either through the use of event study methodologies or time-series regression (for example, Laub, 1976; Gonedes, 1978) have been criticized for their inability to identify accurately the information directly conveyed by dividends.

Garrett and Priestley (2000) analyze the dividend behavior of stocks, using a modified objective function of the dividend decision that is based on variations of actual dividends from permanent earnings or the target level and adjustment costs. They criticize Lintner's (1956) model and point out that it consistently penalizes the adjustment of dividends regardless of whether the adjustment brings the actual value nearer to the target. Their major finding is that dividends do convey information on unexpected changes in current permanent earnings and that both tests for signaling and the dividend's speed of adjustment to target dividends are sensitive to the model's specification.

Kao and Wu (1994) apply a new direct test to determine the relationship between unexpected dividends and changes in earnings. Their results show that a change in the level of dividends is reflected in (i) managers' permanent earnings expectations (future); (ii) unexpected changes in earnings prospects; and (iii) past, current, and future earnings. These results differ from studies such as Nakamura and Nakamura (1985) on account of the ability of dividends to reflect more than just current and one-period-lagged earnings information, thereby widening the spectrum of study. The results also suggest that dividends convey earnings prospects in the year of and the year following dividend initiation. This process tends to prevail for about two years following the dividend payment.

3. Relevance of Announcement to Shareholder Wealth, Expected Cash Flows, Interest Rates, and Agency Costs

The signaling theory rests on the idea that there are information asymmetries between corporate managers (insiders) and investors. Dividend announcements, therefore, serve as an essential tool for conveying unique information (to investors) about future firm value and prospects. Further, dividend initiation as an informative tool brings about positive reactions in the market and is responsible for changes in shareholders' wealth (total stockholders' equity). This shareholders' wealth can take either direction, i.e., it can be a negative wealth impact or a positive wealth impact, both of which are subject to situational variations. A negative wealth impact simply means that certain factors, when realized through a dividend initiation, can create negative trends in wealth. A

positive wealth impact implies the presence of such factors that add value to the shareholder's wealth (ending wealth) and magnify returns.

Lewellen, Stanley, Lease, and Schlarbaum (1978) look at the "clientele" effect from a different viewpoint by using actual securities holding data from the equities marketplace for a large and diverse sample of individual shareholders. Their study focuses on the securities position, for which purpose they include each security's dividend yield. The dividend yield is calculated as the ratio of four times the preceding quarter's dividends to its 1970 closing market price. Since dividend income is subject to higher taxation vis-à-vis income from capital appreciation (gains), this signals a negative wealth effect, which automatically leads investors to avoid dividends and ultimately results in an outflow, implying that they are not better off. Moreover, if the firm plans to disburse a dividend financed by issuing new equity, this will also result in a negative wealth impact as the cost of new equity is always greater than the cost of old equity due to flotation costs—a huge percentage of the total issue.

Bernheim and Wantz (1995) study dividend signaling models under different tax regimes based on the alternative hypothesis that the information revealed by dividends does not necessarily take the form of dividend signaling. This view is formalized based on Lang and Litzenberger's (1989) study. Dividend signaling models generally imply that the per-dollar dividend share price response—or "bang-for-the-buck" (BFB)—increases with an increase in dividend taxation.[2] As predicted by the models, the findings show that the response of the share price to a specific dividend signal will be greater if the dividend income is taxed. Additionally, there is a significant negative coefficient for the relative tax burden and change in dividend yield; these findings are in line with the signaling hypothesis predictions. The model used by Bernheim and Wantz shows an inverse relationship between the BFB and dividend tax rate.

Bernhardt, Douglas, and Robertson (2005) investigate whether a given dividend signal (unexpected change in the dividend level or yield) is related to a greater absolute excess return when income is unfavorably taxed under different tax regimes. They use a rank-ordering correlation test to look at the monotonic relationship between the BFB[3] (Bernheim & Wantz, 1995) and tax regimes. Their results support the agency theory, i.e., lower dividend announcement premiums are, in reality, related to higher tax rates.

[2] For details on the BFB, see Bernheim and Wantz (1995).
[3] Excess return linked with a specific dividend signal.

Much of the argument in the literature on ex-dividend dates[4] and announcement dates stems from the lack of sharp, convincing variations in tax rates. The results show that the hypothesis of independence between excess returns linked with a given change in dividend yield, level, or signal and the tax regime cannot be rejected. The marginal cost of dividends is negatively related to the ICD. The z-test shows that tax regimes are positively related to the BFB. As predicted by the signaling models, the excess return is more strongly related to the tax regime than the BFB. The reason for dividend distribution is not explained by the signaling concerns. Overall, the findings above run contrary to Bernheim and Wantz (1995).

