The International Journal of
Business and Finance Research

VOLUME 9 NUMBER 2 2015

CONTENTS

International Journal of Business and Finance Research
Vol. 9, No. 2, 2015, pp. 1-20
ISSN: 1931-0269 (print)
ISSN: 2157-0698 (online)

RETURNS FOR DIVIDEND-PAYING AND NON DIVIDEND PAYING FIRMS

Yufen Fu, Tunghai University
George W. Blazenko, Simon Fraser University

ABSTRACT

In this paper, we compare the equity returns of dividend-paying and non-dividend paying firms. We find no unconditional return difference even though non-dividend paying firms have many characteristics that suggest high risk. Equivalently, because non-dividend paying firms have high risk-metrics, their returns are abnormally low compared with dividend-paying firms. The reason for these anomalies is that a larger fraction of non-dividend paying firms are in financial distress and, despite high distress-risk and high growth-leverage, firms in financial distress have low returns from high volatility that decreases the options-leverage of equity. Removing firms in financial distress, returns for non-dividend paying firms increase relative to dividend-paying firms and abnormal returns disappear. We argue that part of the reason that firms in financial-distress have high volatility that leads to low returns is managerial risk-shifting that takes form as unexpectedly high capital expenditure rates.

JEL: G12, G32, G33, G35

KEYWORDS: Equity Returns, Dividends, Financial Distress, Volatility, Growth

INTRODUCTION

In perfect capital markets, Miller and Modigliani (1961) show the wealth of a firm's shareholders is invariant to corporate dividend policy. Across firms, returns for dividend-paying and non-dividend paying firms can differ if their corporate financial characteristics differ. The financial literature identifies several differences between dividend-paying and non-dividend paying firms. Pastor and Veronesi (2003) report that non-dividend paying firms have high profit volatility, high return volatility, and high market/book ratios. Fama and French (2001) find that non-dividend paying firms are smaller and less profitable but have better growth opportunities. Rubin and Smith (2009) characterize non-dividend paying firms as younger, smaller, and more levered. DeAngelo, DeAngelo and Stulz (2006) find that firms pay dividends when retained earnings are a large fraction of book-equity, which means that dividend-paying firms are more profitable. Fuller and Goldstein (2011) report that non-dividend paying firms have higher returns in advancing markets (and conversely), which means higher leverage. Blazenko and Fu (2010, 2013) find a positive value-premium for dividend-paying firms but a negative value-premium for non-dividend paying firms. Investors might reasonably conclude from these differences that non-dividend paying firms are riskier than dividend-paying firms.

However, Fuller and Goldstein (2011) report that dividend-paying firms have returns that exceed non-dividend paying firms. We find no statistical difference between the unconditional returns of dividend-paying and non-dividend paying firms but standard risk-metrics are higher for non-dividend paying firms and, thus, they have abnormally low returns compared with dividend-paying firms. We argue that standard risk-metrics overstate risk for non-dividend paying firms because they fail to capture relations between volatility, risk, and expected return. A larger fraction of non-dividend paying firms compared with dividend-paying firms are in financial distress (IFD) and IFD firms have low returns from high volatility that decreases the options-leverage of equity. Excluding firms in financial distress, returns for non-dividend paying firms increase relative to dividend-paying firms and abnormal returns disappear.

Our contribution to the literature on dividend-paying and non-dividend paying firms is to explain why returns on non-dividend paying firms are no greater than dividend paying firms despite high risk metrics. Section 2 reviews the literature on dividend and non-dividend paying firms and discusses our contribution to it. Section 3 presents preliminary results on returns of dividend-paying, non-dividend paying, and IFD firms. In section 4, we present evidence that high-profitability firms have high returns because of high growth-leverage despite high volatility and evidence that volatility accounts for low returns for IFD firms despite high growth-leverage. We attribute high volatility and high CAPX rates for IFD firms to managerial risk shifting. Finally in section 4, we report evidence that not in financial distress (NIFD) dividend-paying firms have positive alphas, NIFD non-dividend paying firms have zero alphas, and IFD firms have negative alphas. If the multifactor asset-pricing model we use for bench-marking represents the collective understanding of investors, we conclude that they do not recognize risk differences between dividend-paying, non-dividend paying, and IFD firms. The last section summarizes and concludes.

LITERATURE REVIEW

In the Black-Scholes (1976) economic environment, recognizing the likelihood of exercise, Galai and Masulis (1976) show that volatility increases expected payoff relative to the expected cost of option exercise, which decreases option-leverage and expected return. Thus, volatility and expected return relate negatively for a call option. The Black-Scholes option-pricing environment presumes constant volatility to maturity but volatility can change thereafter. Cross-sectionally, the Galai and Masulis (1976) result says that option returns are lower on stocks with high volatility. These results are true even though one can derive the Black and Scholes (1976) option-pricing formula with the simplifying assumption that risk-neutral investors populate the financial environment. Blazenko and Pavlov (2009) show that expected return and volatility relate negatively for a business with an indefinite sequence of growing growth options.

Empirically, Ang, Hodrick, Xing and Zhang (2006) find that firms with high idiosyncratic-volatility have negative abnormal returns. On the other hand, corporate leverage can induce a positive relation between returns and volatility. Poor profitability decreases share price, which increases financial leverage, volatility, and expected return. Christie (1982) presents evidence that supports this leverage induced relation between returns and volatility. Guided by the Galai and Masulis (1976) perspective that equity is a call option on the assets of a firm, we report evidence the negative impact of volatility on option-leverage is acute for IFD firms. We also find that growth-leverage increases returns. Continuing streams of growth capital expenditures (CAPX), which themselves grow, lever shareholder risk in the same way as fixed costs in operating-leverage (Brenner and Smidt, 1978, Blazenko and Pavlov, 2009). We refer to this relation between expected return and growth as “growth-leverage.” Volatility or growth-leverage can dominate return determination. IFD firms have high volatility and low returns despite high growth-leverage. High-profitability firms with high growth leverage have high returns despite high volatility.

Katz, Lilien, and Nelson (1985), Dichev (1998), Griffin and Lemmon (2002), and Campbell, Hilscher and Szilagyi (2008) all observe that IFD firms have unexpectedly low returns. Garlappi and Yan (2011) argue that shareholder recovery in corporate reorganization decreases shareholder risk, which decreases expected return. We argue, with supporting evidence, that even though other risk types are high for IFD firms (like, growth-leverage), low returns arise from high volatility that decreases the options-leverage of equity.

In Blazenko and Pavlov’s (2009) dynamic equity valuation model, managers maximize shareholder wealth by suspending business growth upon inadequate profit prospects. Consistent with this hypothesis, we find a positive relation between returns and CAPX rates within business classes for NIFD dividend-paying and non-dividend paying firms (not in financial distress) but not for IFD firms. Rather, IFD firms have high

CAPX rates and high growth-leverage even with modest profitability. We interpret this observation as evidence of managerial risk-shifting as businesses fall into financial distress from profit decline (Jensen and Meckling, 1976).

DATA AND METHODOLOGY

Our preliminary testing uses monthly returns for firms from the *CRSP* monthly file excluding exchange-traded funds (ETFs) and closed-end funds (CEFs). *CRSP* monthly-returns use the delisting-price for firms that delist in a calendar-month, which is generally the last traded share price. Delisting returns prevent a survivor bias. The *CRSP* monthly file covers NYSE firms from 12/31/1925, NYSE-AMEX-US firms from 7/31/1962 (AMEX before Oct 2008), NASDAQ firms from 12/29/1972, and NYSE-ARCA firms from 03/31/2006. With the addition of NASDAQ firms in 1972, there is an especially large increase in the number of firms from 2,667 at year-end 1972 to 5,382 at year-end 1973. This increase is important for return results we report in Table 1 because NASDAQ listing requirements are less strict than other exchanges and, thus, as Table 2 shows, NASDAQ firms are more likely in financial distress (IFD). To recognize this changing composition of businesses, Table 1 reports results not only for the period 12/31/1925–12/31/2011 but also for sub periods 12/31/1925–12/31/1972 and 12/31/1972–12/31/2011.

We classify a firm at the beginning of a month as dividend paying if *CRSP* assigns to it a monthly, quarterly, semi-annual, or annual dividend payment cycle and it has an ex-date in the immediately preceding period, respectively. We do not consider share repurchases as a dividend-substitute for several reasons. Grullon and Michaely (2002) and Grullon, Paye, Underwood and Weston (2011) find that most firms that repurchase shares also pay dividends but not conversely. Lee and Rui (2007) find that dividends depend on the permanent part of earnings whereas share repurchases depend on the temporary part. Even if a firm announces a share repurchase, they often leave it un-started or incomplete (Chung, Dusan, and Perignon, 2007) and, thus, it is difficult to identify when firms repurchase shares (other than after the fact in financial statements).

We classify a firm at the beginning of a month as IFD (in financial distress) if it has negative trailing twelve month (TTM) earnings, which we calculate from the *COMPUSTAT* quarterly file for active and inactive companies to prevent a survivor bias. A firm can have a bad reporting quarter without this classification, which results only from continued poor profitability. Katz, Lilien, and Nelson (1985), Dichev (1998), and Griffin and Lemmon (2002) use Z-scores and O-scores (Altman 1968, Ohlson, 1980) and Garlappi and Yan (2011) use Moody's *Expected Default Frequency*™ to predict bankruptcy. Unlike these measures, negative TTM earnings is not subject to estimation risk because it is our definition of financial-distress rather than a statistical measure to predict a future event. Nonetheless, a primary determinant of O-scores, Z-scores, and Moody's *EDF* is profitability. As a financial-health measure, TTM earnings is easy to calculate and commonly reported so any investor can use it for investment strategies. Results in Tables 1 and 3 show the ability of TTM earnings to discriminate returns between IFD and NIFD firms (not in financial distress). In addition, we report evidence in Section 4 that managers of IFD firms undertake more risky growth investments than expected.

Preliminary Return Observations

Without identifying firms in financial distress, Panel A of Table 1 reports average returns and equation (1) parameter estimates with monthly returns for an equally-weighted portfolio of non-dividend paying (ND) versus an equally weighted portfolio of dividend-paying firms (D) for the entire time series and sub periods,

$$r_{EWP_{1,t}} = \alpha + \beta \cdot r_{EWP_{2,t}} + \varepsilon_t \quad (1)$$

We rebalance portfolios with our "dividend paying" definition is at the beginning of each month. The average number of firms in the ND and D portfolios is 1,997 and 1,393, respectively. Equal-weighting better represents the return characteristics of an entire business class (like, dividend paying or non-dividend paying) than does value-weighting that reflects the return characteristics of a few large firms.

When tested against a unity null-hypothesis, the slope, β, in equation (1) measures risk of non-dividend paying firms *relative* to dividend-paying firms, which is β-times greater for $\beta > 1$. Portfolio 2 returns determines portfolio 1 returns (plus an error) and portfolio 1 excess-return is β times that of portfolio 2 even if multiple factors determine both returns in the first instance. Thus, we do not assume a single factor return generating model. The appendix proves these assertions. When tested against a null-hypothesis of zero, the α intercept identifies abnormal returns unexplained by risk differences between non-dividend paying and dividend-paying firms.

Table 1: Monthly Returns for Dividend Paying, Non-Dividend Paying, and in Financial Distress Firms

Panel A: Non-Dividend Paying Firms Versus Dividend Paying Firms					
	12/31/1925-12/31/2011	12/31/1925-12/31/1972	12/31/1972-12/31/2011	Sub-Period α Difference	Sub-Period β Difference
Average Return for Non-Dividend Paying Firms	0.0128	0.0136	0.0119		
Average Return for Dividend Paying Firms	0.0116	0.0106	0.0128		
Return Difference	0.001	0.003	-0.001		
	(0.81)	(1.39)	(-0.50)		
α	-0.0045	-0.0032	-0.0049	0.0017	0.283
	(-3.61)	(-2.13)	(-2.36)	(0.65)	(3.09)
β	1.49	1.59	1.31		
(H_0: β=1)	(8.10)	(7.18)	(7.56)		
R^2	0.80	0.85	0.70		

Panel B: NIFD Non-Dividend Paying, NIFD Dividend Paying, IFD Firms (12/31/1972-12/31/2011)			
	ND:NIFD vs. D:NIFD	IFD vs. D:NIFD	IFD vs. ND:NIFD
Return Difference	0.0024	-0.0042	-0.0066
	(1.62)	(-1.47)	(-3.78)
α	-0.0018	-0.0092	-0.0091
	(-1.21)	(-3.20)	(-5.49)
β	1.33	1.39	1.17
(H_0: β=1)	(9.41)	(5.10)	(3.97)
R^2	0.82	0.55	0.83

In parentheses are t-stats that are Newey and West (1987) adjusted for regressions. Without identifying firms in financial distress, Panel A reports parameter estimates in the regression of monthly returns for an equally weighted portfolio of non-dividend paying firms (ND) versus a portfolio of dividend-paying firms (D) (excluding ETFs and CEFs). In Panel B, firms have data from both CRSP and COMPUSTAT. The acronyms IFD and NIFD stand for "in financial distress" and "not in financial distress." A firm is IFD if it has negative TTM earnings. There are three portfolios in Panel B (all equally weighted): firms that are NIFD and pay dividends (D:NIFD), firms that are NIFD and do not pay dividends (ND:NIFD), and IFD firms regardless of whether they pay dividends or not. The average number of firms in the D:NIFD, ND:NIFD, and IFD portfolios is 1,598, 1,469, and 1,178.

In Panel A of Table 1, over the 12/31/1925–12/31/2011 period, average monthly returns for non-dividend paying firms exceed those of dividend paying firms but the difference is statistically insignificant. This result identifies no risk difference between non-dividend paying and dividend-paying firms. In the regression of portfolio returns for non-dividend paying versus dividend-paying firms, the slope coefficient, β, statistically exceeds unity, $\hat{\beta}$=1.49, which suggests greater risk for non-dividend paying firms. Since there is no difference in raw-returns but non-dividend paying firms have greater risk, the returns of dividend-paying firms are abnormally high compared with non-dividend paying firms. The alpha estimate is negative and statistically significant, $\hat{\alpha} = -0.0045$. Sub period results in Panel A are similar to the entire sample. Raw return differences between dividend-paying and non-dividend paying firms are insignificant, the β-risk of non-dividend paying firms exceeds that of dividend-paying firms, and returns for dividend-paying firms are abnormally greater than non-dividend paying firms.

Panel B of Table 1 reports average monthly return differences and parameter estimates for equation (1) in the regression of equally-weighted portfolio returns for one business class versus another. The three business classes are: NIFD non-dividend paying (ND:NIFD), NIFD dividend-paying (D:NIFD), and IFD firms (regardless of whether they pay dividends or not). We do not distinguish the dividend decisions of IFD firms because they face more serious financial issues than dividend pay-out and Table 2 shows that only a small fraction of IFD firms pay dividends (9%).

Removing IFD firms, returns for non-dividend paying firms increase relative to dividend-paying firms in Panel B of Table 1 compared with Panel A. In the first row, the return difference between ND:NIFD and D:NIFD is positive and statistically significant at roughly the 10% level (return difference is 0.0024 and the t-stat is 1.62). In addition, abnormal returns disappear. Higher risk for ND:NIFD firms relative to D:NIFD firms ($\hat{\beta}$=1.33) accounts for the raw-return difference. The alpha estimate is insignificant ($\hat{\alpha}$=−0.0018 and the t-stat is −1.21).

In the final two rows of Panel B, high β-risk for IFD firms relative to D:NIFD firms ($\hat{\beta}$=1.39) and IFD firms relative to ND:NIFD firms ($\hat{\beta}$=1.17) does not accord with low returns for IFD firms. Abnormal returns are negative and statistically significant in both cases ($\hat{\alpha} = -0.0092$ and $\hat{\alpha} = -0.0091$, respectively). Beginning in the following section, guided by the Galai and Masulis (1976) view that equity is a call option on the assets of a firm, we investigate the hypothesis that returns decrease with volatility and that this relation accounts for low returns for IFD firms. In addition, we present evidence that high-profitability firms have high returns from high growth-leverage despite high volatility.

Table 2: Firms in Financial Distress, NASDAQ, and Dividend-Paying Firms

	Fraction of Firms That Are IFD	Fraction of Firms That Are NASDAQ	Fraction of Firms That Are Dividend-Paying
Panel a: *CRSP* (12/31/1972–12/31/2011)			
Non-Dividend Paying		68%	
Dividend-Paying		35%	
All Firms		55%	39%
Panel B: CRSP & COMPUSTAT (12/31/1972–12/31/2011)			
Non-Dividend Paying	42%	70%	
Dividend-Paying	6%	33%	
NASDAQ	36%		24%
Non-NASDAQ	18%		60%
IFD Firms		72%	9%
NIFD Firms		49%	52%
All Firms	28%	55%	40%
Panel C: CRSP, COMPUSTAT & I/B/E/S (1/15/1976–1/19/2012)			
Non-Dividend Paying	35%	69%	
Dividend-Paying	6%	29%	
NASDAQ	30%		27%
Non-NASDAQ	13%		66%
IFD Firms		69%	12%
NIFD Firms		45%	55%
All Firms	21%	50%	46%

Acronyms IFD and NIFD stand for "in financial distress" and "not in financial distress." IFD firms have negative trailing twelve month earnings.

Portfolio Analysis

In Blazenko and Pavlov's (2009) dynamic equity-valuation model, expected return decreases with volatility and increases with business growth. Since profitability underlies volatility and growth, we form portfolios with profitability and then explore relations between returns, volatility and growth-leverage. Corporate growth depends on profitability for several reasons. First, since earnings have high persistence (Fama and French, 2006), high earnings occur with good growth prospects that managers exploit with expansion investments. Second, with financing constraints (Froot, Scharfstein and Stein, 1993), managers finance growth largely internally and only when profitability allows. We require firms have data from each of the *COMPUSTAT*, *CRSP*, and *I/B/E/S* databases. *CRSP* is our source for share price and other stock market data. Forward annual *ROE* is our measure of business profitability using *I/B/E/S* consensus analysts' annual earnings forecasts for the next unreported fiscal year as forward earnings. In an investigation of analysts' forecasts (not reported), we find that analysts accurately forecast the upcoming unreported fiscal-year but they over-forecast more distant unreported fiscal years. Forward *ROE* is forward earnings divided by book equity from the most recent quarterly report prior to portfolio formation. Book equity is Total Assets less Total Liabilities less Preferred Stock plus Deferred Taxes plus Investment Tax Credits from the *COMPUSTAT* quarterly file. We exclude firms with negative book equity. We use annual rather than quarterly earnings to avoid profit seasonality. We use TTM earnings as our financial-distress measure but forecast earnings to form portfolios because forecast earnings better represent investors' information when they form and rebalance portfolios. Forecast earnings also allow us a more refined investigation of financial-distress than is possible with only historical earnings. For example, if a firm has negative TTM earnings but positive forecast earnings, then investors expect the duration of financial distress to be short. If a firm has positive TTM earnings but negative forecast earnings, then, analysts expect imminent financial-distress.

I/B/E/S reports a time series snapshot of analysts' earnings per share (*EPS*) forecasts on "Statistical Period" dates (the Thursday preceding the third Friday of the month). We rebalance portfolios at the close of trading on Statistical Period dates so that the data we use for testing is timely and matches the information available to investors. The first *I/B/E/S* Statistical Period date is 1/15/1976 and the last for our study is 1/19/2012. This period has 433 Statistical Period dates and 432 "Statistical Period months" (intervals between Statistical Period dates). For Statistical Period dates before 7/20/1978 there are fewer than 20 IFD firms and, thus, for IFD firms in Panel C of Table 3 we begin our analysis thereafter. This period has 403 Statistical Period dates and 402 Statistical Period months. At Statistical Period dates from the 1'st to the 432'd, we assign each firm with positive *BVE* and data from *COMPUSTAT*, *CRSP*, and *I/B/E/S* into one of three business classes: IFD, D:NIFD, or ND:NIFD. Within each business class, we sort firms with forward *ROE* into twenty portfolios with roughly an equal number of firms in each portfolio ($3 \times 20 = 60$ portfolios). From low to high forward *ROE*, portfolios *b*=1,2,…,20 are D:NIFD, portfolios *b*=21,…,40 are ND:NIFD, and portfolios *b*=41,…,60 are IFD. The average numbers of firms in these portfolios are 63, 51, and 33 for D:NIFD, ND:NIFD, and IFD firms, respectively. Our sample has 3,750,840 firm-month observations in total. Panels A, B, and C of Table 3 report median forward *ROE*s for firms in each of these portfolios.

Portfolio Returns

Because Statistical Period dates are midmonth, we cannot use *CRSP* monthly returns that use month-ends. Instead, monthly return for firm *i* sorted into portfolio *b*, for Statistical Period month *t* (from Statistical Period *t* to Statistical Period *t+1*), is,

$$R_{i,b,t} = \left(\frac{P_{i,t+1}+D_{i,t}-P_{i,t}}{P_{i,t}}\right) \tag{2}$$

where $P_{i,t}$ and $P_{i,t+1}$ are split-adjusted closing share prices for firm *i* on Statistical Period date *t* and *t+1* and $D_{i,t}$ is the split-adjusted dividend (or distribution) per share with ex-date between Statistical Period dates. For $P_{i,t+1}$ we use the *CRSP* delisting price or last trading price in the statistical period month. We use the first opening or closing price available from *CRSP* in Statistical Period month *t* if the share price $P_{i,t}$ is missing. Denote $N_{b,t}$ as the number of firms in portfolio *b* at Statistical Period date *t*. The equally weighted return on portfolio *b* that we rebalance at each Statistical Period date *t*=1,2,…,432 is the average of the monthly return on portfolio *b* at time *t*,

$$\bar{R}_b \equiv \sum_{t=1}^{T} \left(\sum_{i=1}^{N_{b,t}} R_{i,b,t}/N_{b,t}\right)/T = \sum_{t=1}^{T} \bar{R}_{b,t}/T \tag{3}$$

We form portfolios on Statistical Period dates with historical profitability (that is, IFD or not) and within business classes with forward *ROE*. Investors can reproduce our results because only in the month after portfolio formation do we measure returns. Table 3 reports monthly equally-weighted returns over our test period, *t*=1,2,…,432, for portfolios of D:NIFD, ND:NIFD, and IFD firms.

Additional Portfolio Measures

We measure portfolio *b* volatility as the average over firms of daily return standard deviation for the number of trading days, κ, in the 365 calendar days before statistical period *t*,

$$\hat{\sigma}_{b,t} \equiv \sum_{i=1}^{N_{b,t}} \frac{\sigma_{i,t}}{N_{b,t}} \tag{4}$$

where $\bar{R}_i = \sum_{\tau=-1}^{-\kappa} R_{i,\tau}/\kappa$ and $\sigma_{i,t} = \sqrt{\sum_{\tau=-1}^{-\kappa}\left(R_{i,\tau} - \bar{R}_i\right)^2/(\kappa - 1)}$. Table 3 reports median portfolio volatility, $\overline{\hat{\sigma}_b} = \underset{t=1,T}{median}\left(\hat{\sigma}_{b,t}\right)$, for each portfolio *b*=1,2,…,60. Equation (4) measures the average volatility of a firm in a portfolio rather than the volatility of the portfolio itself. We use this measure for individual equity risk rather than the risk of a portfolio that an equity is in. We measure corporate growth with annual capital expenditure (CAPX) relative to net fixed assets (NFA) from the most recent year-end financial report before a statistical period date. We use CAPX as a growth measure because it requires a purposeful decision by managers. Alternatives, like, asset growth, depend on current-asset changes that depend on revenue changes that are subject to uncertainties not immediately related to managerial decisions. Average portfolio skewness is the temporal average of cross-sectional return skewness over firms in a portfolio at a particular month. Average market-capitalization is the temporal average of the cross-sectional average for firms in the portfolio at a particular month. Leverage is the temporal average of the cross-sectional average of total book liabilities before *t* from the COMPUSTAT quarterly file divided by market capitalization for firm *i*.

Median forward ROE is $\underset{t=1,T}{median}\left(\underset{i=1,N}{median}\, ROE_{i,b,t}\right)$ and the median TTM ROE is $\underset{t=1,T}{median}\left(\underset{i=1,N}{median}\, TTM\ ROE_{i,b,t}\right)$. B/M is the median Book to Market ratio. Market-beta is the slope in the regression of the portfolio excess return on the CRSP value-weight excess return over the entire time series. The riskless rate is the one month T-Bill rate.

Summary Statistics across Business Classes

We begin our discussion of portfolio summary measures in Table 3 across panels that represent the three business classes we study: ND:NIFD, D:NIFD, and IFD. We base this discussion on average summary measures at the bottom of each panel. IFD firms have the lowest monthly return, while ND:NIFD and D:NIFD firms have about equal monthly returns. Return skewness is about the same for D:NIFD and ND:NIFD firms and highest for IFD firms. Financial leverage increases from D:NIFD to ND:NIFD to IFD firms. Market capitalization decreases from D:NIFD to ND:NIFD to IFD firms. CAPX rates are the lowest for D:NIFD firms and highest for ND:NIFD and IFD firms. CAPX rates are high in each panel of Table 3 because businesses make capital expenditures both to maintain existing assets (maintenance CAPX) and to grow (growth CAPX). We do not distinguish between these CAPX types because we expect both to increase shareholder risk and return and, thus, we want both in our analysis.

Profitability, measured by either TTM ROE or forward ROE, is about the same for D:NIFD and ND:NIFD firms and lowest for IFD firms. Book/market is lowest for ND:NIFD, then D:NIFD, and highest for IFD firms. Market-β is lowest for D:NIFD firms (below unity), higher ND:NIFD firms (above unity), and, highest for IFD firms (even higher above unity). Return volatility is lowest for D:NIFD firms, higher for ND:NIFD firms, and highest for IFD firms. Portfolio return-skewness is positive and greatest for IFD firms in Panel C compared with D:NIFD and ND:NIFD firms in Panels A and B, respectively. Our interpretation of this observation is that investors accept low average monthly returns for IFD firms because they might own a common-share that emerges from financial distress with a large payoff as compensation for bearing the risk the common-share never leaves the financial-distress state. The Galai and Masulis (1976) hypothesis is consistent with investor skewness-preference.

<u>Summary Statistics within Business Classes</u>

A review of TTM *ROE* and forward *ROE* in Table 3 suggests that investors expect businesses in extreme financial distress to remain in financial distress. IFD firms in Panel C with the lowest TTM *ROE* have negative forward *ROE*. Among IFD firms, investors expect improving financial health from businesses in least financial distress. IFD firms with highest TTM *ROE* have positive forward *ROE*. Panel B indicates that investors expect the profitability of the least profitable ND:NIFD firms to worsen. ND:NIFD firms with lowest TTM *ROE* have lower forward *ROE*. Investors expect the profitability of the most profitable ND:NIFD firms to improve. ND:NIFD firms with highest TTM *ROE* have higher forward *ROE*. Panel A shows that investors expect no change in the profitability of D:NIFD firms. Regardless of whether TTM *ROE* is high or low, forward *ROE* is about the same.

In Panels A and B of Table 3, CAPX increases with forward *ROE* for D:NIFD and ND:NIFD firms, (that is, portfolios b=1 to b=20 and b=21 to b=40). This observation is consistent with the hypothesis that managers use profitability to fund business investment because of financing constraints or the Blazenko and Pavlov (2009) hypothesis that managers suspend expansion when profit prospects are poor. However, this relation does not hold for IFD firms. In Panel C, CAPX is unrelated or even decreasing with forward *ROE* (portfolio b=41 to b=60).

NIFD firms with low forward *ROE* at the top of Table 3 Panels A and B have CAPX rates greater than zero even with book/market above unity. Growth with book/market above unity is inconsistent with both Tobin (1969) and Blazenko and Pavlov (2009). On the other hand, Blazenko and Pavlov (2010) argue that managers grow a business with *innovative* investments that have "shadow options" for unanticipated growth opportunities even with book/market above unity. In panel C, IFD firms have book/market less than unity, high CAPX rates, and low profitability. We argue that high CAPX rates despite low profitability arises from managerial risk-shifting for firms in financial distress.

In each panel of Table 3, the relation between return-volatility and forward *ROE* is U-shaped. We interpret this observation to mean that at low profitability, profitability decreases the likelihood of financial distress, which decreases volatility. High profitability induces high return-volatility from high CAPX rates that create high growth-leverage. Profitability has offsetting forces that decreases return-volatility at low profitability and increases return-volatility at high profitability. For each of the three business classes in Table 3, average realized monthly return increases with forward *ROE* (portfolio b=1 to b=20, b=21 to b=40, and b=41 to b=60). For ND:NIFD and D:NIFD firms in Panels A and B, we interpret these results to be from growth leverage from high CAPX rates within business classes. A similar interpretation is not appropriate for IFD firms since the least profitable IFD firms have the greatest CAPX rates (portfolios b=41 and b=42). We argue that this phenomenon is consistent with managerial risk shifting.

Table 3: Summary Statistics

Portfolio	Monthly Return	Skewness	Leverage	Size	CAPX	TTM ROE	Forward ROE	B/M	Beta	Portfolio Volatility
Panel A: Dividend Paying Firms NIFD (1/15/1976-1/19/2012)										
b=1	0.0102	0.3120	21.57	1,124	0.191	0.045	0.030	1.40	1.03	0.0213
b=2	0.0114	0.4242	4.92	1,430	0.178	0.056	0.055	1.19	0.94	0.0192
b=3	0.0117	0.4798	3.43	1,492	0.167	0.067	0.068	1.09	0.87	0.0180
b=4	0.0119	0.4540	3.25	1,823	0.162	0.076	0.078	1.02	0.85	0.0175
b=5	0.0130	0.3525	3.19	2,037	0.168	0.083	0.086	0.97	0.84	0.0172
b=6	0.0117	0.4164	3.48	2,179	0.172	0.091	0.093	0.91	0.84	0.0175
b=7	0.0131	0.4051	3.51	2,181	0.176	0.097	0.101	0.85	0.86	0.0177
b=8	0.0125	0.4696	3.42	2,379	0.185	0.104	0.109	0.79	0.88	0.0179
b=9	0.0136	0.3933	3.42	2,421	0.193	0.111	0.116	0.75	0.88	0.0183
b=10	0.0132	0.4716	3.45	2,711	0.201	0.118	0.124	0.70	0.92	0.0182
b=11	0.0132	0.4741	3.63	3,179	0.207	0.125	0.132	0.66	0.95	0.0179
b=12	0.0137	0.3970	3.44	3,132	0.215	0.132	0.139	0.62	0.95	0.0182
b=13	0.0138	0.4010	3.34	3,063	0.225	0.139	0.148	0.58	0.99	0.0180
b=14	0.0142	0.4054	2.96	3,607	0.225	0.147	0.157	0.53	0.99	0.0184
b=15	0.0136	0.3708	2.51	4,444	0.232	0.157	0.167	0.49	0.99	0.0183
b=16	0.0143	0.3561	2.05	5,170	0.234	0.165	0.179	0.43	1.05	0.0188
b=17	0.0140	0.3267	1.62	7,177	0.240	0.179	0.194	0.39	1.05	0.0190
b=18	0.0134	0.3351	1.20	7,612	0.247	0.199	0.216	0.33	1.10	0.0192
b=19	0.0138	0.3071	0.99	9,012	0.266	0.231	0.253	0.27	1.12	0.0202
b=20	0.0144	0.3770	0.70	9,993	0.274	0.325	0.364	0.17	1.09	0.0103
Average	0.0130	0.3964	3.80	3,808	0.208	0.132	0.140	0.71	0.96	0.0186
Panel B: Non-Dividend Paying Firms (1/15/1976-1/19/2012)										
b=21	0.0079	0.5579	68.69	423	0.296	0.049	0.000	1.33	1.33	0.0330
b=22	0.0083	0.4257	16.44	515	0.268	0.041	0.024	1.32	1.29	0.0312
b=23	0.0111	0.5110	2.97	579	0.281	0.045	0.044	1.03	1.25	0.0326
b=24	0.0124	0.4175	2.33	575	0.290	0.054	0.059	0.94	1.27	0.0317
b=25	0.0115	0.3832	1.96	562	0.297	0.063	0.072	0.85	1.26	0.0324
b=26	0.0101	0.4133	1.92	615	0.304	0.075	0.083	0.79	1.25	0.0319
b=27	0.0109	0.3343	1.56	613	0.312	0.082	0.094	0.73	1.27	0.0318
b=28	0.0108	0.3088	1.48	627	0.317	0.090	0.105	0.67	1.27	0.0311
b=29	0.0105	0.3177	1.36	636	0.318	0.100	0.115	0.60	1.27	0.0309
b=30	0.0134	0.4206	1.25	691	0.322	0.108	0.125	0.57	1.31	0.0310
b=31	0.0118	0.3038	1.17	748	0.335	0.117	0.135	0.53	1.31	0.0305
b=32	0.0122	0.3245	1.08	844	0.342	0.126	0.146	0.48	1.34	0.0308
b=33	0.0124	0.2636	1.00	900	0.350	0.134	0.157	0.45	1.34	0.0307
b=34	0.0159	0.3385	0.80	992	0.383	0.144	0.169	0.40	1.38	0.0302
b=35	0.0129	0.3386	0.71	1,250	0.370	0.157	0.184	0.38	1.38	0.0307
b=36	0.0152	0.2715	0.71	1,412	0.371	0.172	0.201	0.34	1.38	0.0308
b=37	0.0141	0.3037	0.62	1,769	0.385	0.188	0.223	0.30	1.38	0.0311
b=38	0.0152	0.3581	0.58	1,784	0.386	0.212	0.254	0.26	1.44	0.0314
b=39	0.0163	0.3599	0.54	2,287	0.416	0.256	0.309	0.21	1.44	0.0322
b=40	0.0184	0.5632	0.72	1,961	0.387	0.387	0.493	0.12	1.51	0.0338
Average	0.0126	0.3758	5.39	989	0.337	0.130	0.150	0.61	1.33	0.0315
Panel C: IFD Firms (7/20/1978-1/19/2012)										
b=41	0.0031	0.7280	5.85	212	0.483	-1.932	-1.673	0.17	1.73	0.0518
b=42	0.0083	0.7535	5.31	197	0.659	-0.750	-0.694	0.35	1.65	0.0483
b=43	0.0047	0.6946	3.71	205	0.364	-0.490	-0.457	0.44	1.55	0.0451
b=44	0.0055	0.6700	3.76	235	0.362	-0.360	-0.322	0.55	1.61	0.0437
b=45	0.0042	0.6198	4.04	288	0.356	-0.288	-0.229	0.64	1.67	0.0432
b=46	0.0093	0.7159	4.05	299	0.338	-0.216	-0.152	0.76	1.55	0.0408
b=47	0.0092	0.6270	3.93	339	0.318	-0.157	-0.103	0.84	1.58	0.0394
b=48	0.0085	0.5030	4.20	351	0.314	-0.135	-0.067	0.89	1.34	0.0393
b=49	0.0029	0.5921	4.28	408	0.370	-0.106	-0.038	0.96	1.42	0.0367
b=50	0.0084	0.5360	5.43	435	0.361	-0.088	-0.017	1.00	1.44	0.0360
b=51	0.0063	0.5943	6.91	488	0.360	-0.072	0.000	1.02	1.46	0.0347
b=52	0.0056	0.4933	15.39	530	0.272	-0.066	0.010	1.05	1.45	0.0334
b=53	0.0055	0.4900	11.74	548	0.271	-0.059	0.024	1.04	1.32	0.0335
b=54	0.0107	0.4212	13.66	596	0.268	-0.062	0.037	0.99	1.39	0.0333
b=55	0.0092	0.4738	8.66	698	0.274	-0.062	0.049	0.89	1.39	0.0336
b=56	0.0085	0.4320	3.21	890	0.277	-0.069	0.062	0.83	1.32	0.0339
b=57	0.0105	0.5279	3.17	994	0.280	-0.072	0.079	0.74	1.37	0.0344
b=58	0.0111	0.3712	3.01	1,006	0.299	-0.083	0.102	0.62	1.43	0.0343
b=59	0.0109	0.4682	3.06	1,011	0.315	-0.109	0.145	0.48	1.44	0.0364
b=60	0.0099	0.6478	2.19	1,046	0.336	-0.276	0.285	0.25	1.48	0.0406
Average	0.0076	0.5680	5.78	539	0.344	-0.273	-0.148	0.73	1.48	0.0386

Monthly return is equally weighted over firms in each portfolio. Skewness is over firms in a portfolio and then averaged over the time-series. Size is average market capitalization. Leverage is the average of book value of total liabilities divided by market value of equity. CAPX is the average of capital expenditures per annum divided by net fixed assets. TTM ROE and forward ROE are both medians. Beta is the slope coefficient in the regression of portfolio excess return on the CRSP value weighted excess return over the entire time series. The riskless rate is from a one-month T-bill. Volatility for a portfolio is a time-series median of the average return standard-deviation for firms in a portfolio.

At low forward *ROE*, D:NIFD firms in Table 3 have returns that exceed ND:NIFD firms and vice versa for high forward *ROE*. In the following sub-section, we investigate whether these return differences are normal (explained by risk differences) or abnormal.

EMPIRICAL RESULTS

Our Table 3 observations in the last section suggest a risk dispersion across and within business classes. The annual return spread between portfolios of high and low profitability firms is 12.6% for ND:NIFD firms (not in financial distress non-dividend paying), 5.04% for D:NIFD firms (not in financial distress dividend-paying) and 8.16% for IFD firms (in financial distress). Across the panels of Table 3, average monthly returns are 1.30% (highest) for D:NIFD firms and 0.76% (lowest) for IFD firms, which is an annual return spread of 12*(0.0130-0.0076)=6.48%. The annual return spread between highest profitability ND:NIFD firms (*b*=40) and least profitable IFD firms (*b*=41) is 12*(0.0184-0.0031)=18.36%. We conclude from these large spreads that firms are not of uniform risk either within or across business classes. In sections that follow, we study the economic risk determinants of these return spreads.

Fama-MacBeth Regressions of Portfolio Returns versus Volatility and CAPX Rates

In the Galai and Masulis (1976) perspective that equity is a call option on the assets of a firm, returns decrease with volatility. In Blazenko and Pavlov (2009), expected return for a business with an indefinite sequence of growing growth options decreases with volatility and increases with growth. A review of Table 3 shows that volatility and CAPX rates increase with each other. Regression in the current section separates the impact of growth and volatility on returns. To test for these impacts, we create four variables each for volatility and growth. The first volatility variable (similarly for growth) measures the impact of volatility on returns across business classes and the second, third, and fourth measure the differential impact of volatility on returns within each business class.

We measure return volatility for business class J=ND:NIFD, J=D:NIFD, and J=IFD as the average over firms of daily return standard deviations for the number of trading days, κ, in the 365 calendar days before statistical period t,

$$\sigma_{J,t} = \sum_{i=1}^{N_{J,t}} \frac{\sigma_{i,t}}{N_{J,t}} \qquad (5)$$

where $\bar{R}_i = \sum_{\tau=-1}^{-\kappa} R_{i,\tau}/\kappa$, $\sigma_{i,t} = \sqrt{\sum_{\tau=-1}^{-\kappa}\left(R_{i,\tau} - \bar{R}_i\right)^2/(\kappa-1)}$ and $N_{J,t}$ is the number of firms in business class *J* at Statistical Period date *t*. For Fama and MacBeth (1973) regressions, we define an across business class volatility variable at month *t*, $\sigma_{BC,t}$, as $\sigma_{D:NIFD,t}$ for element *b*=1,…,20 (that is, the same number repeated 20 times), as $\sigma_{ND:NIFD,t}$ for element *b*=21,…,40 (again, same number repeated 20 times), and $\sigma_{IFD,t}$ for element *b*=41,…,60 (again, the same number repeated 20 times). Each element in this vector of 60 elements is nonzero.

We define a differential within business class volatility variable at month *t* for D:NIFD firms (beyond the business class variable $\sigma_{BC,t}$) with nonzero elements for *b*=1,…,20 and zero otherwise. Element *b*=1,…,20 measures the volatility differential between portfolio *b* and the business class for D:NIFD companies, $\Delta\sigma_{D,t} = \sigma_{b,t} - \sigma_{D:NIFD,t}$ for *b*=1,2,…,20 and zero otherwise. Similarly, the elements for a differential within business class volatility-variable at month *t* for ND:NIFD firms, $\Delta\sigma_{ND,t}$, is zero for elements 1,…,20 and 41,…,60 and $\Delta\sigma_{ND,t}$=$\sigma_{b,t} - \sigma_{ND:NIFD,t}$ for *b*=21,…,40. Similarly, the elements for a differential within business class volatility variable at month *t* for IFD firms, $\Delta\sigma_{IFD,t}$, is zero for elements *b*=1,…,41 and $\Delta\sigma_{IFD,t}$=$\sigma_{b,t} - \sigma_{IFD,t}$ for elements *b*=41,…,60. In our Fama-MacBeth regressions below, $\sigma_{BC,t}$ measures the impact of volatility on returns across business classes and the variables $\Delta\sigma_{D,t}$, $\Delta\sigma_{ND,t}$, and $\Delta\sigma_{IFD,t}$ measure the differential impact of volatility on returns within each business class, respectively.

We use the notation $\chi_{i,b,t}$ to represent corporate growth for firm *i* in portfolio *b*=1,2,…,60, which is annual CAPX relative to net fixed assets (NFA) from the most recent year-end financial report before Statistical Period *t*. For our Fama and MacBeth (1973) regressions, we define an across business class growth variable at month t, $\chi_{BC,t}$ with the same methodology as in the previous paragraph for volatility. In addition, we define within business class growth variables at month *t* for D:NIFD firms, $\Delta\chi_{D,t}$=$\chi_{b,t} - \chi_{D:NIFD,t}$, for ND:NIFD firms, $\Delta\chi_{ND,t}$=$\chi_{b,t} - \chi_{ND:NIFD,t}$, and for IFD firms, $\Delta\chi_{IFD,t}$=$\chi_{b,t} - \chi_{IFD,t}$ (again using the methodology in the previous paragraph).

We regress the return for portfolio *b* at month *t*, $r_{b,t}$, on eight independent variables: four related to volatility and four related to growth (all measured prior to month *t*), $\sigma_{BC,t}$, $\Delta\sigma_{D,t}$, $\Delta\sigma_{ND,t}$, $\Delta\sigma_{IFD,t}$, $\chi_{BC,t}$, $\Delta\chi_{D,t}$, $\Delta\chi_{ND,t}$, and $\Delta\chi_{IFD,t}$, over the 60 portfolios *b*=1,2,…,60. We use volatility and growth as explanatory variables because they have theoretical justification from the equilibrium equity valuation model of Blazenko and Pavlov (2009) and we eschew variables without theoretical underpinning. In particular, we use no market variables like size, book/market or earnings yield to avoid econometric endogeneity. Our analysis in the current section is an ex-ante association between financial measures that investors can use for investment strategies before return realization. Our multifactor asset-pricing analysis in a later section is an ex-post contemporaneous association between portfolio returns and risk-factors. We form portfolios with forward *ROE* but include only volatility and growth as explanatory variables in equation (6) because profitability is not itself a risk-factor. Rather, profitability determines volatility and growth, which are risk-factors. In the current subsection, we study raw returns. In a later subsection, we study abnormal returns. For Statistical Period dates before 7/20/1978 there are less than 20 IFD firms and, therefore, we start our analysis thereafter. We repeat the cross-sectional regression in equation (6) for 402 statistical period months between 7/20/1978 and 1/19/2012 and report temporal averages of coefficient estimates in Table 4,

$$r_{b,t} = a_0 + a_1 \cdot \sigma_{BC,t} + a_2 \cdot \Delta\sigma_{D,t} + a_3 \cdot \Delta\sigma_{ND,t} + a_4 \cdot \Delta\sigma_{IFD,t} + a_5 \cdot \chi_{BC,t} + a_6 \cdot \Delta\chi_{D,t} + a_7 \cdot \Delta\chi_{ND,t} + a_8 \cdot \Delta\chi_{IFD,t} + \varepsilon_t \quad b=1,2,\ldots,60 \quad (6)$$

Table 4: Fama-MacBeth Regressions of Portfolio Returns versus Volatility and CAPX Rates

Independent Variable	Time Series Average of Parameter Estimates
Constant	$\overline{\hat{a}_0} = 0.0119$ (3.92)
Volatility Across Business Classes	$\overline{\hat{a}_1} = -0.601$ (-3.14)
Within Business Class Voltility (D)	$\overline{\hat{a}_2} = -0.403$ (-2.30)
Within Business Class Voltility (ND)	$\overline{\hat{a}_3} = -0.270$ (-1.77)
Within Business Class Voltility (IFD)	$\overline{\hat{a}_4} = -0.106$ (-0.756)
Growth Across Business Classes	$\overline{\hat{a}_5} = 0.056$ (2.75)
Within Business Class Growth (D)	$\overline{\hat{a}_6} = 0.025$ (2.44)
Within Business Class Growth (ND)	$\overline{\hat{a}_7} = 0.022$ (2.67)
Within Business Class Growth (IFD)	$\overline{\hat{a}_8} = -0.014$ (-1.45)
Average R^2	0.452
Average $\bar{R}^2$	0.366

Times series t-stats over parameter estimates are in parentheses. The notation D, ND, and IFD stands for dividend paying, non-dividend paying and in financial distress. The variable $\sigma_{BC,t}$ measures the impact of volatility on returns across business classes and the variables $\Delta\sigma_{D,t}$, $\Delta\sigma_{ND,t}$, and $\Delta\sigma_{IFD,t}$ measure the differential impact of volatility on returns within each of the business classes (D:NIFD, ND:NIFD, and IFD) respectively. We use the notation χ to denote corporate growth, which we measure as the annual CAPX rate relative to net fixed assets (NFA) from the most recent year-end financial report prior to statistical period date t. The variable $\chi_{BC,t}$ measures the impact of growth on returns across business classes and the growth variables, $\Delta\chi_{D,t}$ for D:NIFD firms, $\Delta\chi_{ND,t}$ for ND:NIFD firms, and $\Delta\chi_{IFD,t}$ for IFD firms, measure the differential impact of growth on returns within each of the business classes. We regress the return for portfolio b, $r_{b,t}$, on these eight independent variables (four for volatility and four for growth and all measured prior to month t) over the 60 portfolios b=1,2,…,60 at month t. We repeat this cross-sectional regression 402 times over the period 7/20/1978 to 1/19/2012 and report temporal averages of coefficient estimates.

Table 4 reports temporal averages of coefficient estimates in the cross-sectional Fama-Macbeth regressions in equation (6). The coefficient on the across business class volatility variable, $\overline{\hat{a}_1}$, is negative and statistically significant. The coefficient on the within-class volatility variables, $\overline{\hat{a}_2}$ and $\overline{\hat{a}_3}$, are negative and statistically significant for D:NIFD and ND:NIFD firms. This is strong evidence of a negative volatility impact on returns across business classes and within business classes but not for IFD firms. The coefficient on the across business class growth variable, $\overline{\hat{a}_5}$, is positive and statistically significant. The coefficients on the within-class growth variables $\overline{\hat{a}_6}$ and $\overline{\hat{a}_7}$ for D:NIFD and ND:NIFD firm, respectively, are also positive and statistically significant. This is strong evidence of a positive impact of growth-leverage on returns across and within business classes but not within-class for IFD firms.

Firms in Financial Distress and Managerial Risk Shifting

Across the business classes in Table 3, IFD firms have unexpectedly high CAPX rates that are roughly equal those of ND:NIFD firms and exceed by a wide margin those of D:NIFD firms. This observation is contrary to the Blazenko and Pavlov (2009) hypothesis that managers suspend business investments when faced with poor profit prospects. Rather, high CAPX rates with low profitability is consistent with managerial risk-shifting for firms in financial distress (Jensen and Meckling, 1976). We test this hypothesis by studying the relation between CAPX rates and profitability within and across business classes.