In order to understand the problem of agency cost, it is important to consider Crockett and Friend's (1988) arguments that (i) stockholders agree to dividends because they want to avoid incurring agency costs,[5] (ii) that dividends have a strong signaling force, (iii) that investors are risk-averse, and (iv) that transaction costs/liquidity risk are associated with the liquidation of stock. Agency cost refers to the fear that the firm's management is not basing its decisions entirely in favor of the owners. Shareholders are thus willing to pay a dividend-related tax cost to reduce the agency cost.

Crockett and Friend (1988) relate the realized (ex-poste) rate of the return to beta (risk coefficient) to the dividend yield, using a joint capital asset pricing model (CAPM). Their hypothesis is that investors are indifferent between after-tax dollar expected dividends and after-tax dollar expected capital gains. This leads to the conclusion that the required rate of return is a positive linear function of the dividend yield. However, the CAPM-based results create confusion when concluding that corporations choose to incur a high cost of equity by paying more dividends than are actually required, especially given the option of utilizing those funds elsewhere, e.g., by repurchasing stock.

The agency signaling scenario incorporates both the agency problem (as explained earlier) and signaling models. In many situations, the cost of signaling is considered part of the agency cost in the form of an extension or increment—an outcome of the firm's capital structure decision. Agency studies tend to associate the structure of claims with corporate assets and related conflicting issues and the incomplete exposure

[4] The date after or on which a security is traded without a past declared distribution or dividend.

[5] When a firm acquires debt, an agency cost arises because of the conflict between bondholders and stockholders. Stockholders are tempted to follow selfish strategies, imposing an agency cost on the firm, in turn lowering the firm's market value.

of outsiders with investment/financing actions adopted inside the firm, affecting the worth of their claims.

Sembenelli's (1993) model of financial signaling holds that outsiders act rationally when drawing inferences about insider policies regarding capital structure. The signaling effect in itself is a positive indicator and, under equilibrium conditions, the existence of the agency problem may also be seen as a favorable revaluation of the firm by the market. Most empirical findings (see John, 1987) also show that, in cases where levels of risky debt have risen—causing agency costs to rise—the signaling effect tends to smoothen leverage and bring about favorable revaluation responses by the market.

4. Dividend Policy and Market Signals

Lintner's (1956)[6] model of corporate dividend policy has a comparatively direct effect on longer-term growth trends and recurring fluctuations in the economy. His results show that the parameters used are not biased and the study's major finding is that, over long periods, investment costs remain consistent and have a high correlation with sales volume, current profits, and internal funds. An acceptance of these relationships is built into corporations' dividend policies in a way that they are easily able to pay the dividends implied by these policies over a longer period. Moreover, the statistics indicate that the basic model includes the determinants of the main corporate dividend decisions and shows that the parameters are plausibly consistent over time.

Fama and Babiak (1968) analyze the determinants of individual firms' dividend policies and find that a measure of current profits and lagged dividends help explain dividend changes. The most appropriate measure of profits is net income rather than the cash flow model. For the Monte Carlo experiment, the results show that Lintner's model performs well and that serial dependence in disturbances is not a serious problem. Both Lintner (1956) and Fama and Babiak (1968) thus find that dividend policy is a major factor resulting in a positive wealth impact: it provides investors with quality information that reflects managers' perceptions of firm performance and their forecast of future trends. This addition to investors' knowledge is realized in the face of a monetary advantage that increases net worth.

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[6] The model states that dividend policy has two parameters: (i) the target payout ratio and (ii) the speed at which current dividends adjust to the target.

With reference to the assumptions made by Asquith and Mullins (1983), investors can have expectations about the future in two directions: (i) either no expectation of future dividends at all, implying that any change in dividends will be unexpected, or (ii) some sort of expectation of future cash flows.

Yoon and Starks (1995) argue that there is an asymmetry between dividend decreases and dividend increases at the individual firm level. They investigate the association between the firm's investment opportunity set and dividend changes and the relationship between the overinvestment or cash flow signaling hypothesis and the wealth effects accruing from dividend change announcements. They note that Lang and Litzenberger's (1989) finding alone is not perfect proof against the free cash flow hypothesis and suggest a more suitable test for determining the sources of the wealth effects implied by the two competing hypotheses.