We regress the CAPX rate for portfolio b, $\chi_{J,b,t}$, on forward profitability, $ROE_{J,b,t}$, over the 20 portfolios in each of three business classes, *J*=D:NIFD, J=ND:NIFD, and J=IFD. We repeat these three cross-sectional regressions 432 times for *J*=D:NIFD and *J*=ND:NIFD firms and 402 times for *J*=IFD firms over Statistical Periods from 1/15/1976 to 12/15/2011 and from 7/20/1978 to 12/15/2011, respectively,

$$\begin{aligned} \chi_{D,b,t} &= b_0 + b_1 \cdot ROE_{D,b,t} + \omega_t \quad b=1,2,\ldots,20 \\ \chi_{ND,b,t} &= b_0 + b_1 \cdot ROE_{ND,b,t} + \omega_t \quad b=21,\ldots,40 \\ \chi_{IFD,b,t} &= b_0 + b_1 \cdot ROE_{IFD,b,t} + \omega_t \quad b=41,\ldots,60 \end{aligned} \tag{7}$$

In Table 5, for D:NIFD and ND:NIFD firms, the relation between CAPX and forward *ROE* is positive and statistically significant. This observation is consistent with the argument that managers use profitability to fund business investment because of financing constraints or the hypothesis that managers suspend expansion investments when faced with poor profit prospects. For IFD firms, the relation between CAPX and forward *ROE* is negative and statistically significant, which means that IFD and NIFD firms differ. There is no evidence that IFD firms use profitability as a funding source or that forward *ROE* reflects business prospects to encourage investment. The evidence is consistent with managerial risk-shifting for IFD firms. CAPX rates are higher for IFD firms when they are in the greatest financial distress.

Table 5: Fama-MacBeth Regressions of Portfolio CAPX on Forward Profitability (*ROE*)

Independent Variable	Dividend Paying (1/15/1976-12/12/2011)	Non-Dividend Paying (1/15/1976-12/12/2011)	In Financial Distress (7/20/1978-12/15/2011)
Constant	0.148 (102.2)	0.289 (83.0)	0.317 (39.2)
Forward ROE	0.423 (36.87)	0.317 (23.1)	-0.81 (-3.15)
Average R^2	0.58	0.37	0.19
Average $\bar{R}^2$	0.56	0.33	0.14

Forward annual ROE is I/B/E/S consensus analysts' annual earnings forecasts for the next unreported fiscal year as forward earnings divided by book equity from the most recent quarterly report prior to statistical period t. We report temporal averages of the coefficient estimates with t-stats in parentheses that are Newey and West (1987) adjusted.

There is further evidence of managerial risk-shifting in Table 5. Intercepts estimate CAPX rates of 31.7%, 14.8% and 28.9% a year for IFD, D:NIFD, and ND:NIFD firms with zero forward *ROE*, respectively. These estimates mean that CAPX has a "path dependence." Firms with modest profit prospects (zero forward *ROE*) have greater CAPX rates if they have been in financial distress recently (negative TTM earnings) compared with if they have not. This evidence is consistent with managers taking on risky investments because of financial distress.

Abnormal Portfolio Returns

In this section, we report evidence that D:NIFD firms have positive alphas, ND:NIFD firms have zero alphas, and IFD firms have negative alphas. If the multifactor asset-pricing model we use for bench-marking represents the collective understanding of investors in financial markets, we conclude that they do not recognize risk differences between these firms.

We use the Fama-French-Carhart four factor model (Fama and French, 1996, Carhart, 1997) with book/market, size, momentum, and a market factor to represent normal returns.

We need risk factors between Statistical Period dates like returns in equation (2). From Ken French's website, http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library, we download daily returns for the six Fama and French (1993) size and B/M portfolios to calculate monthly SMB and HML factors (value-weighted portfolios formed on size and then book/market) and the six size and momentum portfolios (value-weighted portfolios formed on size and return from twelve months to one month prior). To calculate monthly risk factors, we compound daily returns following the procedure on Ken French's website to create monthly SMB, HML, MOM, and market risk factors for statistical period months rather than calendar months. We risk-adjust the 60 D:NIFD, ND:NIFD, and IFD portfolios with these risk factors in the regression,

$$R_{b,t} - R_{f,t} = \alpha_b + \beta_{M,b} \cdot \left(R_{M,t} - R_{f,t}\right) + \beta_{SMB,b} \cdot SMB_t + \beta_{HML,b} \cdot HML_t + \beta_{MOM,b} \cdot MOM_t + \epsilon_{b,t}, \quad (8)$$

where $R_{b,t}$ is the return on portfolio b=1,2,…,60, in month t = 1,2,…,T, $R_{M,t}$ is the return on the *CRSP* value weighted index of common stocks in month t, SMB_t and HML_t are the small-minus-big and high-minus-low Fama-French factors, and MOM_t is the momentum factor. The monthly riskless rate, $R_{f,t}$, is the compounded simple daily rate, downloaded from the website of Ken French, that, over the trading days between statistical period dates, compounds to a 1-month T-Bill rate.

The purpose of the Gibbons, Ross, and Shanken (1989) (GRS) test is to search for pricing errors in an asset pricing model. We use the GRS statistic to test the hypothesis the regression intercepts are jointly equal to zero, $\alpha_1 = \alpha_2 = \cdots = \alpha_{20} = 0$, $\alpha_{21} = \alpha_{22} = \cdots = \alpha_{40} = 0$, and $\alpha_{41} = \alpha_{42} = \cdots = \alpha_{60} = 0$ within the D:NIFD, ND:NIFD, and IFD business classes. The alternative hypothesis is that there is a missing factor in the asset pricing model for a business class.

In Panel A of Table 6, the alphas for the twenty D:NIFD firms (b=1,2,…,20) are almost all positive and most are statistically significant especially for high profitability portfolios. The only portfolio with a negative alpha is b=1 (lowest profitability D:NIFD portfolio) but this alpha is not statistically significant. The two lowest profitability ND:NIFD portfolios (b=21 and b=22) have statistically negative alphas and the two highest profitability ND:NIFD portfolios (b=39 and b=40) have statistically positive alphas. Other than these two pairs, alphas for ND:NIFD portfolios are sometimes positive and sometimes negative but rarely statistically significant. The alphas for portfolios of IFD firms (b=41,…,60) are uniformly negative and often statistically significant.

The GRS statistic rejects the hypothesis $\alpha_1 = \alpha_2 = \cdots = \alpha_{20} = 0$ for D:NIFD firms but fails to reject the hypothesis $\alpha_{21} = \alpha_{22} = \cdots = \alpha_{40} = 0$ for ND:NIFD firms and $\alpha_{41} = \alpha_{42} = \cdots = \alpha_{60} = 0$ for IFD firms. These results suggest a missing factor for D:NIFD firms in the Fama-French-Carhart asset pricing model.

Factor Betas

The factor betas in Table 6 offer some interesting insights into the nature of risk for D:NIFD, ND:NIFD, and IFD firms. First, in Panel A, market betas are lowest for D:NIFD firms, higher for ND:NIFD firms, and highest for IFD firms. For portfolios of D:NIFD and ND:NIFD firms, market betas increase from low profitability to high profitability (*b*=1 to *b*=20 and *b*=21 to *b*=40).

In Panel B, SMB betas are lowest for D:NIFD firms, higher for ND:NIFD firms, and highest for IFD firms, which means that IFD firms are smallest, ND:NIFD firms larger, and D:NIFD firms largest.

The HML beta is largest and positive for D:NIFD portfolios. This observation means that part of the reason that D:NIFD firms have high raw returns is that they are value stocks although there is only modest confirming evidence for this observation in Table 3. Despite this high D:NIFD risk factor, in Panel A of Table 6, D:NIFD firms have positive alphas. In Panel C of Table 3, IFD firms have higher book/market than D:NIFD firms in Panel A. The HML beta for IFD portfolios in Panel B of Table 6 are sometimes positive and sometimes negative but rarely large. Thus, value is not a determinant of low IFD returns.

The momentum (MOM) beta is negative and always statistically significant for IFD firms (*b*=41,…,60). Of course, IFD firms have negative TTM earnings and, thus, their share prices have often decreased in the recent past. Lowest profitability D:NIFD and ND:NIFD portfolios have negative MOM betas. Highest profitability D:NIFD and ND:NIFD portfolios have positive MOM betas. Both these results arise from selection.

CONCLUDING COMMENTS

In this paper, we explain why the returns for non-dividend paying firms are no greater than dividend paying firms despite high risk metrics. We argue this anomaly arises because a larger fraction of non-dividend paying firms are in financial distress and, despite high distress-risk and high growth-leverage, firms in financial distress have low returns from high volatility that decreases the options-leverage of equity. We test this hypothesis with common-share returns and reporting data for US publicly traded companies. We find no unconditional return difference even though non-dividend paying firms have several characteristics that suggest high risk. Equivalently, because non-dividend paying firms have high risk-metrics, their returns are abnormally low compared with dividend-paying firms. Consistent with our hypothesis, we find that removing firms in financial distress from our sample (negative trailing twelve month earnings), returns for non-dividend paying firms increase relative to dividend-paying firms and abnormal returns disappear.

We argue that part of the reason that firms in financial-distress have high volatility that induces low returns is managerial risk-shifting. Consistent with this hypothesis, we present evidence that firms in financial distress have with unexpectedly high capital expenditure rates and firms in the greatest financial distress have the greatest capital expenditure rates.

We argue that volatility and growth-leverage have opposite impacts on returns. Consistent with this hypothesis, we find that across business classes, firms in financial distress with high volatility have low returns despite high growth-leverage and, within business classes, high profitability firms (not in financial distress) have both high raw-returns and high abnormal-returns despite high volatility.

Limitations of our Study

We have not explained why volatility dominates growth-leverage across business classes to produce low returns for firms in financial distress or why growth-leverage dominates volatility within business classes to produce high returns for high-profitability firms despite high volatility. An investigation of the relative strength of these forces and their joint impact on returns requires more exacting equity valuation models than the current financial literature provides.

Our explanation for high capital expenditure rates for firms in financial distress is managerial risk-shifting. There are alternative explanations. Blazenko and Pavlov (2010) argue that cost of capital is lesser for innovative compared with standard investments. Thus, high capital expenditure rates and low returns for firms in financial distress can arise if their investments are more innovative than other firms. Future research will test alternative hypotheses for high capital expenditure rates for firms in financial distress.

Additional Topics for Future Research

We have taken an investor perspective in our study of dividend-paying and non-dividend paying firms. For example, our ranking of firms by forward *ROE* in Table 3 creates an almost identical ranking of firms by realized average returns. We presume this ranking gives investors an equivalent expected-return ranking they can use for their portfolio decisions. Of course, an investor prospective is the opposite side of the same "coin" for corporate financial purposes and the equity cost of capital in the weighted average cost of capital. For this purpose, we need greater precision than is possible from an ordinal ranking of average realized raw returns. Instead, we need an equity cost of capital that reflects current interest rate conditions. To do this, we can reproduce Table 3 with excess returns above a "riskless" interest rate rather than average raw returns. The equity cost of capital for a particular firm from a particular business class and with a particular forward *ROE* is the current riskless interest rate plus a risk premium equal to a temporal average of past realized excess returns. In future research, we plan a comparison this equity cost of capital with alternatives.

Second, in the current paper, except when we use standard asset pricing methods, we avoid market measures as explanatory regression variables to avoid endogeneity problems. One market measure is the market/book ratio. Our analysis suggests a new hypothesis for the value-premium (high market/book "growth" stocks have lower returns than low market/book "value" stocks). We call this hypothesis the "Equity as a Call Option Hypothesis for the Value-Premium." The option features of high volatility firms gives them high market/book ratios and low returns (Galai and Masulis, 1976). We plan to test this hypothesis against alternative value-premium explanations in the financial literature.

Third, in the current paper, we note that average returns are lower but return skewness is greater for firms in financial distress compared with other firms. Our interpretation of this observation is that investors accept low returns because of a skewness preference. We plan a test this hypothesis in future research.

Table 6: Fama-French-Carhart Four-Factor Asset Pricing Model

Panel A: Alpha, Market Beta, and SMB Beta

	Alpha			Market Beta			SMB Beta		
Portfolio	D:NIFD	ND:NIFD	IFD	D:NIFD	ND:NIFD	IFD	D:NIFD	ND:NIFD	IFD
b=1,21,41	-0.0015	-0.0033*	-0.0092**	0.98	1.11**	1.27***	0.56***	0.95***	2.07***
b=2,22,42	0.0000	-0.0039***	-0.0039	0.92***	1.08	1.21**	0.44***	1.06***	2.02***
b=3,23,43	0.0005	-0.0015	-0.0056*	0.87***	1.05	1.07	0.36***	1.11***	1.96***
b=4,24,44	0.0009	0.0006	-0.0051	0.87***	1.06*	1.10	0.29***	1.00***	2.10***
b=5,25,45	0.0022**	-0.0006	-0.0079**	0.86***	1.07**	1.25***	0.24***	0.97***	1.84***
b=6,26,46	0.0007	-0.0019	-0.0020	0.86***	1.07	1.17***	0.24***	0.93***	1.67***
b=7,27,47	0.00023**	0.0000	-0.0001	0.86***	1.07*	1.14**	0.28***	1.00***	1.73***
b=8,28,48	0.0012	-0.0010	-0.0022	0.89***	1.06*	0.99	0.34***	1.03***	1.63***
b=9,29,49	0.0026***	-0.0012	-0.0076***	0.88***	1.08**	1.06	0.32***	0.89***	1.57***
b=10,30,50	0.0021**	0.0016	-0.0018	0.91***	1.12***	1.08	0.35***	0.88***	1.50***
b=11,31,51	0.0020**	-0.0008	-0.0050**	0.94**	1.13***	1.14***	0.34***	0.96***	1.50***
b=12,32,52	0.0025**	-0.0009	-0.0064***	0.95*	1.18***	1.18***	0.30***	0.91***	1.39***
b=13,33,53	0.0026**	0.0003	-0.0055***	0.97	1.14***	1.07	0.32***	0.92***	1.23***
b=14,34,54	0.0031***	0.0030*	-0.0001	0.98	1.18***	1.18***	0.27***	1.02***	1.06***
b=15,35,55	0.0022**	0.0009	-0.0025	1.00	1.20***	1.14***	0.21***	0.79***	1.25***
b=16,36,56	0.0031***	0.0027	-0.0028	1.04	1.19***	1.07*	0.24***	0.87***	1.27***
b=17,37,57	0.0027**	0.0020	-0.0014	1.05*	1.21***	1.14***	0.20**	0.74***	1.19***
b=18,38,58	0.0024**	0.0021	-0.0006	1.08***	1.23***	1.21***	0.18**	1.03***	1.07***
b=19,39,59	0.0028***	0.0035*	-0.0010	1.10***	1.22***	1.18***	0.20**	1.01***	1.28***
b=20,40,60	0.0035***	0.0046**	-0.0021	1.07***	1.30***	1.20***	0.18**	1.06***	1.35***
GRS	1.69	1.34	1.25						
(p-value)	0.032	0.149	0.209						

Panel B: HML Beta, MOM Beta, and R^2

	HML Beta			Momentum Beta			R^2		
Portfolio	D:NIFD	ND:NIFD	IFD	D:NIFD	ND:NIFD	IFD	D:NIFD	ND:NIFD	IFD
b=1,21,41	0.54***	0.15**	-0.11	-0.19***	-0.34***	-0.30**	0.88	0.77	0.63
b=2,22,42	0.52***	0.16**	-0.06	-0.12***	-0.19***	-0.28***	0.89	0.83	0.66
b=3,23,43	0.57***	0.26***	-0.27**	-0.12***	-0.17***	-0.35***	0.89	0.82	0.69
b=4,24,44	0.55***	0.09	-0.29**	-0.10***	-0.18***	-0.35***	0.88	0.81	0.69
b=5,25,45	0.50***	0.10	-0.13	-0.08***	-0.12***	-0.26***	0.88	0.80	0.73
b=6,26,46	0.48***	0.09	-0.05	-0.04	-0.13***	-0.31***	0.88	0.77	0.75
b=7,27,47	0.43***	0.07	-0.25**	-0.07***	-0.11**	-0.36***	0.87	0.81	0.72
b=8,28,48	0.45***	0.02	0.10	-0.03	-0.13***	-0.31***	0.88	0.84	0.67
b=9,29,49	0.41***	0.01	-0.02	-0.05	-0.12**	-0.34***	0.87	0.81	0.76
b=10,30,50	0.38***	-0.07	0.01	-0.06*	-0.08	-0.39***	0.88	0.79	0.68
b=11,31,51	0.40***	0.07	0.18*	-0.08**	-0.08	-0.36***	0.88	0.83	0.82
b=12,32,52	0.35***	0.09	0.25***	-0.03	-0.02	-0.29***	0.85	0.76	0.78
b=13,33,53	0.37***	-0.07	0.12*	-0.07*	-0.07	-0.24***	0.86	0.81	0.77
b=14,34,54	0.31***	-0.06	0.22***	-0.05	-0.03	-0.25***	0.86	0.82	0.80
b=15,35,55	0.29***	-0.10	0.15	0.01	-0.08*	-0.22***	0.86	0.83	0.75
b=16,36,56	0.21***	-0.18**	0.22***	-0.01	0.02	-0.26***	0.87	0.81	0.82
b=17,37,57	0.22***	-0.15*	0.13*	0.00	-0.03	-0.16***	0.87	0.80	0.77
b=18,38,58	0.12**	-0.14*	0.19*	-0.02	0.01	-0.27***	0.87	0.82	0.79
b=19,39,59	0.10*	-0.19**	0.15*	-0.03	0.01	-0.22***	0.88	0.81	0.77
b=20,40,60	0.07	-0.13	0.06	0.01	0.03	-0.20***	0.85	0.78	0.72

The symbols ***, **, and * represent statistical significance at the 1, 5, and 10% levels, respectively. The test for market betas, $\beta_{M,b}$, is against a null-hypothesis of unity and all other t-tests are against a null-hypothesis of zero.

APPENDIX

In the modeling of equation (1), if the returns of portfolio 2 determine the returns of portfolio 1 (plus an error), and if a multifactor model determines the returns of portfolio 2, then the excess return of portfolio 1 will be β times that of portfolio 2. Thus, we do not assume a single factor return generating model.

Suppose a two-factor model (factor A and B) for the returns of portfolio 2 (the generalization is obvious),

$r_2 = E(r_2) + g_A \cdot f_A + g_B \cdot f_B + \xi$ (A1)

where $f_A = r_A - E(r_A)$ and $f_B = r_B - E(r_B)$ are the unexpected parts of economic factors A and B that determine returns. The excess return of portfolio 2 is

$E(r_2) - r_f = g_A \cdot [E(r_A) - r_f] + g_B \cdot [E(r_B) - r_f]$ (A2)

Since the returns of portfolio 2 determine the returns of portfolio 1,

$r_1 = \alpha + \beta \cdot r_2 + \epsilon$ (A3)

Substitute equation (A1) in (A3),

$r_1 = \alpha + \beta \cdot [E(r_2) + g_A \cdot f_A + g_B \cdot f_B + \xi] + \epsilon$

$= \alpha + \beta \cdot E(r_2) + \beta \cdot g_A \cdot f_A + \beta \cdot g_B \cdot f_B + \beta \cdot \xi + \epsilon$ (A4)

$= [\alpha + \beta \cdot E(r_2)] + (\beta \cdot g_A) \cdot f_A + (\beta \cdot g_B) \cdot f_B + [\beta \cdot \xi + \epsilon]$

Take the expectation of (A3),

$E(r_1) = \alpha + \beta \cdot E(r_2)$ (A5)

and replace the first term of (A4) with (A5),

$r_1 = E(r_1) + (\beta \cdot g_A) \cdot f_A + (\beta \cdot g_B) \cdot f_B + [\beta \cdot \xi + \epsilon]$ (A6)

(A6) shows that the return of portfolio 1 is determined by the two factors, A and B, with sensitivity βg_A for factor A and βg_B for factor B. Therefore, the excess return of portfolio 1 becomes:

$E(r_1) - r_f = (\beta \cdot g_A) \cdot [E(r_A) - r_f] + (\beta \cdot g_B) \cdot [E(r_B) - r_f]$

$=\beta\{g_A \cdot [E(r_A) - r_f] + g_B \cdot [E(r_B) - r_f]\}=\beta[E(r_2) - r_f]$

The excess return of portfolio 1 is β times that of portfolio 2.

REFERENCES

Altman, E.I. (1968) "Financial ratios, discriminant analysis and the prediction of corporate bankruptcy," *Journal of Finance*, 23(4), 589-609.

Ang, A., Hodrick, R., Xing, Y., and Zhang, X. (2006) "The cross-section of volatility and expected returns," *Journal of Finance*, 61(1), 259-299.

Black, F. and Scholes, M. (1973) "The pricing of options and corporate liabilities," *Journal of Political Economy*, 81(3), 637-655.

Blazenko, G. and Fu, Y. (2013) "Value versus growth in dynamic equity investing," *Managerial Finance*, 39(3), 272-305.

Blazenko, G. and Fu, Y. (2010) "Non-dividend paying stocks and the negative value premium," *SSRN Working Paper. Available at: http://ssrn.com/abstract=1654705*

Blazenko, G. and Pavlov, A.D. (2009) "Investment timing for dynamic business expansion," *Financial Management*, 38(4), 837-860.

Blazenko, G.W. and Pavlov, A.D. (2010) "Investment timing for new business ventures," *The Journal of Entrepreneurial Finance*, 15(1), 37-68.

Brenner, M. and Smidt, S. (1978) "Asset characteristics and systematic risk," *Financial Management*, 7(4), 33-39.

Campbell, J.Y., Hilscher, J., and Szilagyi, J. (2008) "In search of financial distress," *Journal of Finance*, 63(6), 2899-2939.

Carhart, M. (1997) "On persistence in mutual fund performance." *Journal of Finance*, 52(1), 57-82.

Christie, A. (1982) "The stochastic behavior of common stock variances: value, leverage, and interest rate effects," *Journal of Financial Economics*, 10(4), 407-32.

Chung, D.Y., Dusan, I., and Perignon, C. (2007) "Repurchasing shares on a second trading line," *Review of Finance*, 11(2), 253-285.

DeAngelo, H., DeAngelo, L., and Stulz, R.M. (2006) "Dividend policy and the earnings/contributed capital mix," *Journal of Financial Economics*, 81(2), 227-254.

Dichev, I.D. (1998) "Is the risk of bankruptcy a systematic risk?" *Journal of Finance*, 53(3), 1131-1147.

Fama, E.F. and French, K.R. (2006) "Profitability, investment, and average returns," *Journal of Financial Economics*, 82(3), 491-518.

Fama, E.F. and French, K.R. (2001) "Disappearing dividends: changing firm characteristics or lower propensity to pay?" *Journal of Financial Economics*, 60(1), 3-43.

Fama, E.F. and French, K.R. (1996) "Multifactor explanations of asset pricing anomalies," *Journal of Finance*, 51(1), 55-84.

Fama, E.F. and French, K.R. (1993) "Common risk factors in the returns on stocks and bonds." *Journal of Financial Economics*, 33(1), 3-56.

Froot, K.A., Scharfstein, D.S., and Stein, J.C. (1993) "Risk management: coordinating corporate investment and financing policies," *Journal of Finance*, 48(5), 1629-1658.

Fuller, K.P. and Goldstein, M.A. (2011) "Do dividends matter more in declining markets?" *Journal of Corporate Finance*, 17(3), 457-473.

Galai, D. and Masulis, R.W. (1976) "The option pricing model and the risk factor of stock," *Journal of Financial Economics*, 3(1/2), 53-81.

Garlappi, L. and Yan, H.Y. (2011) “Financial distress and the cross section of equity returns,” *Journal of Finance*, 66(3), 789-822.

Gibbons, M., Ross, S., and Shanken, J. (1989) “A test of the efficiency of a given portfolio,” *Econometrica*, 57(5), 1121-1152.

Griffin, J.W. and Lemmon, M.L. (2002) “Book-to-market equity, distress risk, and stock returns,” *Journal of Finance*, 57(5), 2317-2336.

Grullon, G. and Michaely, R. (2002) “Dividends, share repurchases and the substitution hypothesis,” *Journal of Finance*, 57(4), 1649-1684.

Grullon, G., Paye, B., Underwood, S., and Weston, J.P. (2011) “Has the propensity to pay out declined?” *Journal of Financial and Quantitative Analysis*, 46(1), 1-24.

Jensen, M.C. and Meckling, W.J. (1976) “Theory of the firm: managerial behavior, agency costs and ownership structure,” *Journal of Financial Economics*, 3(4), 305-360.

Katz, S., Lilien, S., and Nelson, B. (1985) “Stock market behavior around bankruptcy: distress and recovery predictions,” *Financial Analysis Journal*, 41(1), 70-74.

Lee, B-S. and Rui, O.M. (2007) “Time series behavior of share repurchases and dividends,” *Journal of Financial and Quantitative Analysis*, 42(1), 119-142.

Miller, M. and Modigliani, F. (1961) “Dividend policy, growth, and the valuation of shares,” *Journal of Business*, 34(4), 411−433.

Newey, W.K. and West, K.D. (1987) "A simple, positive semi-definite, heteroskedastic and autocorrelation consistent covariance matrix," *Econometrica*, 55(3), 703-708.

Ohlson, J.A. (1980) “Financial ratios and the prediction of bankruptcy,” *Journal of Accounting Research*, 18(1), 109-131.

Pastor, L. and Veronesi, P. (2003) “Stock valuation and learning about profitability,” *Journal of Finance*, 58(5), 1749-1789.

Rubin, A. and Smith, D. (2009) “Institutional ownership, volatility and dividends,” *Journal of Banking and Finance*, 33(4), 627-639.

Tobin, J. (1969) “A general equilibrium approach to monetary theory,” *Journal of Money, Credit and Banking*, 1(1), 15-29.

ACKNOWLEDGEMENTS

Without sharing fault, we thank the editor Terrance Jalbert, two anonymous reviewers, Alexander Barinov, Katheleen Fuller, Michael Goldstein, John Wei, Robert Faff, Louis K.C. Chan, Johnathan Berk, Heitor Almeida, Diane Del Guercio, Lorenzo Garlappi, Jason Chen, Masahiro Watanabe, Liyan Yang, Wen-I Chuang, Weiqi Zhang, Adlai Fisher, Murray Carlson, Andrey Pavlov, Christina Antanasova, Amir Rubin, Peter Klein, Rob Grauer, and Alexander Vedrashko and participants at the International Conference of the Taiwan Finance Association, May 2013, National Yunlin University of Science and Technology, Taipei, Taiwan for comments.

BIOGRAPHY

Yufen Fu is an Assistant Professor of Finance at Tunghai University, Taichung, Taiwan, 181, Sec.3, Taichung-kan Rd., Taichung, Taiwan, R.O.C, e-mail: yufenfu@thu.edu.tw

George Blazenko is a Beedie School of Business Professor of Finance at Simon Fraser University, 500 Granville Street, Vancouver, BC, Canada, V6C 1W6, e-mail: blazenko@sfu.ca His publications have appeared in such journals as: *Journal of Finance*, *American Economic Review*, *Financial Management*, *Managerial Finance*, and *Management Science*.

International Journal of Business and Finance Research
Vol. 9, No. 2, 2015, pp. 21-38
ISSN: 1931-0269 (print)
ISSN: 2157-0698 (online)

www.theIBFR.org

HOW DO BROAD-BASED STOCK OPTION GRANTS AFFECT FIRMS' OVERALL FUTURE PRODUCTIVITY?

Wenjing Ouyang, University of the Pacific
Menghistu Sallehu, Eastern Illinois University

ABSTRACT

We investigate the impact of broad-based stock option grants on future firm productivity using a sample of U.S. firms from 1990-2006. We focus on stock option grants predominantly to rank-and-file employees (broad-based stock options) because significant amount of stock options are granted to rank-and-file employees other than the top five named executives. This study documents that the extent of broad-based stock option grants are negatively associated with future firm productivity. Further tests show this negative relation is attenuated by a firm's financial constraints and stock price informativeness but is exacerbated in "new economy" industry firms. We interpret these results as evidence that the expected incentive effect of broad-based stock options fails to compensate for the additional direct and indirect costs associated with such compensation programs. In cases when it is necessitated by a firm's financial condition or when stock price informativeness closely link its value with firm performance, the broad-based stock option less likely leads to diminished productivity. However, it more likely does so in firms where resources for R&D and capital investment are crucial for growth. Robustness tests show endogeneity issues do not drive our results. Other than making significant contribution to the academic literature, this study also has important practical implications in designing efficient compensation packages.

JEL: G30, J33

KEYWORDS: Broad-Based Stock Options, Productivity, Financial Constraints, New Economy Industry, Stock Price Informativeness

INTRODUCTION

We investigate the impact of broad-based stock options on future firm productivity, and the extent to which this relationship is influenced by a firm's financial condition, industry practice, and stock price informativeness. Firms implement stock option programs to attract risk-neutral entrepreneurial employees and to motivate these employees by giving them the opportunity to share the wealth created through their added effort (Oyer and Schaefer, 2005; Core and Guay, 2001). This view seems to be well received by corporate boards such that adoption of option programs permeates through a wide spectrum of firms across many industries. Over the course of a few decades, the number of U.S. employees holding stock options exploded from as few as 250,000 in the late 1970s to about 3.1 million in 2002 (Revsine, Collins, Johnson, and Mittelstaedt, 2012). For firms in the S&P 500 index, Murphy (2012a) estimates that the dollar value of stock options per company increased from $27 million in 1992 to roughly $300 million in 2000 even though the average fell to $88 million in 2005. From 1992 through 2005, between 85% – 90% of annual option grants were awarded invariably to employees other than the top five named firm executives (Hall and Murphy, 2003; Murphy, 2012a).

Even though employees below the top five executives receive a significant portion of stock option grants, the implication of such grants on future firm productivity is not well understood. Sesil, Kroumova, Blasi, and Kruse (2002) investigate the performance of "New Economy" firms after implementation of broad-based stock option programs and report higher value added per employee but not higher Tobin's Q or knowledge generation. Using a panel data, Sesil and Lin (2011) re-examine the issue of broad-based stock option granted in 206 firms. Their finding generally indicates that value added per employee marginally improves one year after initiation of broad-based stock option but then dissipates afterwards. Similarly, Aboody, Johnson, and Kasznik (2010) show firms that re-price underwater stock options for non-executive employees do not show improvement in their subsequent performance. In contrast, Hochberg and Lindsey (2010) show evidence that suggests a positive association between existence of broad-based option programs and higher adjusted ROA, particularly in small or high growth firms.

Given the prevalence and significance of broad-based stock options, understanding that whether such programs deliver the desired outcome is important to those interested in designing efficient compensation contracts. Our study documents the performance implication of broad-based options. By doing so, we direct investors' and regulators' attention toward the consequence of a significant part of option grants that is generally neglected. We hypothesize that broad-based stock options are negatively related to future productivity. Our prediction is based on the premise that employee risk aversion necessitates options with low value-to-cost ratio and that options are generally granted as add-on compensation (Hall and Murphy, 2003). Because employees are not diversified, the value of option grants should be greater than the amount that would have been paid in cash. Put differently, the value of the options to the employee is generally lower than the cost of these instruments to the employer.

Furthermore, implementation of broader incentive programs fail to incent individual employees because individuals' rewards depend on increase in the value of the firm as opposed to directly measurable outcome (Core and Guay, 2001; Oyer and Schaefer, 2005), not to mention stock prices may not fully reflect the value of firm fundamentals (Wurgler, 2000; Durnev, Morck, and Yeung, 2004; Chen, Goldstein, and Jiang, 2007). As rewards are shared among a large number of participants based on a broad performance measure, an individual employee is likely to free ride off other members by holding back his effort (Alchian and Demsez, 1972; Weitzman and Kruse, 1990). Collectively, the existing literature suggests that broad-based stock options constitute increase in compensation without a matching downward adjustment to other forms of compensation, and too diffused to incent individual employees. Prior research also shows that stock options are predictors of share repurchase and that such repurchases prompt firms to divert funds away from necessary investments in productive assets and R&D (Bens et al., 2002; Bhargava, 2013). If stock options generally represent costly compensation that trigger resource diversion, widespread distribution of options to rank-and-file employees is likely to lead to greater resource diversion and cuts culminating in diminished future productivity.

We test our hypothesis using a sample of 12,067 firm-year observations for 1,976 U.S. firms over the period from 1996 to 2006. Our results show that broad-based stock option grants are negatively associated with future productivity measured by the relative efficiency score of the firm. Specifically, we find that the future productivity is lower in the presence of more broad-based stock options compared to when there are less broad-based stock options. Additionally, our results show that the future productivity of the firm decreases as the proportion of option granted to rank-and-file employees increases. Results are robust to using both continuous and dichotomous proxies of broad-based stock options and to controls of CEO and executive stock options. These results support our hypothesis that broad-based stock options lead to diminished future productivity. Our tests to examine the effect of broad-based stock options in New Economy industries, where such programs are prevalent, show that the negative relationship between broad-based stock options and future productivity is exacerbated in these industry firms.

This result supports that argument that, being an add-on compensation, broad-based stock options more likely diminish future productivity in firms that resources for R&D and capital investment are crucial for growth. On the other hand, we find the negative relationship is attenuated when firms face financial constraints at the time of granting these options or when stock prices are more informative of the value of firm fundamentals. These evidence suggest when broad-based stock options are necessitated by a firm's financial condition or when stock price informativeness closely link the option value with firm performance, such option grants less likely lead to diminished productivity. In robustness tests, we discuss endogeneity issues, the employee size effect, and the impact of enhanced corporate governance. We get consistent results supporting previous arguments. We extend the literature by showing the relationship between the specific extent of granted broad-based stock options and future productivity. Sesil and Lin (2011) and Sesil et al. (2002) study the performance of firms subsequent to initiation of broad-based stock option programs. Similarly, Aboody et al. (2010) examine firm performance after re-pricing of underwater executive and employee stock options. Different from these studies that focus on the existence of broad-based stock options, we examine the relationship between the extent of broad-based stock options and future productivity. Our results show that when the extent is considered, granting relatively more broad-based stock options actually reduces firm productivity. In addition, our study uses a more comprehensive measure of future productivity under Data Envelopment Analysis (DEA).

The output of the DEA model is a relative efficiency score for each Decision Making Unit (DMU) determined using a linear programming method that was initially developed by Charnes, Cooper, and Rhodes (1978) and later extended by Banker, Charnes, and Cooper (1984). DEA does not require the researcher to make assumptions about the particular production function of sample firms; it rather allows measurement of relative productivity based on the observed input and output relationships for all decision-making units. Prior studies generally assume the Cobb-Douglas production function and use ROA or sales per employee as performance measures. In contrast, our performance metric is less subjective, more comprehensive, and less susceptible to mechanical change.

Our study also extends the current research that examines corporate actions subsequent to option grants. Bhargava (2013) and Bens et al. (2002) show that firms appear to divert resources required for R&D and capital expenditure toward prevention of dilution of earnings per share (EPS) following option grants and exercises. We extend this literature by showing that these corporate actions, which are prompted by option grants, are followed by decline in productivity. In addition, this study contributes to the literature of stock price informativeness. Existing studies show more informative stock prices improves managerial decisions (Wurgler, 2000; Durnev et al., 2004; Chen et al., 2007). This paper provides new evidence that this information enhances the positive impact of broad-based stock options on future productivity. Finally, we inform the studies on compensation in general. The existing literature shows that executive stock options constitute a significant part of incentive-based compensation and that properly designed stock-based compensation aligns the interests of executives and shareholders (Hall and Murphy, 2002; Murphy, 2012b). We provide new evidence that the extent of broad-based stock option grants, which represents option grants to non-executive employees, do not benefit shareholders in that it is negatively associated with future productivity. The rest of the paper proceeds as follows. We review the related literature and develop our hypotheses in section 2. In section 3, we describe our empirical methods and the sample selection process. We discuss our empirical results in section 4 and summarize our findings in section 5.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The significant increase, over the last few decades, of executive pay has been fueled by the grant-date value of stock options. Hall and Murphy (2003) show that the value of option grants, mainly to nonexecutive employees, by S&P 500 companies increased approximately tenfold between 1992 and 2002. Over the same period, the use of stock option as a form of compensation has expanded to lower level employees. For example, a 2002 survey by National Center for Employee Ownership shows that over a quarter of all public firms granted options to all or most of full time employees. This phenomenon is widespread across many industries and trends show that the majority of such option grants are for employees below the top five named executives (Hall and Murphy 2003; Oyer and Schaefer 2005; Mehran and Tracy 2001). The upward trend and prevalence of stock-based compensation has attracted considerable research interest in recent years.One view holds that these programs incent employees toward better performance. Typical option plans lead to realized compensation if stock prices increase subsequent to the grant date. The resulting partial stake in company's performance is expected to induce desirable outcome by aligning employees' incentive with that of shareholders' (Conyon and Murphy, 2000; Hillegeist and Panalva 2003). Another view suggests that the primary motivation behind broad-based stock option grants is perhaps sorting and retention of entrepreneurial employees. Oyer and Schaefer (2005) show that stock options can be efficient instruments to attract sufficiently optimistic employees who are willing to accept large reduction in cash compensation. In addition, the required vesting period of options helps companies prevent costly employee turnover. Other studies suggest that incentive, sorting, and retention motives may not be mutually exclusive (Hochberg and Lindsey, 2010; Core and Guay 2001). Hochberg and Lindsey (2010) show that implied incentive in broad-based employee options is associated with future performance while Core and Guay (2001) document that firms use employee stock options to incent employees and when those firms face cash constraints or when they need [equity] financing.

We focus on the implication of broad-based stock options on future firm performance regardless of the stated objective of program initiations. Our hypotheses are predicated on the premise that future firm performance is related to stock option grants. Employee motivation through profit sharing is generally presumed to promote modes of behavior that enhance productivity; however, theory also suggests that the associated increase in risk and co-determination may inhibit productivity (Weitzman and Kruse, 1990). Remunerations based upon production outputs represent a shift from fixed wage to variable wage system where employees' pays will be subjected to risk. As employee income is less diversifiable, variable compensation will have a deleterious effect on employee motivation. Profit sharing also transfers profit from capitalists, with the consequent decline in the capitalists' incentive and decision-making authority. For top-executives, the direct link between their effort and stock price performance provides a potent motivation. As a result, incentives through option grants or re-pricing are likely to enhance firm performance (Aboody et al. 2010; Sesil and Lin, 2011).

We posit that stock options granted to rank-and-file employees are less effective in soliciting more efforts from employees than options to named top executives. Unlike top executives, rank-and-file employees do not consider their efforts directly affect stock price performance. In addition, the number of participants who share the outcome of greater effort is large. Such lack of direct effort-output relationship and division of reward among a large number of participants tends to prompt each member to free ride off other members by holding back his effort (Alchian and Demsetz, 1972; Weitzman and Kruse, 1990). In the context of stock option awards, Aboody et al. (2010) examine performance consequence of re-pricing of under-water stock options for 300 firms and show that re-pricing of options to rank-and-file employees does not appear to lead to improvement in operating income or cash flows. Similarly, Sesil and Lin (2011) report that after the broad-based stock option grants the improvement in employee value-added is short lived.

In addition, broad-based options bring more cost burden to the granting firm. Most broad-based stock option plans are added on top of existing compensation packages (Hall and Murphy, 2003). The economic cost of option grants is greater than that of other forms of compensation because it increases the stock-price risk. More specifically, the option's value-to-cost ratio is 50% or less (Hall and Murphy, 2002). This means that the value of compensation a company has to offer is greater if it is in the form of stock option than it is in another form of compensation. Another cost burden to the granting firm comes from the fact that stock option grants lead to diminished long-term growth. Bhargava (2013) shows that the executive stock option grants and exercises are positively associated with subsequent stock repurchases in an effort to avoid EPS dilution. However, funds used in stock repurchases are those diverted away from R&D and capital expenditures needed for long-term growth (Bens et al., 2002). If firms granting stock options generally tend to invest less optimally due to resource diversion, their future productivity is likely to diminish. Because broad-based stock options do not induce efforts from employees but divert resources needed for future growth, we hypothesize the following:

H1: Broad-based stock option grants are negatively associated with future productivity.

Core and Guay (2001) document that broad-based stock options are more likely granted by firms with greater capital requirements and financing constraints. Since the primary motivation of constrained firms to grant broad-based options is to conserve resources, we argue that these firms less likely experience 'add-on compensation' or 'low value-to-cost' problem mentioned above. Firms in New Economy industries are characterized by aggressive use of stock-based executive and non-executive compensation (Ittner, Lambert, and Larcker, 2003). Meanwhile, these firms are also characterized by being in the innovation-driven competitive environment. In order to succeed in such a competitive environment, firms should invest in infrastructure and intellectual property. To the extent that extensive use of stock option compensation forces them to scale back R&D and capital expenditures, their future productivity is likely to suffer to a greater extent. Because of the unique characteristics of financially constraint firms and firms in New Economy industries, we hypothesize the following:

H2a: The relationship between broad-based stock options and future productivity is less negative for firms facing financial constraints.

H2b: The negative relationship between broad-based stock options and future productivity is exacerbated for firms in the New Economy industries.

The channel through which stock option grants solicit better employee performance depends on the assumption that stock prices reflect firm performance. A series of studies show stock prices can reflect different amounts of information about firm performance (Wurgler, 2000; Durnev et al., 2004; Chen et al., 2007). When stock prices are more informative, managers whose compensation has high pay-performance sensitivity are more likely to react to stock price changes in making corporate decisions (Kau, Linck, and Rubin, 2008). It suggests that because stock price informativeness increases the link between the value of stock-based compensation and firm performance it intensifies the positive impact of stock-based compensation in aligning the interests between managers and shareholders. One of the purposes to grant broad-based stock options is also to align the interests between rank-and-file employees and shareholders. If stock prices more closely reflect the value of firm fundamentals, we expect broad-based option grants more likely solicit better performance from non-executive employees.

H3: The relationship between broad-based stock options and future productivity is less negative when stock prices are more informative of firm fundamentals.

DATA AND METHODOLOGY

Determining productivity of a firm requires observation of the input-output process of a firm and comparing output with the expected performance level. Since expected performance level is not observable, such an assessment can best be achieved by constructing a benchmark from observed practice of other firms operating under similar conditions (Athanassopoulos and Ballantine, 1995). We perform our analyses using output from Data Envelopment Analysis (DEA). The output of the DEA model is a relative efficiency score for each Decision Making Unit (DMU) determined using a linear programming method that was initially developed by Charnes, Cooper, and Rhodes (1978) and later extended by Banker, Charnes, and Cooper (1984). A distinct advantage of DEA over parametric methods is that estimation of productivity under DEA does not require the researcher to impose specific functional form of the production process. Furthermore, DEA allows development of an overall performance measure when DMUs use multiple inputs to produce single or multiple outputs. We obtain DEA output (efficiency score) for each firm-year of our sample firms from output used in Demerjian, Lev, and McVay (2012). Demerjian et al. (2012) construct the DEA output for firms on COMPUSTAT based on annual data for 1980 – 2009. To estimate the productivity measure, they identify seven input and one output variables. The seven input variables used are net property, plant and equipment; net operating leases; net R&D; goodwill; other intangible assets; cost of goods sold; and selling, general and administrative expenses while the output variable is sales.

Each productivity score under DEA is a measure of firm performance in a given year relative to the best-observed practice in the industry. Demerjian et al. (2012) construct the best-observed practice using observed annual input-output relationships of all firms in each Fama-French industry classification. More specifically, the relative efficiency measure for each DMU_j is developed using the model shown below where θ_j is computed as the reciprocal of the inefficiency measure (Φ_j):

$$\Phi_j = \max \Phi \tag{1a}$$

$$subject\ to: \quad X_{ji} \geq \sum_{j=1}^{N} \lambda_j X_{ji} \tag{1b}$$

$$\Phi Y_j \leq \sum_{j=1}^{N} \lambda_j Y_j \tag{1c}$$

$$\sum_{j=1}^{N} \lambda_j = 1 \tag{1d}$$

$$\lambda_j \geq 0 \tag{1e}$$

where X_{ji} is the quantity of input consumed by firm j; Y_j is the quantity of output produced by firm j; and λ_j is the weight placed on the inputs or output of firm j. The relative efficiency measure that results from solving the above linear program for each DMU_j falls between 0 and 1. A DMU with a DEA efficiency score of 1 (and 0 slack) is efficient; and the lower the score, the less efficient the unit is compared to the rest of the population.

Productivity Regressions

To assess the effect of broad-based stock options on productivity, we use the efficiency scores as dependent variable in the regression specification shown under equation 2. Banker and Natarajan (2008) show that OLS regression where DEA efficiency score is the dependent variable yield consistent estimators of coefficients. Hoff (2007) and McDonald (2009) validate the claim. Thus, we use the following OLS regression to assess the impact of broad-based stock options (NON_EXE_OPT) on productivity:

$$PROD_{i,t+1} = \beta_0 + \beta_1 NON\_EXE\_OPT_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 COMPET_{i,t} + \beta_5 AGE_{i,t} + \beta_6 LEV_{i,t} + \beta_7 PE_{i,t} + \varepsilon_{i,t} \tag{2a}$$

$$PROD_{i,t+1} = \beta_0 + \beta_1 NON\_EXE\_OPT_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 COMPET_{i,t} + \beta_5 AGE_{i,t} + \beta_6 LEV_{i,t} + \beta_7 PE_{i,t} + \beta_8 EXEC\_OPT_{i,t} + \beta_9 CEO\_OPT_{i,t} + \varepsilon_{i,t} \tag{2b}$$

$PROD_{i,t+1}$ is the productivity score subsequent to the year of option grants. $NON\_EXE\_OPT_{i,t}$, $CEO\_OPT_{i,t}$ and $EXEC\_OPT_{i,t}$ are broad-based, CEO, and executive option grants as a percentage of shares outstanding, respectively. For ease of exposition, we multiply these ratios by 10. We expect that *NON_EXE_OPT* to be negatively related to $PROD_{i,t+1}$. Therefore, we predict a negative coefficient for β_1 in equations 2a and 2b above. We predict negative relation only for broad-based stock options because there appears to be no other source to compensate for the adverse effect of stock options induced resource diversion. $EXEC\_OPT_{i,t}$ includes options granted to the top five named executives of the company. We include executive and CEO stock options as controls for the dynamics between broad based stock options and executive/CEO option and how this dynamic affects productivity. We do not have a theoretical or robust empirical basis to make a prediction regarding the relationship between broad based and executive/CEO options. In equation (2b), we predict non-negative relation between executive/CEO options and future productivity because decline in productivity from these option grants are likely to be offset by positive effect from other sources (e.g. incentive effect). Following Bulan, Sanyal, and Yan (2010) and Chang, Fernando, Srinivasan, and Tripathy (2013), we include size (SIZE), profitability (ROA), competition (COMPET), firm age (AGE), leverage (LEV), and P/E ratio (PE) as control variables in the regressions. Ittner et al. (2003) find new economy firms that grant significant stock options are cash rich firms. To the extent that their cash reserve permits stock repurchase without cutback of essential investments, the adverse effect of broad-based options on future firm productivity may be attenuated. We include LEV to address this concern. Prior research suggests that the extent of industry competition has significant effect on firm productivity (Tang and Wang, 2005; Griliches, 1986; Bulan et al., 2010). Firms in competitive industries need to find ways to continuously improve their productivity, which is greatly affected by industry structure and competition (Chang et al., 2013; Tang and Wang, 2005). Therefore, we expect COMPET to be positively associated with productivity. More resources and wider economies of scale allow larger and older firms to be more productive (Haltwinger, Lane, and Speltzer, 1999; Lee and Tang, 2001; Bulan et al., 2010). Therefore, we expect SIZE and AGE to be positively related to productivity. Firms with more future growth opportunities measured by PE ratio tend to have higher productivity (Chung and Charenwong, 1991). Finally, we expect firm profitability measured by ROA to be positively related to productivity.

<u>Sample Collection</u>

We obtain an initial sample from the ExecuComp data, which provides information on option grants to the five highest-paid executives of each firm in the S&P 500, S&P MidCap, and S&P Small Capstock indexes during the period from 1996 to 2006. In addition, each firm reports the share of total grants given to the top five executives. Following Desai (2003) and Bergman and Jenter (2007), we extrapolate the total options data with the use of options granted to executives and the corresponding percentage of overall options granted. We use the mean of the total option estimates only when the standard deviation of these estimates from each executive is no more than 10% of the mean. We get 15,028 firm-year observations after this step.

For those records that do not meet this criterion, we adopt the procedure in Kedia and Rajgopal (2009) by calculating the total option grants based on the CEO stock options and the percentage in total granted options. When there are multiple entries for the same CEO's options in a given fiscal year, we require that the standard deviation is no more than 10% of the mean. We get 625 additional observations. Therefore, in total, we get 15,653 firm-year observations for 2,597 firms. This sample size is comparable to that in Bergman and Jenter (2007) and Kedia and Rajgopal (2009). We then match the broad-based stock options data with the productivity data from Demerjian et al. (2012) and other financial data from COMPUSTAT. After matching, our sample decreases to 12,067 observations for 1,976 firms. If we perform our analyses including CEO option grants, our sample decreases to 9,501 observations for 1,832 firms. This is because some firms do not report the CEO identity in the Execucomp database. As a result, observations with our CEO_OPT variable are fewer than the total sample.