Yoon and Starks (1995) find that, after the dividend changes and in spite of their investment opportunities over a three-year period, firms notably increased (decreased) their capital expenditures after a dividend increase (decrease). The announcement of a dividend decrease or increase in terms of changes in cash flow expectations is the major basis for analysts to modify their current earnings forecast in line with the signaling hypothesis. The long-term earnings growth forecast is lowered following a decrease announcement but not after a dividend increase announcement. This result explains why a decrease in dividends causes a greater stock price reaction than an increase in dividends announcement. Yoon and Starks thus favor cash flow signaling over free cash flow signaling.

Bar-Yosef and Huffman's (1986) reward-penalty managerial incentive scheme helps explain corporate dividend policy in terms of an incentive for the manager to signal accurately. An ideal scheme would have two traits: (i) it would signal the knowledge as soon as it became available, so the manager must be rewarded according to the value of the firm based on how quickly the information becomes available; and (ii) it would ensure accuracy otherwise the scheme would penalize the manager for providing overestimated or false information.

For the scheme to be implemented efficiently, the manager must be prevented from taking part in any trading activity pertaining to his own firm's stock so that he cannot exploit the knowledge he has beforehand. Additionally, his post-announcement trading activity must be governed by disclosure rules so that he cannot raise his compensation (incentive) by

passing on an incorrect expectation of cash flow. As a result, the size of the declared dividend will be positively proportional to the expected cash flow, which is natural as the higher the potential cash flow, the more likely the firm will be to distribute it among its owners.

As far as the relationship between dividend policy and the payout ratio and interest rates is concerned, the literature indicates that interest rates have a less clear-cut effect on the payout ratio; theoretically, this can be identified as an indirect impact. However, researchers such as Brittain (1966) show that dividend payments are a decreasing function of interest rates. If the economy is expected to be weak and earnings prospects are uncertain—when the growth of a sector is doubtful—then this leads to a decline in the dividend payout ratio since managers may not expect sufficient earnings to support a dividend decision.

It is commonly held that dividends are a useful signaling tool for a firm's management to transmit information to investors in times of information asymmetries. However, Lintner (1956), Fama and Babiak (1968), and Laub (1976) present models in which dividends resolve any sort of information asymmetries present and are weakened by the fact that firms stabilize their payout ratios "d" if the earnings have perfect serial correlation. Therefore, dividends may not always be a very good predictor of earnings (Penman, 1983). Penman (1983) also finds that less information is conveyed by dividend changes after controlling for the management's future earnings forecast.

While some studies argue that dividends are a complete transmitter of information (which is obviously an overestimation), others hold that they are irrelevant to the firm's prospects (again, a superficial notion). A rational way to handle this is to consider dividends as being responsible for passing on only "some" information rather than its complete content.

The rational approach says that shareholders will prefer stocks and will lower the payout to avoid heavy personal taxation on dividend income. Modigliani (1982) points out that all possible estimates of the effective capital gains tax rate prove to be much lower than the effective personal tax rate imposed on dividend income. So, ideally, the corporation will not pay dividends for the welfare of its owners. Historical trends and even recent market studies, however, do not show that firms pursue such (anti-dividend paying) policies.

5. Conclusion

The signaling effect of dividends has been debated for over three decades. ICD refers to the message that dividends transmit to market participants. It is common knowledge that corporate insiders possess information that is not accessible to investors; dividend announcements are, therefore, one way of transmitting this knowledge to the public. Normal price reactions to dividend announcements are positive, which means that an increase in dividends will be met by an increase in stock prices, thereby yielding positive announcement day returns.

Another phenomenon that also constitutes a signal is the insider trading prevalent around dividend announcements. This provides the market with a signal and the resulting security returns reflect insider activity. Insider buying indicates a positive signal while insider selling sends negative signals to the market. Efficient signaling is that optimal mix of both signals (insider trading and announcement of dividends) that incurs the minimum signaling cost. To test the accuracy of ICD, contemporary tests involve a rational signaling equilibrium. These provide useful and statistically significant results, showing that dividends signal future earnings prospects and apply to more than one-period time-lagged earnings information.

In reality, we do not really know if shareholders' wealth is affected by dividend policy, but the empirical evidence does seem to suggest that it is important or is perceived to be so. Dividend decisions should, therefore, be taken carefully, given the limitations of real world capital markets. Whether a dividend decision is correct will depend on the extent to which an individual shareholder is affected by various market imperfections. Market imperfections affect individual shareholders in many contradictory ways with respect to dividends, making it difficult to agree on a single dividend policy. The only way for a company to escape this quandary is to maintain a consistent dividend policy that allows individual shareholders to assess its desirability with respect to their personal conditions.

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