RESULTS AND DISCUSSION

Table 1 presents the descriptive statistics of the variables used in our regressions. $PROD_{t+1}$ is the one year ahead productivity score from Demerjian et al. (2012) determined using DEA. NON_EXE_OPT is the stock option grants to non-executive employees as a percentage of total outstanding shares. BROAD_OPT takes a value of 1 when NON_EXE_OPT is more than 20% and 0 otherwise. CEO_OPT is the option grants to CEOs as a percentage of common shares outstanding. The number of option grants is determined based on data from Execucomp following Bergman and Jenter (2007) and Kedia and Rajgopal (2009). CONSTRAINT and BURDEN are indicator variables that take a value of 1 if cash constraint or burden is greater than the sample median and 0 otherwise. Following Core and Guay (2001), we define cash constraint (CONTRAINT) as the three-year average of common and preferred dividends plus cash flow used in investing activities less cash flow from operations, all divided by total assets. We define interest burden (BURDEN) as the three-year average of interest expense scaled by operating income before depreciation. SIZE and AGE are the natural logarithms of total assets at the beginning of the year and the number of years since the firm's first appearance in COMPUSTAT, respectively. LEV is the sum of current and long-term debt divided by total assets while PE is the price/earnings ratio. ROA is income before extraordinary items divided by average total assets. COMPET is calculated as the sales of the firm as a percentage of the total sales of the firm's industry. We use Fama-French 12 industry classification. INFO is stock price informativeness measured as non-synchronicity of the market model regression using at least 100 daily stock prices during the fiscal year. Following Sesil et al. (2002) and Murphy (2012b), we classify the following four-digit SIC codes as New Economy industries: SIC 3570 – 3572, SIC 3576 -3577, SIC 3661, SIC 5045, SIC 3674, SIC 4812-4813, SIC 5961, and SIC 7370 – 7373.

Table 1: Descriptive Statistics of Variables

	Mean	**1st Quartile**	**Median**	**3rd Quartile**	**Std. Dev**
$PROD_{t+1}$	0.7354	0.5892	0.7900	0.9144	0.2208
NON_EXE_OPT	0.2200	0.0804	0.1477	0.2725	0.2321
BROAD_OPT	0.3653	0.0000	0.0000	1.0000	0.4815
CEO_OPT	0.0372	0.0100	0.0203	0.0417	0.0518
CONSTRAINT	0.1920	0.0000	0.0000	0.0000	0.3939
BURDEN	0.1763	0.0000	0.0000	0.0000	0.3811
SIZE	7.0146	5.8910	6.8573	7.9912	1.5598
PE	19.0938	9.7649	18.1165	28.3680	56.8323
LEV	0.2155	0.0465	0.2025	0.3302	0.1802
AGE	2.8862	2.3026	2.8904	3.6109	0.7769
ROA	0.0406	0.0159	0.0550	0.0975	0.1211
COMPET	0.0032	0.0003	0.0008	0.0025	0.0073
NEW_ECON	0.1839	0.0000	0.0000	0.0000	0.3874
INFO	2.1343	1.1787	1.8718	2.7891	1.4150

This table lists the descriptive statistics of main variables.

The dependent variable in our regressions is relative productivity of each firm against the ideal benchmark for the year in each industry. The mean (median) productivity ($PROD_{t+1}$) of the average firm is 0.74 (0.79). DEA measures productivity as a scaled score relative to the most efficient firm based on the observed input-output relationship. Therefore, a mean productivity score of 0.74 suggests that the average firm in our sample is 74% efficient compared to the virtual efficient firm. Our main variable of interest is broad-based stock option (NON_EXE_OPT), measured as the percentage of stock options granted to rank-and-file employees out of total shares outstanding. Its average is 22%, close to that in Bergman and Jenter (2007). CEO stock option takes 4% of the total shares outstanding. Also similar to their study, we have an average of 71% of total options granted to rank-and-file employees. In order to construct a more powerful test, we create a dichotomous broad-based stock options variable (BROAD_OPT) based on whether the broad-based stock options is greater than 20%. We choose 20% as the mean and median of broad-based stock option ratio is 22% and 15%, respectively. Using this procedure we classify 36% of firm years as providing significant broad-based stock options, as shown on Table 1. Approximately 18% of the observations are from New Economy industries. To test our second hypothesis, we examine how interest burden and cash constraints affect the relationship between broad-based stock options and productivity. Our sample shows that 19% and 18% of the observations face cash constraint and interest burden, respectively. Stock price non-synchronicity (INFO) has an average of 2.13, suggesting an average market model R^2 of 10.6%. The distributions of other variables are generally similar to those in other studies (Chang et al., 2013).

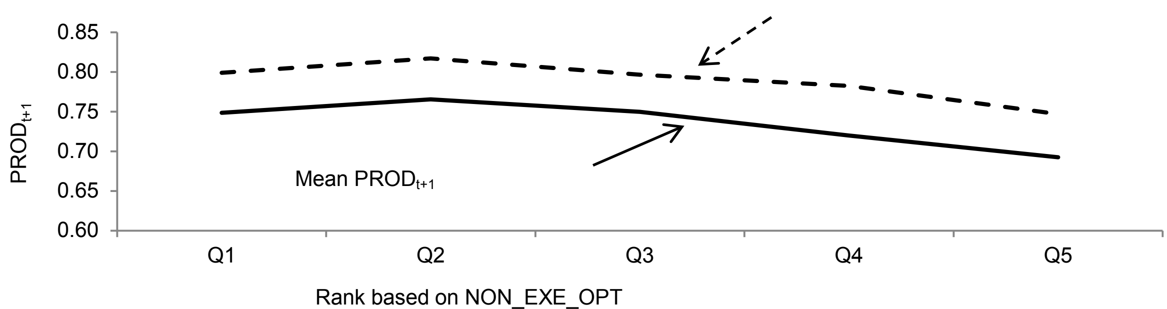
Table 2: Correlation Matrix for Regression Variables

	$PROD_{t+1}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NON_EXE_OPT (1)	-0.254***									
CEO_OPT (2)	-0.206***	0.337***								
CONSTRAINT (3)	-0.161***	0.103***	0.124***							
BURDEN (4)	-0.024**	-0.015	0.082***	0.031***						
SIZE (5)	0.487***	-0.223***	-0.340***	-0.142***	0.081***					
PE (6)	0.052***	-0.005	-0.023**	0.003	-0.068***	-0.001				
LEV (7)	0.087***	-0.099***	0.026**	0.189***	0.398***	0.247***	-0.070***			
AGE (8)	0.303***	-0.285***	-0.223***	-0.197***	0.033***	0.447***	-0.035***	0.118***		
ROA (9)	0.381***	-0.203***	-0.180***	-0.224***	-0.169***	0.129***	0.159***	-0.204***	0.093***	
INFO (10)	-0.1239***	0.0268***	0.1827***	0.0548***	0.0825***	-0.3305***	-0.0208**	0.0942***	-0.1415***	-0.0915***

*This table lists the correlation of regression variables. T-statistics are provided in parentheses. * , ** , *** denote significance at 10%, 5% and 1% level, respectively.*

In Table 2, we present the correlation matrix for our main variables in the regression models. Because of space limitation, we do not include COMPET and NEW_ECON in the correlation table. The correlation coefficient between broad-based options (NON_EXE_OPT) and productivity ($PROD_{t+1}$) is negative and significant. Consistent with our hypothesis, this relationship suggests that the costs associated with higher level of NON_EXE_OPT may outweigh the expected benefits thereon, leading to diminished productivity. To further examine this relationship, we first classify observations into deciles based on annual amounts of our broad-based stock options measure. Next, we determine the median $PROD_{t+1}$ for each decile, and plot the relationship between the ranks and the mean (median) productivity.

Figure 1: Relation between Rank in Broad-Based Stock Options and Future Productivity



This figure shows the relationship between broad-based stock options and future productivity.

Figure 1 shows that the relationship between the rank of broad-based stock options and productivity is negative. The results in the correlation matrix and figure 1 provide preliminary results supporting our hypothesis that more broad-stock options are associated with lower future productivity. Table 2 also shows that CEO stock option is negatively related to productivity. Since the correlation table suggests that bigger firms have higher productivity but have less CEO option, the negative relation between CEO option and firm productivity can be driven by the firm size effect. Consistent with the results in Core and Guay (2001), we find that firms facing higher cash constraints tend to grant more broad-based stock options as a means to conserve resources. The positive correlation coefficients between $PROD_{t+1}$ and SIZE, PE, and ROA are consistent with the results in prior studies, and suggest that bigger, growth, and profitable firms are generally more productive. Stock price informativeness has a negative relation with firm productivity, which can also be driven by the size effect (larger firms have lower INFO but higher PROD).

As the correlation table shows that other variables are related to productivity, we now use multivariate regressions to test our hypotheses. Table 3 presents the regression results. The dependent variable ($PROD_{t+1}$) shows the annual performance of each firm relative to the benchmark that is constructed using the observed input-output relationship in the industry-year. We include year and industry fixed effects to address the autocorrelation and industry clusters. The first two columns in Table 3 show the relationship between $PROD_{t+1}$ and control variables, including executive and CEO option grants. Consistent with the correlation table, we find firm size, growth opportunities, industry competition, and firm profitability are positively associated with future productivity. Firm age, however, is negatively related to future productivity in our sample.

Table 3: Broad-Based Stock Options on Future Productivity

	$Prod_{t+1}$	**$Prod_{t+1}$**	**$Prod_{t+1}$**	**$Prod_{t+1}$**	**$Prod_{t+1}$**
	(1)	(2)	(3)	(4)	(5)
BROAD_OPT			-0.0091***	-0.0098**	-0.0101***
			(-2.73)	(-2.57)	(-2.95)
SIZE	0.0593***	0.0598***	0.0589***	0.0598***	0.0594***
	(41.90)	(37.80)	(43.18)	(37.79)	(41.94)
PE	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***
	(3.28)	(3.68)	(3.26)	(3.67)	(3.28)
LEV	-0.0084	-0.0077	-0.0084	-0.0086	-0.0094
	(-0.93)	(-0.76)	(-0.94)	(-0.85)	(-1.05)
AGE	-0.0004***	-0.0003**	-0.0005***	-0.0003***	-0.0005***
	(-4.18)	(-2.51)	(-4.61)	(-2.88)	(-4.59)
COMPET	0.9126***	0.7835***	0.9354***	0.7880***	0.9188***
	(3.47)	(2.81)	(3.57)	(2.83)	(3.50)
ROA	0.5089***	0.5170***	0.5048***	0.5145***	0.5064***
	(40.42)	(36.36)	(40.26)	(36.10)	(40.16)
EXEC_OPT	0.0084				0.0197
	(0.54)				(1.23)
CEO_OPT		0.0119		0.0271	
		(0.36)		(0.82)	
INTERCEPT	0.4084***	0.3942***	0.4163***	0.3984***	0.4119***
	(38.89)	(33.69)	(41.90)	(33.73)	(38.98)
N	12,067	9,501	12,067	9,501	12,067
Adj. R^2	0.518	0.527	0.518	0.527	0.518
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes

*This table shows the relationship between broad-based stock options and future productivity. T-statistics are provided in parentheses. * , ** , *** denote significance at 10%, 5% and 1% level, respectively.*

We show the results of our tests on the relation between broad-based stock options and future productivity after controlling for other factors in Columns (3) to (5). To intensify the statistical significance of the tests, we mainly focus on the dichotomy variable of broad-based stock options (BROAD_OPT). In column (3) of Table 3, we find that the coefficient of BROAD_OPT is negative and significant (t= -2.73), suggesting that the relative productivity of firms with higher broad-based stock options is lower than that of other firms. Since Table 2 shows that CEO option grants are positively correlated with broad-based stock options but is negatively correlated with productivity, the negative relationship between BROAD_OPT and $PROD_{t+1}$ documented above could be primarily due to the impact of executive or CEO option grants on $PROD_{t+1}$. To address concerns that the extent of executive or CEO options may affect the relationship between BROAD_OPT and $PROD_{t+1}$, we run the regression model after including EXEC_OPT and CEO_OPT. Column (4) of Table 3 shows that the coefficient of BROAD_OPT is still negative and significant (t-stat= -2.57) after controlling for CEO option grants. Similarly, we find negative and significant coefficient (t-stat=-2.95) when we include EXEC_OPT in column (5). Collectively, the results in Table 3 provide evidence that the future one-year productivity of firms that grant more broad-based stock options is lower than that of other firms. In untabulated results, we also test the relationship between BROAD_OPT and three year ahead PROD. Our results are similar to the relationship indicated in Table 3. The coefficients of other independent variables in Table 3 are significant in the expected direction except for AGE. Our second hypothesis predicts that the relation between BROAD_OPT and $PROD_{t+1}$ is likely to be affected by the firm's industry practice and financial constraints. More specifically, we note that New Economy firms are characterized by higher needs for R&D and other expenditures. To the extent that broad-based options represent additional compensation which involve resource diversion, their adverse effect on productivity is expected to be exacerbated in these industries. In contrast, broad-based stock options necessitated by financial constraints save the cash flows out of the firm and thus are less likely to lead to resource diversion. Therefore, we expect the relation between BROAD_OPT and $PROD_{t+1}$ to be less negative for financially constraint firms.

Table 4 shows how BROAD_OPT influences $PROD_{t+1}$ for firms facing interest burden and cash constraints. We include an indicator variable BURDEN that takes the value of 1 when a firm's interest burden is greater than the industry median, and 0 otherwise. Column (1) shows that the coefficient of BROAD_OPT is negative and significant (t-statistic=-4.50), which is consistent with the result we presented in Table 3. The coefficient of the interaction term (BROAD_OPT × BURDEN) in the same regression, however, is positive and significant (t-statistic=5.33). These results are consistent with our prediction that while broad-based stock options are in general negatively related to future productivity, this negative relationship is attenuated when such grants are necessitated by interest burden. In unreported tests, we compare coefficients of BROAD_OPT for firms facing higher interest burden with that for firms not facing interest burden. The test shows that the former is significantly higher (F-statistic=12.63; p-value = 0.02). In Column (2), we use the specific percentage of broad-based stock option (NON_EXE_OPT), the results do not change.

Table 4: The Impact of Broad-Based Options for Firms with Financial Constraint or Interest Burden

	$Prod_{t+1}$	$Prod_{t+1}$	$Prod_{t+1}$	$Prod_{t+1}$
	(1)	(2)	(3)	(4)
BROAD_OPT	-0.0185***		-0.0116***	
	(-4.50)		(-2.78)	
BROAD_OPT × BURDEN	0.0482***			
	(5.33)			
NON_EXE_OPT		-0.0314***		-0.0276***
		(-3.52)		(-2.98)
NON_EXE_OPT × BURDEN		0.1073***		
		(4.81)		
BROAD_OPT × CONSTRAINT			0.0164*	
			(1.93)	
NON_EXE_OPT × CONSTRAINT				0.0595***
				(3.32)
SIZE	0.0601***	0.0601***	0.0590***	0.0591***
	(38.04)	(38.00)	(37.25)	(37.29)
PE	0.0001***	0.0001***	0.0001***	0.0001***
	(3.62)	(3.65)	(3.88)	(3.86)
LEV	-0.0000	0.0004	0.0038	0.0039
	(-0.00)	(0.04)	(0.37)	(0.38)
AGE	-0.0004***	-0.0003***	-0.0004***	-0.0004***
	(-3.00)	(-2.73)	(-3.61)	(-3.52)
COMPET	0.7351***	0.7537***	0.7873***	0.7865***
	(2.64)	(2.71)	(2.83)	(2.83)
ROA	0.5108***	0.5097***	0.5051***	0.5049***
	(35.81)	(35.41)	(34.95)	(34.63)
CEO_OPT	0.0417	0.0504	-0.0117	0.0020
	(1.12)	(1.32)	(-0.30)	(0.05)
CEO_OPT × BURDEN	-0.0532	-0.0662	0.1385**	0.0901
	(-0.70)	(-0.87)	(1.97)	(1.24)
BURDEN	-0.0247***	-0.0297***	-0.0370***	-0.0426***
	(-4.23)	(-4.62)	(-6.14)	(-6.86)
INTERCEPT	0.3984***	0.3975***	0.4100***	0.4105***
	(33.61)	(33.51)	(34.36)	(34.34)
N	9,501	9,501	9,501	9,501
ADJ. R^2	0.529	0.529	0.529	0.530
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes

*This table shows the impact of broad-based options on future productivity for firms facing financial constraint or interest burden. T-statistics are provided in parentheses. * , ** , *** denote significance at 10%, 5% and 1% level, respectively.*

In the next two columns, we test how cash constraint (CONSTRAINT) affects the relation between BROAD_OPT and $PROD_{t+1}$. The indicator variable CONSTRAINT takes the value of 1 when a firm's cash constraint is greater than the industry median, and 0 otherwise. Column (3) of the Panel shows that while the coefficient of BROAD_OPT is negative and significant (t-statistic= -2.78), the interaction term (BROAD_OPT × CONSTRIANT) is positive and significant (t-statistic= 1.93). Again, these results are consistent with our prediction that while broad-based stock options are in general negatively related to future productivity, this negative relationship is attenuated when such grants are necessitated by cash constraint. When we use the NON_EXE_OPT to measure specific broad-based option percentage, the results stay qualitatively the same. Taken together, Table 4 provides evidence supporting our hypothesis that BROAD_OPT necessitated by the firms' financial constraints enhances future productivity.

In our second hypothesis, we predict that the prevalent use of broad-based stock options in New Economy industries exacerbates the negative relation between BROAD_OPT and $PROD_{t+1.}$ In Table 5, we examine the relationship between BROAD_OPT and $PROD_{t+1}$ after classifying our sample into two subsamples: one group has firms in NEW_ECON industries and the other group does not. In the first two columns of Table 5, we run a separate regression in each subsample. Column (1) shows that, when firms are not in NEW_ECON industries, the relation between BROAD_OPT and $PROD_{t+1}$ is not statistically significant. In contrast, the coefficient of BROAD_OPT is negative and significant (t-statistic = -4.70) when the firm is in NEW_ECON industries as shown in Column (2). These results are consistent with the observation that broad-based stock options are granted indiscriminately to almost all employees in these industries. As we discussed before, such programs are less likely to have incentive effect and are more likely to be add-on compensations and divert away resources needed for investment, the collective effect being diminished productivity. Another way to test the influence of broad-based stock options to future productivity in NEW_ECON firms is shown in the last three columns in Table 5.

In particular, we examine how CONSTRAINT and BURDEN moderate the relationship between BROAD_OPT and $PROD_{t+1}$ in NEW_ECON firms. Results show that the coefficient of BROAD_OPT is less negative for these firms when they are faced with financial constraints (i.e., the coefficient of BROAD_OPT × NEW_ECON × CONSTRAINT is positive and significant: t-stat = 2.96). However, the coefficient of the interaction term for BROAD_OPT × NEW_ECON × BURDEN is not significant. Overall, the results in Table 5 provide evidence that the pronounced negative relation between broad-based stock option grants and productivity for new economy firms is attenuated when these programs are necessitated by the firms' financial condition. To test the hypothesis that stock price informativeness attenuates the negative relation between broad-based stock options and future productivity, we conduct the tests as shown in Table 6. First, we split the sample into two subsamples according to the level of stock price informativeness. Since the previous correlation table shows that INFO is negatively related to SIZE, we define each subsample according to the median stock price non-synchronicity in every firm size decile. Columns (1) and (2) show that only in the low stock price informativeness subsample, BROAD_OPT decreases $PROD_{t+1}$ (t-stat= -4.70). In the high stock price informativeness subsample, however, BROAD_OPT increases $PROD_{t+1}$ (t-stat = 1.85). These results suggest option grants are more likely to solicit effort from rank-and-file employees when the employees' performance is more in line with their compensation as guaranteed by informative stock prices. We get similar results using the percentage of broad-based stock options in columns (3) and (4).

Table 5: The Impact of Broad-Based Options for Firms in the New Economy

	NEW_ECON=0	NEW_ECON=1	Whole Sample		
	$PROD_{t+1}$	$PROD_{t+1}$	$PROD_{t+1}$	$PROD_{t+1}$	$PROD_{t+1}$
	(1)	(2)	(3)	(4)	(5)
BROAD_OPT	-0.0119	-0.0636***	-0.0093**	-0.0060	-0.0182***
	(-1.14)	(-4.70)	(-2.03)	(-1.15)	(-3.61)
BROAD_OPT × NEW_ECON			-0.0115	-0.0207*	-0.0075
			(-1.06)	(-1.83)	(-0.67)
BROAD_OPT × CONSTRAINT × NEW_ECON				0.0443***	
				(2.96)	
BROAD_OPT × CONSTRAINT				-0.0073	
				(-0.69)	
CONSTRAINT				-0.0220***	
				(-3.23)	
BROAD_OPT × BURDEN × NEW_ECON					-0.0057
					(-0.31)
BROAD_OPT × BURDEN					0.0480***
					(4.18)
BURDEN					-0.0317***
					(-4.83)
CEO_OPT × CONSTRAINT				0.1389*	
				(1.74)	
CEO_OPT × BURDEN					0.0014
					(0.02)
CEO_OPT			0.1119***	0.0704	0.1155***
			(2.99)	(1.62)	(2.75)
NEW_ECOM			-0.1023***	-0.1030***	-0.1033***
			(-11.36)	(-11.45)	(-11.49)
SIZE	0.0568***	0.0620***	0.0602***	0.0598***	0.0606***
	(32.85)	(18.87)	(34.43)	(34.11)	(34.68)
PE	0.0000	0.0002***	0.0001**	0.0001**	0.0001**
	(1.13)	(3.72)	(2.24)	(2.27)	(2.17)
LEV	-0.0042	-0.1127***	-0.0089	-0.0011	0.0027
	(-0.39)	(-4.59)	(-0.79)	(-0.10)	(0.22)
AGE	0.0004***	-0.0009**	0.0005***	0.0005***	0.0005***
	(3.29)	(-2.09)	(3.91)	(3.52)	(3.80)
COMPET	-0.3919	2.3713***	-0.2426	-0.2613	-0.3066
	(-1.24)	(3.24)	(-0.80)	(-0.86)	(-1.01)
ROA	0.5735***	0.2058***	0.5710***	0.5695***	0.5657***
	(33.62)	(10.49)	(35.68)	(35.02)	(35.29)
INTERCEPT	0.3343***	0.2380***	0.2943***	0.3004***	0.2951***
	(30.47)	(10.92)	(25.30)	(25.45)	(25.26)
N	9,848	2,219	9,501	9,501	9,501
ADJ. R^2	0.306	0.363	0.395	0.396	0.397
Year fixed effect	Yes	Yes	Yes	Yes	Yes

*This table shows the impact of broad-based stock options on future productivity in new economy firms relative to other firms. T-statistics are provided in parentheses. * , ** , *** denote significance at 10%, 5% and 1% level, respectively.*

In columns (5) and (6) of Table 6, we include the whole sample and test the interaction term of broad-based option grants and stock price informativeness. We find broad-based option grants still generally have a negative influence on future productivity. However, when stock prices are more informative of the value of firm fundamentals, this negative relation decreases (the coefficients of the interaction term are positive and significant). Overall, the results in Table 6 support our third hypothesis.

Table 6: Stock Price Informativeness on the Impact of Broad-Based Options on Future Productivity

	LOW_INFO	HIGH_INFO	LOW_INFO	HIGH_INFO	Whole Sample	
	$PROD_{t+1}$	$PROD_{t+1}$	$PROD_{t+1}$	$PROD_{t+1}$	$PROD_{t+1}$	$PROD_{t+1}$
	(1)	(2)	(3)	(4)	(5)	(6)
BROAD_OPT	-0.0261***	0.0099*			-0.0239***	
	(-4.70)	(1.85)			(-4.63)	
BROAD_OPT × HIGH_INFO					0.0311***	
					(4.63)	
HIGH_INFO					0.0020	
					(0.45)	
NON_EXE_OPT			-0.0483***	0.0263**		-0.0693***
			(-3.89)	(2.20)		(-4.99)
NON_EXE_OPT × INFO						0.0248***
						(5.22)
INFO						-0.0030*
						(-1.69)
CEO_OPT	-0.0071	0.0048	0.0166	-0.0041	0.0105	0.0093
	(-0.13)	(0.11)	(0.30)	(-0.09)	(0.31)	(0.27)
SIZE	0.0601***	0.0590***	0.0602***	0.0589***	0.0601***	0.0612***
	(26.40)	(26.09)	(26.44)	(26.06)	(37.42)	(36.13)
PE	0.0001***	0.0001	0.0001***	0.0001	0.0001***	0.0001***
	(3.18)	(1.29)	(3.30)	(1.29)	(3.50)	(3.51)
LEV	-0.0326**	0.0031	-0.0325**	0.0042	-0.0125	-0.0098
	(-2.11)	(0.22)	(-2.10)	(0.29)	(-1.19)	(-0.93)
AGE	-0.0005***	-0.0002	-0.0004**	-0.0002	-0.0004***	-0.0004***
	(-2.69)	(-1.43)	(-2.50)	(-1.43)	(-3.11)	(-3.18)
COMPET	0.7657*	0.5482	0.7722**	0.5332	0.7233***	0.6212**
	(1.95)	(1.37)	(1.97)	(1.34)	(2.58)	(2.20)
ROA	0.4903***	0.5537***	0.4847***	0.5581***	0.5263***	0.5259***
	(25.44)	(25.00)	(24.83)	(25.01)	(36.28)	(35.79)
INTERCEPT	0.4022***	0.3700***	0.4012***	0.3694***	0.3872***	0.3858***
	(16.97)	(13.75)	(16.91)	(13.73)	(22.06)	(20.71)
N	9,501	9,501	9,501	9,501	9,501	9,501
ADJ. R^2	0.5549	0.5134	0.5543	0.5136	0.5298	0.5295
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes

*This table shows the effect of stock price informativeness on the relation between broad-based stock options and firm productivity. T-statistics are provided in parentheses. * , ** , *** denote significance at 10%, 5% and 1% level, respectively.*

Additional Tests

The possible endogeneity is a serious issue for the kind of our analysis. On possible form of endogeneity is reverse causality in which firms with lower productivity tend to adopt broad-based stock options. Following Sesil and Lin (2011), we run the regressions of (2a) and (2b) by including lag variables in the form of $BROAD\_OPT_{t+2}$ as an additional control variable. The coefficient on $BROAD\_OPT_{t+2}$ is not significant while the coefficient of BROAD_OPT keeps negatively significant, suggesting our results are not driven by reverse causality. Another possible form of endogeneity in this study is that the observed negative relation is indeed caused by the relation between BROAD_OPT and other control variables. To address this concern, we conduct a two-step procedure. In the 1st stage, BROAD_OPT is regressed on control variables in the regression (2a); in the 2nd stage, we use the 1st stage residual to substitute BROAD_OPT in the regression (2b) with an additional control of $BROAD\_OPT_{t+2}$. In this way, the residual used in the regressions is not related with other control variables and the reverse causality is controlled. The results show nearly no change. Therefore, our results stay robust to endogeneity issues.

As we discussed before, one of the drawbacks of broad-based stock options is that, as rewards are shared among a large number of participants based on a broad performance measure, an individual employee is likely to free ride off other members by holding back his effort (Alchian and Demsez, 1972; Weitzman and Kruse, 1990). If this is the case, we expect the broad-based stock options are less likely to cause reduced productivity when there are fewer employees. That is, when such option grants are thinly distributed. To assess the effect of employee size, we rank firms into quintiles annually based on the employee size and then run the previous regressions (2a) and (2b) in the first and the fifth quintiles, respectively. Unreported results show that BROAD_OPT only has a negatively impact on $PROD_{t+1}$ in the fifth quintile where firms have the most number of employees. In the first quintile where firms have the smallest employee size, BROAD_OPT does not lead to lower $PROD_{t+1}$. This observation suggests that the wide distribution of broad-based stock options can be one of the reasons that such option grants bring an overall negative impact on firm productivity. If regulators recognize that broad-based stock options do not enhance productivity, recent corporate governance reforms and scrutiny may have curbed such option grants.

To test this projection, we compare the amount of broad-based stock options granted before and after the implementation of Sarbanes-Oxley Act 2002 (SOX). We find both BROAD_OPT and NON_EXE_OPT are significantly lower in post-SOX periods. Furthermore, to control for other factors related with broad-based stock option grants, we run a Probit regression using NON_EXE_OPT as the dependent variable and SOX, SIZE, LEV, AGE, CONSTRAINT, PE, and COMPET as independent variables. We define SOX=1 if the observation is after 2002, and 0 otherwise. The results show SOX has a negative and significant coefficient. This observation does not change when the dependent variable is BROAD_OPT. These results indicate enhanced corporate governance after SOX does curb the grants of broad-based options. However, when we test the effect of broad-based stock options on future productivity in periods before and after SOX, we find the negative relation holds in both periods. It suggests enhance corporate governance cannot change the negative relation between broad-based stock options and future productivity. Overall, additional test results confirms previous arguments and provide additional insights on the mechanism through which broad-based stock options are negatively associated with future productivity.

CONCLUSION

Using 12,067 firm-year observations for 1,976 U.S. firms that granted broad-based stock options during the period from 1996 to 2006, we find that the extent of broad-based stock option grants are negatively associated with future productivity. In addition, this negative relation is attenuated if firms face cash constraints or interest burden but is exacerbated if firms are in New Economy industries or if stock prices are more informative of firm fundamentals. Additional robustness tests confirm these results are not driven by endogeneity issues. The recent increase in the use of stock options to remunerate non-executive employees suggests that stock options constitute an important component of compensation packages to both executive and non-executive employees. However, while the existing research examines the impact of executive option grants, there are limited studies that focus on the performance implication of option grants to rank-and-file employees. Companies pay higher amount in options than they would pay in cash for the same service because options are risky to undiversified employees (Hall and Murphy, 2003). Prior evidence also suggests that the increase in options compensation is not matched by a corresponding downward adjustment in other forms of compensation. Furthermore, increase in the number of shares due to exercise seems to motivate managers to divert resources needed for investment in productive resources to repurchase shares so as to prevent dilution of earnings per share (Bens et al. 2002; Bhargava 2013). Our study enforces these previous findings by showing that such diversions are manifested as diminished future productivity.

Our study also contributes to the literature in the following aspects. We measure productivity using the DEA efficiency score, where relative efficiency is determined based on the empirical observation of annual inputs and output of each industry. This gives us a comprehensive measure that does not require a specific assumption about the underlying production function. In addition, the productivity metric is less susceptible to accounting manipulation than other metrics, such as ROA. Different from previous studies that focus on the existence of broad-based stock options, we examine the relationship between the extent of broad-based stock options and future productivity. Last but not the least, this paper reports that stock price informativeness intensifies the positive impact of broad-based stock options in aligning the interests between rank-and-file employees and shareholders. Collectively, this study highlights that expected incentive effect of broad-based stock options fails to compensate for the additional direct and indirect costs associated with such compensation programs. Our study makes significant contribution to the academic literature and has important practical implications in designing efficient compensation packages.

REFERENCES

Aboody, D., Johnson, N.B., and Kasznik, R. (2010), Employee Stock Options and Future Firm Performance: Evidence from Option Re-pricings. *Journal of Accounting and Economics,* 50, 74-92.

Alchian, A.A., and Demsetz, H. (1972), Production, Information Costs, and Economic Organization. *American Economic Review,* 62, 777–795.

Athanassopoulos, A.D., and Ballantine, J.A. (1995), Ratio and Frontier Analysis for Assessing Corporate Performance: Evidence from The Grocery Industry in the UK. *Journal of Operational Research Society,* 46, 427-440.

Banker, R.D., Charnes, A., and Cooper, W.W. (1984), Some Models for the Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis. *Management Science*, 30(9), 1078-1092.

Banker, R.D., and Natarajan, R. (2008), Evaluating Contextual Variables Affecting Productivity Using DEA. *Operations Research*, 56(1), 48-58.

Bens, A.B., Nagar, V., and Wong, M.H.F. (2002), Real Investment Implications of Employee Stock Option Exercises. *Journal of Accounting Research*, 40(2), 359-393.

Bergman, N.K., and Jenter, D. (2007), Employee Sentiment and Stock Option Compensation. *Journal of Financial Economics*, 84, 667-712.

Bhargava, A. (2013), Executive Compensation, Share Repurchases and Investment Expenditures: Econometric Evidence from US Firms. *Review of Quantitative Finance and Accounting,* 40, 403-422.

Bulan, L., Sanyal, P., and Yan, Z. (2010), A Few Bad Apples: An Analysis of CEO Performance Pay and Firm Productivity. *Journal of Economics and Business*, 62(4), 273-306.

Charnes, A., Cooper, W.W., and Rhodes, E. (1978), Measuring Efficiency of Decision-Making Units. *European Journal of Operational Research*, 2(6), 429–444.

Chang, H., Fernando, G.D., Srinivasa, D., and Tripathy, A. (2013), A Re-Examination of Diversification and Firm Productivity. *Journal of Management Accounting Research*, 25(1), 99-118.

Chen, Q., Goldstein, I., and Jiang, W. (2007), Price Informativeness and Investment Sensitivity to Stock Price. *Review of Financial Studies,* 20, 619-650.

Chung, K., and Charenwong, C. (1991), Investment Options, Assets in Place, and the Risk of Stocks. *Financial Management*, 20, 21–33.

Conyon, M. J., and Murphy, K. J. (2000), The Prince and the Pauper? CEO Pay in the United States and United Kingdom. *The Economic Journal*, 110(467), 640-671.

Core, J. E., and Guay, W. R. (2001), Stock Option Plans for Non-executive Employees. *Journal of Financial Economics,* 61, 253–287.

Demerjian, P., Lev, B., and McVay, S. (2012), Quantifying Managerial Ability: A New Measure and Validity Tests. *Management Science,* 58(7), 1229–1248.

Desai, M. (2003), The Divergence Between Book and Tax Income. In: Poterba, J. (Ed.), *Tax Policy and the Economy*, Vol. 17. MIT Press, Cambridge, MA.

Durnev, A., Morck, R., and Yeung, B. (2004), Value-Enhancing Capital Budgeting and Firm-Specific Stock Return Variation. *The Journal of Finance,* 59, 65-105.

Griliches, Z. (1986), Productivity, R&D, and Basic Research at the Firm Level in the 1970's. *American Economic Review*, 76(1), 141-154.

Hall, B.J., and Murphy, K.J. (2003), The Trouble with Stock Options. *Journal of Economic Perspectives,* 17, 49–70.

Hall, B., and Murphy, K. (2002), Stock Options for Undiversified Executives. *Journal of Accounting and Economics*, 33, 3–42.

Haltiwanger, J C., Lane, L. I., and Speltzer, J.R. (1999), Firm Size and Wages – Productivity Differences across Employers: The Roles of Employer Size, Age, and Human Capital. *American Economic Review*, 89 (2), 94–99.

Hillegeist, S. A., and Penalva, F. (2003), Stock Option Incentives and Firm Performance. *Working Paper*, INSEAD.

Hochberg, T.V., and Lindsey, L. (2010), Incentives, Targeting, and Firm Performance: An Analysis of Non-executive Stock Options. *The Review of Financial Studies,* 23(11), 4148-4186.

Hoff, A. (2007), Second Stage DEA: Comparison of Approaches for Modelling the DEA Score. *European Journal of Operational Research,* 181(1), 425–435.

Ittner, C. D., Lambert, R. A., and Larcker, D. F. (2003), The Structure and Performance of Equity Grants to Employees of New Economy Firms. *Journal of Accounting and Economics,* 34, 89–127.

Kau, J. B., Linck, J. S., and Rubin, P. H. (2008), Do Managers Listen to the Market? *Journal of Corporate Finance*, 14, 347 – 362.

Kedia, S., and Rajgopal, S. (2009), Neighborhood Matters: The Impact of Location on Broad Based Stock Option Plans. *Journal of Financial Economics,* 92, 109-127.

Lee, F., and Tang, J. (2001), Multifactor Productivity Disparity between Canadian and U.S. Manufacturing Firms, *Journal of Productivity Analysis*, 15, 115-128.

McDonald, J. (2009), Using Least Squares and Tobit in Second Stage DEA Efficiency Analyses. *European Journal of Operational Research,* 197(2), 792-798.

Mehran, H., and Tracy, J. (2001), The Effect of Employee Stock Options on the Evolution of Compensation in the 1990s. *FRBNY Economic Policy Review*, 7, 19–34.

Murphy, K.J. (2012a). Executive Compensation: Where We Are and How We Got There. *In: G. Constantinides, M. Harris, and R. Stulz (Ed.), Handbook of the Economics of Finance*. Elsevier Science North Holland.

Murphy, K.J. (2012b), Pay, Politics and the Financial Crisis. *In: A. Blinder, A. Lo, and R. Solow (Ed.), Economic Lessons from the Financial Crisis,* Russell Sage Foundation.

Oyer, P., and Schaefer, S. (2005), Why Do Some Firms Give Stock Options to All Employees? An Empirical Examination of Alternative Theories. *Journal of Financial Economics, 7*6, 99–103.

Revsine, L., Collins, D.W., Johnson, W.B., and Mittelstaedt, H.F. (2012), *Financial Reporting and Analysis*. Fifth edition. The McGraw-Hill Companies, Inc. New York, NY 10020.

Sesil, J.C. and Lin, Y.P. (2011), The Impact of Employee Stock Option Adoption and Incidence on Productivity: Evidence from U.S. Panel Data. *Industrial Relations,* 50(3), 514-534.

Sesil, J.C., Kroumova, M.K., Blasi, J.R., and Kruse, D.L. (2002), Broad-based Employee Stock Options in US 'New Economy' Firms. British Journal of Industrial Relations, 40(2), 273-294.

Tang, J., and Wang W. (2005), Product Market Competition, Skill Shortages and Productivity: Evidence from Canadian Manufacturing Firms. *Journal of Productivity Analysis,* 23(3), 317-333.

Weitzman, M., and Kruse, D. (1990), Profit Sharing and Productivity. *In: A. Blinder (Ed.), Paying for Productivity: A Look at the Evidence*. Washington: The Brookings Institution, 95 - 141.

Wurgler, J. (2000), Financial Markets and the Allocation of Capital. *Journal of Financial Economics,* 58, 187-214.

ACKNOWLEDGEMENT

We would like to thank the journal editors, Terrance Jalbert and Mercedes Jalbert, and two anonymous referees for their insightful comments. Any errors are our own.

BIOGRAPHY

Dr. Wenjing Ouyang is an Assistant Professor of Finance at University of the Pacific. She can be contacted at: Weber Hall 210B, Eberhardt School of Business, University of the Pacific, 3601 Pacific Ave, Stockton, CA 95219. Phone: 209-946-3910. Email: wouyang@pacific.edu.

Dr. Menghistu Sallehu is an Assistant Professor of Accounting at Eastern Illinois University. He can be contacted at: 600 Lincoln Avenue, 4016 Lumpkin Hall, Charleston, IL 61920. Phone 217-581-7052. Email: mmsallehu@eiu.edu.

International Journal of Business and Finance Research
Vol. 9, No. 2, 2015, pp. 39-52
ISSN: 1931-0269 (print)
ISSN: 2157-0698 (online)

www.theIBFR.org

THE IMPACT OF FINANCIAL AND LEGAL STRUCTURES ON THE PERFORMANCE OF EUROPEAN LISTED FIRMS

Hani El-Chaarani, Beirut Arab University (B.A.U.)

ABSTRACT

This study examines the impact of capital structure on the performance of listed firms in the European region by considering different systems of legal protection. Based on 5,050 listed firms in eight European countries, the results of the study reveal that owners in low level of legal investor protection countries are more likely to use the firm's capital structure to serve their own interests. In the case of high level of legal protection the results indicate that debt is used as a disciplinary tool to constrain the expropriation of private benefits.

JEL: K4, F23

KEYWORDS: Capital Structure, Financial Performance, Legal Protection, Financial Behavior, Leverage

INTRODUCTION

During the last half century we have witnessed the development of financial theories that emphasize the importance and impact of financial structure on firm performance. In their seminal work, Modigliani and Miller (1958) lay out the foundations of modern corporate finance by developing a theory that helps us understand factors that determine the firm's capital structure decisions. They demonstrate the value of a firm is independent of its capital structure and consequently there is no correlation between leverage and firm value in a world without taxes, agency conflicts, bankruptcy and transactions costs. Modigliani and Miller (1963) show that when taxes are introduced into their model the value of a leveraged firm is enhanced by the tax shield provided by the tax deductibility of interest payments on corporate debt. Under this condition, the value of the levered firm equals that of the unlevered firm plus the value of the debt tax shield.

Following Modigliani and Miller, several other theories have set out to explain the capital structure choices of firms and their impact on firm value such as the pecking order theory, the free cash-flow theory, the trade-off theory and the agency cost theory. Jensen and Meckling (1976) propose in their agency cost theory the usage of debt as a disciplinary tool to ensure the performance of managerial staff. Doing so serves the best interests of shareholders specifically when control and ownership are separated. Thus, higher debt leads to reduce free cash-flow waste by managers (Jensen, 1986).

Stulz (1990) confirms this effect by indicating that reduction of free cash-flow may decrease the cost of overinvestment and hence increase firm value. However this can also exacerbate the cost of underinvesting by leading managers to reject value enhancing projects. Accordingly, the trade-off theory (Myers, 1984) states that the benefits and costs of capital sources must be traded off until the benefits (e.g. tax advantages) of debt offset the costs (e.g. financial distress) of debt. In Myers (1977) model debt may cause underinvestment in future opportunities, specifically when debt-holders capture most of the investment return while shareholders bear most of the cost. A crucial assumption for this to happen is that the project is equity financed and outstanding debt matures after the return of the new investment is realized so that the increase in the value of bond-holders claims resulting from this project is an excess of its NPV. In this situation debt will have a negative impact on firm value by creating a conflict between shareholders and debt-holders. Therefore, Myers suggests the use of short-term debt may be a better option to avoid the distortionary effects on investment of such conflicts.

The pecking order theory (Myers and Majluf, 1984) advances the underinvestment argument further by emphasizing the effects of informational asymmetries. For example, if managers' information about the value of the firm is superior to that of the market, firms should finance their investments in a hierarchal order giving priority to sources of capital that reveal the least information; i.e. using retained earnings followed by external financing. And, when external financing is required, debt will be preferred before issuing new equity. In recent years, a host of studies have examined the impact of alternative legal rules regarding investor rights on capital structure choices and firm valuation.

The question is to what extent agency conflicts of equity and debt can be mitigated by the legal system. La Porta et al. (1998) and Claessens et al. (2000) highlight the complexities of managing capital structure by considering how factors such as the legal and regulatory environment of investor protection can explain why some firms are financed differently in different countries. The authors divide European countries into three different families of legal regimes: the French civil law countries, the English common law countries and finally the German civil law countries. In French civil law countries they find that the low level of protection and regulation may increase the level of (outside) investor expropriation. On the other hand, in English common law countries the higher level of regulation and legal protection can reduce the agency cost of debt and more generally the expropriation of outside investors by inside owners (managers). Shleifer and Vishny (1997) reveal that legal protection limits the extent of expropriation of minority shareholders and promotes financial performance. Stiglitz (1985) and Bebchuk (1994) indicate that blockholders can abuse their dominant position especially when weak legal protection exists.

The evidence generally indicates that legal protections might explain, at least in part, differences in capital structures in different countries (e.g. Antoniou et al. JFQA 2008, Alves et al. JMFM 2011). The aim of this study is to provide new evidence on this topic by addressing the following questions: What is the influence of legal protection on the capital structure choices of European firms? What is the influence of capital structure on firm performance across different families of European legal regimes? More specifically, we focus on the interaction between capital structure and the performance of European listed firms by considering the different regimes of legal protection. This provides an opportunity to investigate if the legal protection systems in Europe are an important determinant of financial behavior. We carry out our empirical analysis based on new data extracted as of the end of 2012. We recognize it is impossible to study capital structure without considering micro factors that shape firms' financing decisions. We pay particular attention to the ownership dimension by examining the impact of ownership structure in conjunction with the legal investor protection regime. Bebchuk (1994) indicates that differential voting and pyramid schemes are used to facilitate expropriation through debt especially when weak legal protection exists. Indeed we can address another important question, namely: What happens to financial performance if large shareholders can expropriate bondholders especially in the case of weak legal protection? The next section explains briefly the impact of capital structure on financial performance, the legal regimes and their impact on financial behavior and the interaction between ownership and capital structures. Section 2 outlines the methodology and describes the data. Section 3 reports the results and concludes the paper.

LITERATURE REVIEW

Agency theory (Jensen and Meckling, 1976) is based on the premise that managers (agents) will not watch over the businesses of a firm as would the owners (principals). The fundamental element behind this theory is the separation between ownership and management, which may increase the conflicts and consequently the agency costs by moving each entity to achieve its own interests. For Jensen (1986), the excess of free cash-flow is the most important cause of conflicts between managers and shareholders. Accordingly, he proposes to mitigate the opportunistic behavior of a manager by increasing the firm's ratio of debt to total financing. In this case, debt will have a positive impact on firm value through the pressure to generate cash flow in order to service debt. Harris and Raviv (1991) survey evidence that shows debt can act as a monitoring and incentive device. And Dewatripont and Tirol (1994) confirm that by providing performance contingent managerial incentives debt can enhance investor control rights. In Shleifer and Wolfenzon (JFE 2002) distortions caused by private extraction of benefits of control by insiders increase the cost of external finance with weak investor protection increasing these costs further.

In Sarkar and Zapatero (2003) debt has a positive impact on firm profitability. Frank and Goyal (2003), report that equity issues rather than debt issues track much more closely firm financing deficit practices, contrary to what is advocated by the pecking order theory. They find greater support for the pecking order theory among large firms, which is expected as these firms face a less severe adverse selection problem. Moreover, Margaritis and Psillaki (2009) confirmed the free cash flow theory by reporting that firms with high leverage are lesser able to invest in projects showing negative net present value.

While some studies have reported a positive impact of debt on performance, other have found a negative relationship between debt and financial performance. For example, some firms (e.g. growth firms) may be more vulnerable and lose more of their value when they go into financial distress. In this case, theory predicts a negative relation between leverage and profitability. Empirical studies generally support this prediction (e.g. Rajan and Zingales (1995). Similar findings on the relationship between debt and profitability are reported by Chiang et al. (2002) and Eriotis et al. (2002). Abor (2005) find that high long-term debt is negatively correlated with profitability in Ghana, Bhagat and Bolton (2008) in the US, and Ghosh (2008) in India. As for the relation between the expropriation and the usage of debt, many studies point to the presence of expropriation. Recently, Bai et al. (2013) reported a positive and significant relationship between expropriation and debt usage of Chinese firms. The authors measure the amount of expropriation by aggregating the value of corporate loans made to the controlling shareholder. This result is consistent with the prior study of Faccio et al. (2001) in which they argue that higher leverage ensures the controlling shareholder more resources to expropriate private benefits without diluting his controlling. Theories and empirical studies document mixed and significant results, which lead us to formulate the following hypothesis:

H0: There is a significant impact of leverage on the performance of listed firms.

Possible endogeneity problems in this study have to be considered. In its simplest form, a possible problem of endogeneity might arise if firm performance causes choices about capital structure. Bergeret al. (2006) and Margaritis et al. (2010) argue that capital structure may be endogenously determined by firm performance. In such a case, causality might not always run from capital structure to performance. The reverse direction might also be true. Therefore, the simultaneous equations regression analyses are employed to capture if the firm performance is affected by the capital structure.

In recent years, a host of European studies have discussed the importance of laws and regulations to explain financial behavior. For La Porta et al. (1998) and Claessens et al. (2000), it is impossible to explain the impact of any financial behavior without considering its country's regulations. In Europe, regulations vary a lot across countries due to differences in legal origin. We examine three legal origins: French civil law, English common law and finally German and Scandinavian (GS) civil law. The basis of French civil law is identified by the French revolution in the 19th century. The development of France in the colonial era and the dissolution of the Portugal - Spanish empires have extended French civil law to many nations such as: Netherlands, Italy, Belgium, Spain, Portugal and Switzerland. For La Porta et al. (1998) the French civil law countries have the worst legal protections due to some criteria such as: the highest level of concentrated ownership, the highest level of deviation from the principle of one-share/one-vote and the lowest incidence of allowing voting by mail. In this circumstance of low legal protections, high debt levels may be used to increase tunneling and expropriation of outside shareholders. Accordingly, Bebchuk et al. (2000) pointed out that a low level of legal protection leads to increased tunneling in leveraged CMS. Controlling-minority structure: places corporate control in the hands of an insider who holds a small fraction of the firm's cash-flow rights. Bertrand et al. (2002) argued the same results in the case of pyramid structure. Under a pyramidal structure, the ultimate owner has the ability to use debt in order to expropriate resources from affiliated companies to those higher up the pyramid. In the same context of French civil law, Boubaker (2007) reported that external financing eases the expropriation of outside shareholders.

In 2001, Faccio et al. revealed the absence of transparency and disclosures norms enable owners to use debt more effectively to extract private benefits, which has a negative impact on stock valuations. Consistent with these results, Johnson et al. (2000) found that weak legal protection has an important role to play in stock market declines. Therefore, when legal protection is weak, debt fails to serve its disciplinary role and becomes a tool for owners to expropriate company resources. As for common law, the literature indicates that this regulation system was developed according to the principle in which it is unfair to treat similar facts differently. Common law has its roots with the English colonists in some countries such as: US, Canada, Hong-Kong and Australia. In European countries, Ireland was the subject of the first extension of common law system outside the UK.

To prove the importance of common law, La Porta et al. (1998) reported that countries with English common law afford the strongest protection for minority investors. In their papers (1998, 1999 and 2000), the authors found that common law is characterized by the highest incidence of law protecting oppressed minorities. Moreover, they reported that common law has the highest average anti-director rights score. Finally, La Porta el al. (1998) revealed many significant differences between common law and civil law, indicating that strong legal protection decreases the risk of expropriation. In 1995, Zingales confirmed that English common law reduces the ability to extract private benefits by limiting the discretionary power of a manager. In 2001, Dyck and Zingales reported that the levels of private benefits are significantly lower in countries with English legal origins than in French legal origin countries. In this case of legal protection, a high level of debt acts as a disciplining device (Sarkar et al. 2008), by aligning the interests of shareholders with the interests of managers (Jensen, 1986). For Day and Taylor (2004), the effectiveness of debt as a monitoring device depends on the institutional context such as the effective bankruptcy laws. Consistent with these results, it can be argued the disciplinary role of debt is sensitive to the legal protection of the country. In the case of a high level of protection, debt can be used to reduce minority expropriation and increase firm performance.

Finally, German and Scandinavian codes are derived from Roman legal traditions, the most developed one around the world. German codes had an important influence on the legal regulations in many European countries such as Switzerland and Austria. However, the Scandinavian countries (Finland, Sweden, Denmark and Norway) have a distinct civil law derived from German Law. In our study, we consider German and Scandinavian civil law in the same family of regulations based on civil legal regulation. Consistent with this reasoning, La Porta et al. (1998) reported that German and Scandinavian civil law countries are in the middle in terms of legal protection. Their results show that common law countries have the strongest level of protection while civil law countries have the weakest level. Dyck and Zingales (2001) reported that private benefits are highest in countries with French code (21%) then countries with German and Scandinavian legal origins (11% and 4%). Their results confirmed the importance of legal rights in any cross country analysis. For the authors, a higher level of legal protection must be accompanied with lower levels of financial distress. Nenova (2001), confirmed the midmost level of German civil law protection. The author found that private benefits are 4.5% in common law countries, 25.4% in French civil law countries and 16.2% in German legal origin countries. Based on the different regimes of legal protection, the hypotheses H1 and H2 are defined as follows:

H_1: In the case of low legal protection, there is a negative impact of leverage on the performance of listed firms.

H_2: In the case of high legal protection, there is a positive impact of leverage on the performance of listed firms.

In some cases of legal protection the ultimate owners expropriate outside minorities by beating some regulations through the structuring of legal transactions. For example, in many European countries the pyramid structure appears if there are restrictions concerning the use of dual class shares. Accordingly, it is very difficult to detect the impact of financial structure on performance without considering micro factors such as ownership concentration and deviation from the principle of one share-one vote. The logic behind this assumption has been supported by many scholars. For example, Filatotchev et al. (2001) reported that ownership structure may provide an incentive to the ultimate owners to expropriate the minority when the investment project is funded by debt. Brailsford et al. (2002) stated that managers seek to reduce their risks and use less debt at high levels of ownership concentration. Du and Dai (2005) revealed that owners with small proportions of shares tend to increase debt to acquire more resources. Boubaker (2007) confirmed that the level of expropriation is very high in French firms, specifically when shareholders own a small part of cash-flow rights. As for the deviation between cash-flow rights and control rights, prior studies show that tunneling and expropriation activities through debt increases in firms with high ratios of deviation between cash-flow and control rights. In 2002, Claessens et al. completed the study of Filatotchev et al. by indicating that tunneling by ultimate owners often takes place in firms in which there is significant divergence between cash flow rights and control rights. The same results have been observed by La Porta el al. (2002). Finally, Faccio et al. (2002) and Masulis et al. (2009) revealed that a high ratio of ownership rights (O) to control rights (C) and a weak creditor protection enable the owner to use the debt to extract private benefits. When a weak legal system exacerbates the situation of owners, ownership concentration rises as a proxy system to mitigate the level of expropriation. Hence, the final two hypotheses of this study are defined as follows:

H_3: A high level of concentrated ownership reduces the risk of expropriation through debts.

H_4: A high level of deviation between ownership rights and control rights increases the risk of expropriation through debts.

DATA AND METHODOLOGY

This study is based on a new database extracted from European countries at the end of 2012. As a starting point for the data collection, eight European countries from different regimes of legal protection were selected to explore the impact of capital structure on financial performance. From each regime of legal protection we used the richest countries based on gross domestic product (GDP) as identified from Eurostat (http://epp.eurostat.ec.europa.eu). France, Italy and Spain represent the French civil law countries; Austria, Germany and Switzerland represent the GS civil law countries and Ireland and UK represent the common law countries. The selected countries represent 77.7% of European countries GDP (Table 1).

Based on Worldscope database we start with 7,501 listed companies extracted from eight European countries. There are three restrictions on this sample. First, we exclude banks and insurance companies to prevent specificity in our study. Second, we eliminate companies with missing data on ownership and financial structure. Finally, we exclude companies owned by the government. We end up with 5,050 companies divided to three samples for which we can trace the ultimate owner and where stock market data are available. The sample of Common law countries consists of 1,667 listed firms, the sample of French law countries consists of 2,698 listed firms and the sample of GS civil law countries consists of 685 listed firms.

Table 1: GDP in 2012 per Country

Regime	French Law Countries			GS Civil Law Countries			Common Law Countries	
Country	France	Italy	Spain	Germany	Austria	Switzerland	UK	Ireland
GDP (2012)	2.61	2.01	1.32	3.42	0.394	0.491	2.446	0.210
GDP % of European countries	15.7%	12.1%	7.9%	20.6%	2.4%	3%	14.7%	1.3%
Total GDP for the selected countries Over the total of European GDP					77.7%			

This table provides the GDP power for the selected countries. The objective of this table is to prove that the selected countries represent the Europe in term of economic power.

Table 1 provides that the French civil law countries have an important role in Europe due to their Economic contribution in terms of GDP. The three richest countries extracted from French civil law contribute 35.7% of Europe's GDP. This contribution drops to 16% for common law countries. The market capitalization of our three samples (Table 2) is more developed in common law countries followed by French civil law countries then GS civil law countries. These results indicate that listed firms in common law countries specifically those listed on the London stock Exchange may have a direct and fast market reaction on their financial behavior. The research methodology involves quantitative analysis to identify the impact of capital structure on the performance of listed firms by considering different regimes of legal protection. To address this issue, we run the following two regressions by focusing on both micro and macro factors of European firms:

$$Q = \beta_1(DBT) + \beta_2(DBT) * (OWN) + \beta_3(DBT) * (O/C) + \beta_i X_i + e_i \quad (1)$$
$$Q = \beta_1(DBT) + \beta_2(DBT) * (OWN)^2 + \beta_3(DBT) * (O/C)^2 + \beta_i X_i + e_i \quad (2)$$

Table 2: Total Number of Selected Companies per Regime of Legal Protection

Regime	French Law Countries			GS Civil Law Countries			Common Law Countries	
Country	France	Italy	Spain	Germany	Austria	Switzerland	UK	Ireland
# of listed companies 2012	862	279	3167	665	70	238	2179	42
Market capitalization in Billion USD	1823	480	995	1486	106	1079	3019	109
# of selected companies per country	592	175	1931	466	41	178	1639	28
Market capitalization in Billion USD for selected sample	1341	310	562	1021	69	798	2498	66
Total # of selected companies per regime of legal protection		2698			685		1667	
Market capitalization in Billion USD for selected sample		2213			1888		2564	

This table provides the distribution of selected sample based on market capitalization and number of listed firms. In this table we can detect two main points: 1-civil law countries are the most prevalent in Europe, 2-the economic of common law countries is the most important in Europe.

Where *ei* is the stochastic error term and *Xi* denotes all the vector of control variables that can affect the performance. These control variables include firm size measured by the natural log of the book value of total assets, firm age measured by the natural log of the number of years since the firm's inception and firm growth measured as the annual growth rate in sales. The first model (Eq.1) is used to determine the impact of financial debt (*DBT*: debt-to-total assets ratio) on Tobin's Q (*Q*). Tobin's *Q = (EQ + PRE + DEBT)/(ASSETS)*. Where *EQ* = the year-end market value of the firm's common stock; *PRE* = the year-end book value of the firm's preference shares (preferred stock); *DEBT* = the year-end book value of the firm's total debts; and *ASSETS* = the total assets employed by the firm. Further analysis of this regression reveals the combined effects of debt with the variables OWN (cash-flow concentration) and O/C (deviation between cash-flow and voting rights). If debt is employed as a disciplinary mechanism, we would expect a positive relationship between {(DBT)*(O/C)} and firm's performance when O/C is used to extract private benefits. Otherwise, if the ownership concentration is the alternative disciplinary device, we expect a positive and significant relationship between {(DBT)*(OWN)} and firm performance when debts are used to extract private benefits. The second regression (Eq.2) captures any non-monotonic relations. The debt ratio may be non-linearly related to performance when the variables (OWN) and (O/C) increase. On the one hand, higher deviation between ownership and performance might give ultimate owners more power to expropriate through debt. On the other hand, higher cash-flow rights might align the interests of controllers with those of minorities. We regress also the combined effect of financial structure and legal regime by dividing our sample into three subsamples. The first subsample includes French civil law countries, the second one consists of GS civil law countries and the last subsample includes common law countries. The objective is to detect the impact of financial structure on the performance by considering the specificity of each legal regime.

Table 3 provides descriptive statistics of variables used in this study. The sample consists of eight European countries: France, Italy, Spain, Germany, Austria, Switzerland, UK and Ireland. The firms in common law countries have the highest level of performance with the highest level of firm growth. Firms in GS law countries rank second in term of performance while the firms in French civil law rank last. Oppositely, in term of debt ratio French civil law countries rank first ahead of the listed firms in Italy (0.387) and Spain (0.293). Thus, highest debt ratios may be employed as a disciplinary device to reduce cash flow waste. The lowest level of debt ratio exists in UK and Ireland with (0.173) and (0.161) respectively. Between the lowest and the highest debt ratio, firms in France, Germany, Austria and Switzerland have a mid-position.

Table 3: Descriptive Statistics

Regime	**French Law Countries**			**GS Civil Law Countries**			**Common Law Countries**	
Country	France	Italy	Spain	Germany	Austria	Switzerland	UK	Ireland
Tobin's Q	1.624	1.193	1.181	1.935	1.622	1.801	2.094	1.902
DBT	0.261	0.387	0.293	0.284	0.288	0.196	0.173	0.161
OWN	0.448	0.467	0.425	0.458	0.531	0.378	0.359	0.407
O/C	0.883	0.711	0.791	0.854	0.908	0.896	0.842	0.905
FSize	6.187	4.893	4.667	6.213	4.709	4.954	6.001	4.486
FAge	45.21	36.48	39.32	42.87	35.09	39.87	48.32	31.76
FGrow	0.214	0.154	0.179	0.237	0.126	0.245	0.267	0.154
N	592	175	1931	466	41	178	1639	28

This table shows the descriptive statistics of the dependent and independent variables. The dependent variable is Tobin's Q measured by the following equation = (EQ + PRE + DEBT)/(ASSETS). Where; EQ = the year-end market value of the firm's common stock; PRE = the year-end book value of the firm's preference shares (preferred stock); DEBT = the year-end book value of the firm's total debt; and ASSETS = the total assets employed by the firm. The independent variables are: DBT measured by total debt over total assets; OWN measured by cash flow concentration; O/C measured by the deviation between control and ownership; Fsize measured by the natural log of the book value of total assets; Fage measured by the natural log of the number of years since firm's inception; Fgrow is the annual growth rate in sales.

Table 3 shows that ownership is very concentrated in French civil law countries specifically in France (44.8%) and Italy (46.7%), while the lowest level of concentration exists in UK (35.9%) and Switzerland (37.8%). These results indicate that firms in common law countries are wildly held corporations where owners have a very small part of controlling rights. However, unlike the widely held corporations, the closely held corporations in French and GS civil law countries are controlled by majority shareholders such as families and financial institutions. Again, there is considerable variation across countries in terms of deviation between ownership and control. The descriptive statistics indicate that the O/C ratio is at the highest level in GS civil law countries and the lowest level exists in Italy (0.711) and Spain (0.791). Through pyramids, multiple voting rights and a weak legal environment in French civil law countries, controlling shareholders have a high incentive to expropriate non-controlling shareholders.

To demonstrate any meaningful link between all the variables of the study correlation statistics were computed by using Pearson's correlation test. The results in Table 4 indicate the relationship between Tobin's Q and firm's growth is positive and significant whereas the relationship between performance and debt ratio is negative and statistically significant. In light of these results it seems that debt is not used as a disciplinary tool in European countries. The positive relationship between O/C and Debt reveals the possibility of entrenchment, specifically when the ultimate owner has a low cash flow concentration. The negative relationship between OWN and O/C may confirm our first findings.

Table 4: Correlation Statistics

Variables	Tobin's Q	Debt	OWN	O/C	Firm Size	Firm Age	Firm Growth
Tobin's Q	1						
DBT	-0.032*	1					
OWN	0.115	-0.221	1				
O/C	-0.328	0.129**	-0.176*	1			
FSize	0.109	-0.045	0.035	-0.267	1		
FAge	0.185	0.106	-0.076	0.003	0.091*	1	
FGrow	0.254**	-0.097	-0.064	0.051	0.022	-0.031	1

This table presents correlation statistics between the variables of the study (dependent and independent). The dependent variable is Tobin's Q measured by the following equation = (EQ + PRE + DEBT)/(ASSETS). Where; EQ = the year-end market value of the firm's common stock; PRE = the year-end book value of the firm's preference shares (preferred stock); DEBT = the year-end book value of the firm's total debts; and ASSETS = the total assets employed by the firm. The independent variables are: DBT measured by total debts over total assets; OWN measured by cash flow concentration; O/C measured by the deviation between control and ownership; Fsize measured by the natural log of the book value of total assets; Fage measured by the natural log of the number of years since firm's inception; Fgrow is the annual growth rate in sales.
****, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

These findings need further investigation. Accordingly, we try to verify them in the next analysis by regressions analysis. Table 5 presents the results of regression analysis which reveal the relationship between the performance (Tobin's Q), the independent variables (DBT, OWN and O/C), and the control variables (FSize, FAge and FGrow). Before starting the regression analysis of the study, (χ2) and (F) tests were conducted on our classical linear regression models. Both tests indicate that there is no evidence of heteroscedasticity problems.

Table 5: Regression Results

Region	European Countries		French Civil Law Countries		GS Civil Law Countries		Common Law Countries	
Regression	1	2	3	4	5	6	7	8
Equation	Eq.(1)	Eq.(2)	Eq.(1)	Eq.(2)	Eq.(1)	Eq.(2)	Eq.(1)	Eq.(2)
DBT	-0.1622	-0.1451	-0.1908**	-0.2041*	-0.1027	-0.0938	0.0413*	0.0262**
DBT*(OWN)	0.1012	--------	-0.2339*	--------	-0.1362*	--------	0.0152	--------
DBT*(O/C)	-0.1823*	--------	-0.2755**	--------	-0.1401	--------	0.0321	--------
DBT*(OWN)^2	--------	0.1501	--------	0.0189**	--------	0.1202	--------	0.1064
DBT*(O/C)^2	--------	-0.2452**	--------	-0.3454**	--------	-0.1311*	--------	-0.0045
OWN	0.0034	0.0035	0.0041*	0.0137**	0.0054*	0.0051	0.0027	0.0030
O/C	-0.0136**	-0.0143*	-0.0211**	-0.0224*	-0.0198*	-0.0201*	-0.0121	-0.0116
FSize	0.0110*	0.0123	0.0164*	0.0199	0.0186	0.0201	0.0113**	0.0156*
FAge	0.0021	0.0019	0.0031	0.0021	0.0019*	0.0022	0.0021**	0.0016
FGrow	0.0671**	0.0578*	0.0633*	0.0602*	0.0711**	0.0765*	0.0665*	0.0659**
R^2	0.5946	0.5422	0.5487	0.5075	0.5071	0.4861	0.4953	0.4739
Adjusted R^2	0.5145	0.4961	0.4376	0.4387	0.4406	0.4243	0.4661	0.4261
F-statistic	7.7786	7.5641	6.7856	6.4605	6.8013	6.7456	7.2987	7.0785
N	5050	5050	2698	2698	685	685	1667	1667

*This table presents the results of regression analysis to test the mutual impact of capital and legal structures. The first two regressions are applied without dividing our total sample (5050) into subsamples. Regressions 3, 4, 5, 6, 7 and 8 are applied after dividing our sample into three subsamples based on legal origin: regressions 3 and 4 for French civil law countries, regressions 5 and 6 for GS civil law, and finally 7 and 8 for common law countries. The dependent variable is Tobin's Q measured by the following equation = (EQ + PRE + DEBT)/(ASSETS). Where; EQ = the year-end market value of the firm's common stock; PRE = the year-end book value of the firm's preference shares (preferred stock); DEBT = the year-end book value of the firm's total debts; and ASSETS = the total assets employed by the firm. The independent variables are: DBT measured by total debt over total assets; OWN measured by cash flow concentration; O/C measured by the deviation between control and ownership; Fsize measured by the natural log of the book value of total assets; Fage measured by the natural log of the number of years since firm's inception; Fgrow is the annual growth rate in sales. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

According to regressions 1 and 2 the relationships between debt and performance is negative and not significant. After dividing our main sample that consists of 5,050 firms to three subsamples, the results reveal two opposite impacts of debt. On the one hand, debt is related negatively to the performance of listed firms in French civil law countries. On the other hand, there is a positive relationship between debt and the performance of listed firms in common law countries. These results suggest that debt is an important source of expropriation in French civil law countries while there is no evidence of expropriation through debt in GS civil law countries. At low levels of legal protection, managers may expropriate minorities by increasing the debt levels. The recent study of Bai et al. (2013) confirms that the expropriation of minorities is positively related to debt usage in fully-privatized firms. In the same line Agrawal and Knoeber (1996) show that increasing debt levels have a significant negative affect on firm performance. Oppositely, in common law countries it seems that debt is used to increase performance by eliminating risks of expropriation and entrenchment. The evidence of debt in common law countries is consistent with the study of Harris and Raviv (1991) that supports the agency cost hypothesis by showing that higher debt can be used as a monitoring device.

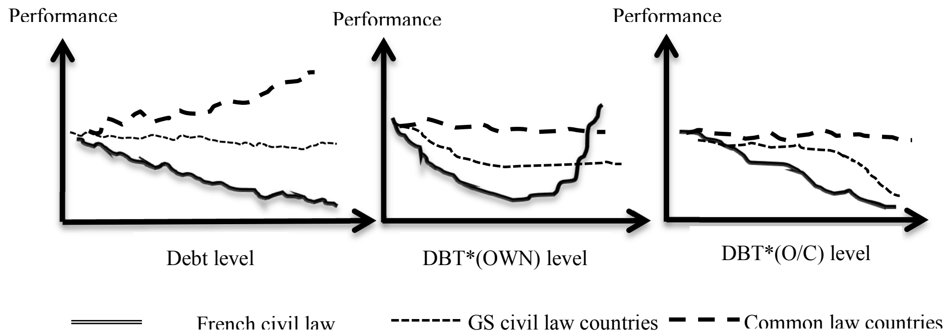
To explore the interaction between debt, performance and ownership concentration, two main variables are run with performance. The first variable is (DBT*OWN), detecting the risk of expropriation through debt at low level of ownership concentration. The second variable is (DBT*OWN2) which is used to capture the risk of tunneling through debt at high level of ownership concentration. In French civil law countries, a non-linear impact of debt (U-Shaped) is identified with ownership concentration while a positive and non-significant impact is pointed out in common law countries. The results lead us to conclude that risk of entrenchment and expropriation through debt exists in French civil law countries especially at low levels of ownership concentration. At high levels of ownership concentration, managers become less entrenched and more controlled by ultimate shareholders. Regression 4 confirms these contentions by demonstrating that ownership concentration in French civil law countries rises as a proxy mechanism to limit the risk of expropriation. This is consistent with hypothesis (H4) which indicates that a high level of concentrated ownership reduces the risk of expropriation through debt.

In GS civil law countries, risks of entrenchment and expropriation are also present when ownership concentration is widely dispersed. At this level of dispersed ownership, managers entrench their powers and derive private benefits from their control of the firm. The explored impact of (DBT*OWN) in GS civil law countries is significantly lower than that of French civil law countries, suggesting a higher risk of expropriation in France, Spain and Italy. In common law countries, ownership is not used to constrain the expropriation of minorities but the high level of legal protection rises as an alternative system. The non-significant impact of (OWN) in regressions 7 and 8 is consistent with this analysis.

Next we examine impact of (DBT*O/C) on the performance of European firms. All the regressions in French civil law countries reveal that high deviation between ownership and control leads the ultimate owner to use debt to expropriate the external shareholders. According to regressions 4 and 6, a negative impact of debt is also detected when the level of deviation between ownership and control comes to be more developed in GS and French civil law countries. From the results it can be argued that the negative impact of (DBT)*(O/C)2 in French and GS civil law countries is significantly higher than that of (DBT)*(O/C), suggesting a higher risk of expropriation through debt with higher a level of deviation. These results are consistent with the studies of La Porta et al. (1999), Faccio et al. (2002) and Claessens et al. (2002) that show a high risk of expropriation and tunneling in firms characterized by high degree of divergence between cash flows rights and control rights. The positive relationship between leverage and (O/C) (Table 4) is also reliable with the hypothesis that debts facilitate tunneling and expropriation.

In common law countries, there is no significant impact of the deviation between ownership and control on the performance of listed firms. Moreover, from regressions 7 and 8 (in Table 5) it seems that the impacts of (DBT)*(O/C) and (DBT)*(O/C) are not significant which means that the owners don't use debt to expropriate external shareholders when the deviation between ownership and control exists. The high level of legal protection is employed as a disciplinary device to eliminate risk of expropriation.

Figure 1: Interaction between Capital Structure, Micro Factors and Legal Protection



This figure presents the results of our empirical study by considering the level ownership concentration (OWN), the level of deviation between cash-flow and voting rights (O/C) and finally the legal origin.

The results in Figure 1 indicate the impact of capital structure on firm performance by considering some micro and macro factors. However, if it is in fact endogenously determined, the results may be non-specified. In order to address the potential endogeneity effect, the following simultaneous equations are used:

$$DBT = \beta_1(Q) + \beta_2(OWN) + \beta_3(O/C) + \beta_i X_i + e_i \quad (3)$$
$$DBT = \beta_1(Q) + \beta_2(OWN)^2 + \beta_3(O/C)^2 + \beta_i X_i + e_i \quad (4)$$

Where e_i is the stochastic error term and X_i denotes all the vector of control variables that can affect the performance including firm size, measured by the natural log of the book value of total assets, firm age, measured by the natural log of the number of years since the firm's inception and firm growth, measured by the annual growth rate in sales.

Table 6: Endogeneity Results

Region	European Countries		French Civil Law Countries		GS Civil Law Countries		Common Law Countries	
Regression	1	2	3	4	5	6	7	8
Equation	Eq.(1)	Eq.(2)	Eq.(1)	Eq.(2)	Eq.(1)	Eq.(2)	Eq.(1)	Eq.(2)
Q	-0.0022	-0.0051	-0.0026	-0.0043	-0.0155	-0.0098	-0.0018	-0.0021
(OWN)	-0.0175	--------	-0.0339	--------	-0.0162	--------	-0.0082	--------
(O/C)	0.1271**	--------	0.1755*	--------	0.1002**	--------	0.0821*	--------
$(OWN)^2$	--------	-0.0501	--------	-0.0439	--------	-0.0347	--------	-0.0654
$(O/C)^2$	--------	0.1922**	--------	0.2272**	--------	0.1724*	--------	0.1097*
FSize	0.1210**	0.1243*	0.1566*	0.1699**	0.1262*	0.1271*	0.1361*	0.1431*
FAge	0.0133	0.0171*	0.0192	0.0202	0.0079*	0.0094*	0.0132	0.0096
FGrow	0.1254**	0.1361*	0.1135**	0.1224*	0.0981**	0.1024**	0.1335*	0.1427**
R^2	0.4546	0.5542	0.5117	0.5151	0.5022	0.4662	0.5115	0.4929
Adjusted R^2	0.5441	0.4961	0.5006	0.4889	0.4844	0.4668	0.5012	0.4881
F-statistic	8.2241	8.0114	7.2341	7.5245	8.0413	7.6113	8.0311	7.6231
N	5050	5050	2698	2698	685	685	1667	1667

*This table presents results of regression analysis to test the endogeneity issue of capital and financial performance. The first two regressions are applied without dividing our total sample (5,050) into subsamples. Regressions 3, 4, 5, 6, 7 and 8 are applied after dividing our sample into three subsamples based on legal origin: regressions 3 and 4 for French civil law countries, regressions 5 and 6 for GS civil law, and finally 7 and 8 for common law countries. The dependent variable is DBT measured by total debt over total assets. The independent variables are: Tobin's Q measured by the following equation = (EQ + PRE + DEBT)/(ASSETS). Where; EQ = the year-end market value of the firm's common stock; PRE = the year-end book value of the firm's preference shares (preferred stock); DEBT = the year-end book value of the firm's total debts; and ASSETS = the total assets employed by the firm.; OWN measured by cash flow concentration; O/C measured by the deviation between control and ownership; Fsize measured by the natural log of the book value of total assets; Fage measured by the natural log of the number of years since firm's inception; Fgrow is the annual growth rate in sales. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

Taking the endogeneity issue into consideration, the analysis of Table 6 confirms that capital structure affects performance and not vice versa. This result is contrary to findings of Bergeret al. (2006) and Margaritis et al. (2010). Moreover, the results in Table 6 indicate that a large deviation between control rights and cash flow rights leads controlling owners to increase debt levels, which suggests a positive effect on firm debt of the separation of control rights and cash flow rights. As a result (from Tables 5 and 6), the large separation of control rights from cash flow rights motives the controlling shareholder to expropriate minority shareholders by increasing debt levels. Table 7 represents the global results of the study, showing how macro and micro factors affect the relationship between capital structure and firm performance. Indeed, for countries with a low legal protection, financial structures are more likely to be used by owners to serve their private interests. For countries with high level of legal protection, it seems the financial market rises as a proxy system to constraint risk of expropriation and entrenchment.

Table 7: General Results

Number	Hypotheses Description	French Civil Law Countries	GS Civil Law Countries	Common Law Countries
H_0	There is a significant impact of leverage on the performance of listed firms	Confirm	Not Confirm	Confirm
H_1	In the case of low legal protection, there is a negative impact of leverage on the performance of listed firms	Confirm*	Not confirm	--------
H_2	In the case of high legal protection, there is a positive impact of leverage on the performance of listed firms	-----------	---------	Confirm
H_3	A high level of concentrated ownership reduces the risk of expropriation through debts.	Confirm	Not Confirm	Confirm
H_4	A high level of deviation between ownership rights and control rights increases the risk of expropriation through debts.	Confirm	Confirm	Not Confirm

This table presents the confirmed and non-confirmed hypotheses after showing the results of descriptive statistics and multivariate regression analysis. (*) This result is not reliable at high level of ownership concentration.

CONCLUSION

Using the data of 5,050 listed firms in European countries, this study focuses on the financial impact of capital structure by considering the level of legal protection. In countries with a low level of legal protection (such as France, Spain and Italy) corporate leverage is likely to be controlled by ultimate owners. At low level of ownership concentration, managers and ultimate owners try to use debt levels to increase tunneling, expropriation and entrenchment. At high levels of ownership concentration, ultimate owners use debt to constraint the entrenchment of managers and consequently increase firm performance. In this low level of legal protection, firms are more exposed to expropriation through debt when there is a high level of deviation between cash-flow and control rights. This is more likely to occur when a firm's structure is organized as a pyramid. In common law countries the situation is totally different.

The high level of legal protection decreases the levels of entrenchment, tunneling and expropriation. In this case, financial markets rise as a proxy system to constraint any opportunistic behavior and debts are enrolled as a monitoring tool to increase the level performance. In such a market-based system, hostile takeovers and investor activism play a key role to discipline managers and ultimate owners. Oppositely, in French civil law countries, capital markets are less protected, which leads ultimate owners to act as monitors to maximize the level of private profits. In GS civil law countries the results indicate no impact of financial structure on the performance of listed firms when it is measured by debt levels. The interaction between ownership and financial structure indicates that at low levels of ownership concentration, a negative and significant impact of debt is found, revealing a high risk of expropriation. This risk of expropriation is also detected when firms use a high level of deviation between ownership and control rights. However, all the results in Table 5 reveal a tendency of higher levels of expropriation in French civil law countries then in GS civil law countries which is consistent with the study of La Porta et al.(1998).

The evidence of this study is important but it could be developed over a longer period of time. The analysis should be improved by categorizing debt into short-term and long-term debt. Finally, more advanced criteria should be considered to classify levels of legal protection.

REFERENCES

Abor, J., (2007). Debt policy and performance of SMEs: evidence from Ghanaian and South Africa firms, *Journal of Risk*, Emerald Group Publishing, vol. 6, p. 438-445.

Agrawal, A. and Knoeber, R., (1996). Firm performance and mechanisms to control agency problems between managers and shareholders, *Journal of Financial and Quantitative Analysis,* vol. 31, p. 377-397.

Bai, Y., Lin B., Wang Y., and Wu L., (2013). Corporate ownership, debt, and expropriation: evidence from China, *China Journal of Accounting Studies*, vol. 1, p. 13-31.

Bebchuk, L, (1994). Efficient and inefficient sales of corporate control, *The Quarterly Journal of Economics*, vol. 109, p. 957-994.

Bebchuk, L., Kraakman, R. and Triantis, G., (2000). Stock pyramids, cross-ownership, and dual class equity: The creation and agency costs of separating control from cash flow rights, *NBER Working Paper,* No. 6951

Berger, A. and E. Bonaccorsi di Patti (2006). Capital structure and firm performance: A new Approach to testing agency theory and an application to the banking industry, *Journal of banking and finance*, vol. 30, p. 1065-1102.

Bhagat, S., and Bolton, B., (2008). Corporate governance and firm performance. Journal of Corporate Finance, vol. 14, p. 257-273.

Boubaker, S., (2007). On the relationship between ownership-control structure and debt financing: New evidence from France. Working paper, Université Paris XII Val de Marne-Institut de Recherche en Gestion.

Brailsford, T. J., Oliver, B.R. and Pua S.L.H., (2002). On the relation between ownership structure and capital structure, *Accounting and Finance*, vol. 42, p. 1-26.

Chiang, Y., Chang, P., and Hui, C., (2002). Capital structure and profitability of the property and construction sectors in Hong Kong, *Journal of Property Investment and Finance*, vol. 20, p. 434-453.

Claessens, S., Djankov, S., Fan, J. P. H., and Lang, L. H. P., (2002). Disentangling the incentive and entrenchment effects of large shareholdings, *The Journal of Finance*, vol. 57, p. 2741-2771.

Claessens, S., Djankov, S., Fan, J. P. H., and Lang, L. H. P., (2000). The separation of ownership and control in East Asian corporations, *Journal of Financial Economics*, vol. 58, p. 81-112.

Day, J. and Peter T., (2004). Institutional change and debt-based corporate governance: A comparative analysis of four transition economies, *Journal of Management and Governance*, vol. 8, p. 73-115.

Dewatripont, M., and Tirole, J., (1994). A theory of debt and equity: diversity of securities and manager-shareholder congruence, *Quarterly Journal of Economics*, vol. 109, p. 1027-1054.

Du, J., and Dai, Y., (2005). Ultimate corporate ownership structures and capital structures: Evidence from East Asian economies, *Corporate Governance: An International Review*, vol. 13, p. 60-71.

Dyck, A., and Zingales L., (2004). Private benefits of control: an international comparison, *Journal of Finance,* vol. 59, p. 537-600.

Eriotis N.P., Franguoli, Z., and Neokosmides, Z.V.,(2002). Profit margin and capital structure: An empirical relationship, J. Appl. Bus. Res, 18, 85-89.

Faccio, M., and Lang, L.H.P., (2002). The ultimate ownership of Western European corporations, *Journal of Financial Economics,* vol. 65, p. 365-395.

Faccio, M., Lang, L. H. P., and Young, L., (2001). Debt and expropriation. Working paper, Purdue University and The Chinese University of Hong Kong.

Faccio, M., Lang, L. H. P., and Young, L., (2001b). Dividends and expropriation, *The American Economic Review*, vol. 91, p. 54-78.

Filatotchev, I., and Mickiewicz, T., (2001). Ownership concentration, private benefits of control, and debt financing, Working Paper, University of London and University College, London, England, *Finance,* vol. 8, p. 364-379.

Frank, M. and Goyal, V., (2003). Testing the pecking order theory of capital structure, *Journal of Financial Economics*, vol. 67, p. 217-48.

Ghosh, S., (2008). Leverage, foreign borrowing and corporate performance: Firm- level evidence for India, *Applied Economics Letters*, vol. 15, p. 607-616.

Harris, M., and Raviv, A., (1991). The theory of capital structure, *Journal of Finance*, vol. 46, p. 297-355.

Jensen, M. and Meckling, W., (1976), Theory of the firm: Managerial behavior, agency cost and ownership structure, *Journal of Financial Economics*, vol. 3, p. 305-360.

Jensen, M., (1986). Agency cost of free cash flow, corporate finance, and takeovers, *American Economic Review,* vol. 76, p. 323-329.

Johnson, S, P. Boone, A. Breach and Friedman E., (2000). Corporate governance in the Asian Financial Crisis, *Journal of Financial Economics,* vol. 58, p. 141-186.

La Porta, R, Lopez-de-Silanes, F., Shleifer, A., and Vishny R.,(2002). Investor protection and corporate valuation, *Journal of Finance*, vol. 57, p. 1147-1170.

La Porta, R, Lopez-de-Silanes, F., Shleifer, A., and Vishny R.,(2000). Investor Protection and corporate governance, *Journal of Financial Economics*, vol. 58, p. 3-27.

La Porta, R, Lopez-de-Silanes, F., Shleifer, A., and Vishny R.,(1999). Corporate ownership Around the World, *Journal of Finance*, vol. 54, p. 471-517

La Porta, R, Lopez-de-Silanes, F., Shleifer, A., and Vishny R.,(1998). Law and Finance, *Journal of Political Economy*, vol. 106, p. 1113-1155.

Margaritis, D., and Psillaki, M., (2009). Capital structure, equity ownership and firm performance, *Journal of Banking and Finance*, vol. 34, p. 621-632.

Masulis, R., Wang, C., and Xie, F., (2009). Agency problems at dual-class companies, *Journal of Finance*, vol. 64, p. 1697-1727.

Modigliani, F. F. and Miller, M. H. (1963). Corporation income taxes and the cost of capital: a correction, *American Economic Review*, vol. 53, p. 433-443.

Modigliani, F., and Miller, M.H. (1958). The cost of capital, corporation finance and the theory of investment, *American Economic Review*, vol. 48, p. 261-297.

Myers, S., (1977). Determinants of corporate borrowing, *Journal of Financial Economics,* vol. 5, p. 147-175.

Myers, S., (1984). The capital structure puzzle, *Journal of Finance,* vol. 39, p. 575-592.

Myers, S., and Majluf, N., (1984). Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics,* vol. 13, p. 187-221.

Nenova, T., (2000). The Value of Corporate Votes and Control Benefits: A cross-country analysis, mimeograph, Harvard University.

Sarkar, J., and Sarkar, S., (2008). Debt and corporate governance in emerging economies: Evidence from India, *Economics of Transition*, vol. 16, p. 293-334.

Sarkar, S., and F. Zapatero, (2003). The trade-off model with mean reverting earnings : Theory and empirical evidence, *Economic Journal*, vol. 113, p. 834-860.

Shleifer, A., and R. Vishny. (1997). A survey of corporate governance, *Journal of Finance*, vol. 52(2), p. 737-83.

Shyam-Sunder, L., and Myers S., (1999), *Journal of Financial Economics*, vol. 51, p. 219-244.

Stiglitz, J., (1985). Credit markets and the control of capital, *Journal of Money, Credit and Banking,* vol. 17, p. 133-152.

Stulz, R. M., (1990). Managerial discretion and optimal financing policies, *Journal of Financial Economics*, vol. 26, p. 3-27.

Zingales, L. (1995). What determines the value of corporate votes?, *Quarterly Journal of Economics*, vol. 110, p. 1075-1110.

BIOGRAPHY

Dr. Hani El-CHAARANI is the Director of Faculty of Business at Beirut Arab University - Tripoli. His research appears in international journals. He can be contacted at: Faulty of business, Beirut Arab University, Corniche El-Mina, Tripoli-Lebanon. E-mail: h.shaarani@bau.edu.lb.

International Journal of Business and Finance Research
Vol. 9, No. 2, 2015, pp. 53-67
ISSN: 1931-0269 (print)
ISSN: 2157-0698 (online)

IBFR
www.theIBFR.org

PREDICTING LOAN LOSS PROVISIONS BY INCLUDING LOAN TYPE CHARACTERISTICS

Glen Hansen, Utica College

ABSTRACT

Researchers examining managerial behavior in the banking industry rely almost entirely on the validity of discretionary loan loss provision models in reaching their conclusions. Very little research analyzes the usefulness and effectiveness of discretionary loan loss provision models. This places our knowledge about managerial discretion in the banking industry on a precarious foundation. This paper evaluates the effectiveness of extant discretionary loan loss provision models and a newly developed model. The new model incorporates loan type variables such as real estate, credit card, commercial, and individual loans. The paper analyzes the models with respect to their explanatory power and the persistence of their discretionary and nondiscretionary components. The new model performs the best in explaining loan loss provisions. All of the variables introduced in the new model are highly significant and the nonperforming credit card loan variable is particularly important, as its coefficient is an order of magnitude larger than other nonperforming loan variables. The new model also produces a discretionary component that has persistence characteristics that are most consistent with managerial discretion. The analysis produces a highly effective new model and provides important evidence on extant loan loss provision models.

JEL: G21, M41

KEYWORDS: Loan Loss Reserves, Loan Loss Provisions, Earnings Manipulation

INTRODUCTION

This paper develops a model of discretionary loan loss provisions and then compares its effectiveness with extant models. The new model incorporates loan types including real estate, commercial, individual, and credit card loans in the analysis. The new model outperforms the other models in terms of goodness of fit and in terms of the expected transitory nature of the discretionary loan loss component. It also performs relatively well in terms of the expected persistence of the nondiscretionary component.

Understanding managerial behavior is a critical component of understanding and interpreting financial statements, evaluating firm and manager performance, and is essential in developing standards and best practices. The earnings management and managerial discretion literature is vast and is growing exponentially. Much of what we have learned about managerial behavior (or at least think we have learned) is based on models of managerial discretion. Kothari (2001) criticizes discretionary accrual models and even provides specific examples where researchers may have misinterpreted the data because of discretionary models. This is despite the fact that accrual models have been analyzed extensively in the literature and researchers have essentially reached a consensus on the preferred model. Banking managerial discretion studies rely on a much more precarious foundation. First, there is no agreement on a preferred model and most banking studies develop their own discretionary models. Second, very little research has examined the validity of these models. Research into discretionary loan loss provision models is essential in order to establish the validity, usefulness, and limitations of these models. This evaluation is critical to improve our understanding and interpretation of previous research and to guide future research on managerial behavior in the banking industry.

This paper extends the literature in several ways. First, it develops a new model of discretionary loan loss provisions incorporating information from specific loan types. Second, it examines the effectiveness of extant discretionary loan loss provision models in terms of goodness of fit and in terms of the expected persistence properties of both the discretionary and nondiscretionary components from these models. Finally, the sample used in this paper is more extensive. Most previous studies have examined only the largest banks as they have relied on the Compustat database. This study examines all U.S. banks with more than one million dollars in assets. The results provide an understanding of a broader sample of banks as compared to most other studies.

The rest of the paper proceeds as follows. Section two provides a review of the managerial discretion literature in the banking industry and of the literature examining models of discretionary behavior by managers. The next section describes the methodology of the paper, the data used for the analysis, and the sample selection process. The next section presents and discusses the empirical results. The last section summarizes and concludes the paper.

LITERATURE REVIEW

Understanding managerial behavior and discretion is critical to understanding and interpreting the financial statements. There is a vast literature on how the financial statements are affected by the way managers respond to different types of incentives and situations. Managing accounting accruals is a significant branch of this research. Early studies focus on accruals. Healy (1985) finds that managers manipulate accruals to maximize their bonus compensation and DeAngelo (1988) argues that managers use their discretion to increase earnings during proxy contests. One criticism of these early earnings management papers is that total accruals are not an adequate proxy for manipulation. Accruals vary with firm operating variables such as sales, depreciation, and other accounts even in the absence of earnings manipulation. Using total accruals as a proxy for manipulation reduces the power of tests and increases the possibility that results are due to economy wide fluctuations and not managerial discretion.

Researchers now use sophisticated techniques to separate accruals into discretionary and nondiscretionary components. Jones (1991) develops a regression model to isolate the discretionary component of accruals in order to examine earnings manipulation in firms seeking import relief. Her methodology and variants of it have become the standard of accrual manipulation research.

Researchers examining managerial discretion in the banking industry focus predominantly on one particular accrual—loan loss provisions. Bank managers respond to earnings incentives just like other managers, but because of bank regulation, they also respond to capital management concerns. The loan loss provision account is of particular interest to bank researchers because it affects both earnings and capital. It is also by far the largest accrual in the banking industry. Loan loss provisions are used to proxy for managerial discretion in earnings smoothing, managerial signaling, and capital management studies.

Earnings smoothing is a popular topic for banking industry earnings management studies. Earnings smoothing occurs when managers "borrow" earnings during good years by increasing loan loss provisions. When earnings are poor managers draw down loan loss allowances which reduces the loan loss provision and increases earnings. Many studies conclude that managers use their discretion over the loan loss provision account to smooth earnings. Kanagaretnam, Matheiu, and Lobo (2003) find that managers smooth earnings in U.S. banks. Perez, Salas, and Salas-Fumas (2008) find earnings smoothing in Spanish banks, Bouvatier, Lepetit, and Strobel (2014) find it in European commercial banks with concentrated ownership, and Handorf and Zhu (2006) in middle-sized banks only. Kanagaretnam, Yang, and Lobo

(2004) find that smoothing evidence is stronger when earnings are extreme. Gebhardt and Novotny-Farkas (2011) find that IAS 39 reduced managers' ability to smooth income. Kilic, Lobo, Ranasinghe, and Sivaramakrishnan (2013) suggest that SFAS increased income smoothing using loan loss provisions. This is just a partial list of the many studies that examine earnings smoothing in banks.

A number of studies also conclude that managers use discretion over the loan loss provision account to signal their private information to investors. Ahmed, Takeda, and Thomas (1999) find that managers use loan loss provisions to manage capital ratios but not for signaling. Kanagaretnam, Yang, and Lobo (2004) show that bank managers use the loan loss provision account to both signal and to smooth earnings. Kanagaretnam, Yang, and Lobo (2005) find that managers in smaller banks and in banks with greater earnings variability are better able to signal their private information. Kanagaretnam, Krishnan, and Lobo (2009) show that managers' ability to signal depends on the industry expertise of their auditors.

The validity of these studies and their conclusions depends almost entirely on the validity of discretionary loan loss provision models. Despite this crucial dependence, very little research has examined discretionary loan loss provision models. Several working papers evaluate discretionary loan loss provision models but I am not aware of any published studies in this area. Medeiros, Dantas, and Lustosa (2012) examine the effectiveness of eleven discretionary loan loss provision models in terms of goodness of fit and their transitory properties using Brazilian bank data. Beatty and Liao (2013) do a factor analysis on 9 discretionary loan loss provision models. They find only three separate statistically significant factors from all of the variables used in these models. They formulate four models to represent the 9 models that they study and to isolate each of the factors contained in these models. Beatty and Liao (2013) provide evidence that all of the models have some ability to identify extreme earnings management from bank restatements and SEC comment letters.

Many studies examine the discretionary accrual models used outside of the banking literature. Dechow, Sloan, and Sweeney (1995) examine the power and specification of five different accrual models. They conclude that the modified-Jones model outperforms the other models in terms of both power and specification. Dechow, Hutton, Kim, and Sloan (2011) find that incorporating reversals increases the power of earnings management tests by forty percent. Guay, Kothari, and Watts (1996) find that none of the five discretionary accrual models they examine effectively isolates managerial discretion. Jones, Krishnan, and Melendrez (2008) find that discretionary accrual models detect fraudulent earnings events and non-fraudulent earnings restatements. Collins and Hribar (2002) and Hansen (2002) both show that the presence of mergers, acquisitions, and discontinued operations bias discretionary accrual models. These results suggest that accrual models are able to detect extreme earnings management but are not very effective in isolating smaller amounts of managerial discretion.

Researchers have expressed concern about conclusions drawn from the accrual management literature despite the amount of research examining discretionary accrual models. Kothari (2001) points out possible misinterpretations from four studies that examine earnings management during the time period leading up to an IPO. He demonstrates that the most popular discretionary accrual model—the modified-Jones model, results in an incorrect prediction of manipulation when legitimate revenue growth from credit sales is present. He calls for an improvement in models and tests in the earnings management literature. The need for improved models and a more thorough examination of existing models is even more critical in the banking industry. Unlike discretionary accrual models, very little research has examined the effectiveness and potential problems in discretionary loan loss provision models The concern that researchers have misinterpreted tests of managerial discretion in the banking industry looms large because of the lack of research into these models. This paper attempts to add to the scant knowledge we have about the effectiveness of these models.

DATA AND METHODOLOGY

This paper compares the effectiveness of extant discretionary loan loss provision models to the effectiveness of a newly developed model that includes loan type variables. First, I describe several extant discretionary loan loss provision models. Second, I develop a model of discretionary loan loss provisions by adding loan type variables. Next, I compare how well the models predict loan loss provisions. Then I use several tests to compare the persistence characteristics of both the discretionary and nondiscretionary components from the models. Earnings persistence and the persistence of loan loss provisions for both the discretionary and nondiscretionary components from each model are tested. I also examine the persistence of the discretionary loan loss provision.

Beatty and Liao (2013) perform a factor analysis on nine extant discretionary loan loss provision models. They find that three significant factors capture the essence of all nine models. They construct four models based on their factor analysis. Since their four models isolate all of the statistically significant factors from a broad partition of the literature, I evaluate their four models in order to consolidate my analysis without sacrificing relevance. Their first model is based on Liu and Ryan (2006) and Bushman and Williams (2012). Nonperforming assets, size, and macroeconomic variables explain one of the factors that in my opinion represents the state of the economy. The second model is based on Wahlen (1994), Beatty, Chamberlain, and Magliolo (1995), and Collins, Shackelford, and Wahlen (1995). This model includes the lagged loan loss allowance variable. Their third model is based on Beaver and Engel (1996), Kim and Kross (1998), Kanagaretnam, Krishnan, and Lobo (2010), and Beck and Narayanmoorthy (2013). These models all include the net charge off variable. Beatty and Liao (2013) then construct their own model that captures all of the relevant factors in one model.

Discretionary Loan Loss Provision Models

I examine the validity and effectiveness of extant discretionary loan loss provision models using the four regression models shown in equations 1-4.

$$\begin{aligned}\mathrm{LLP}_t = {}& \alpha_0 + \alpha_1\Delta\mathrm{NPA}_{t+1} + \alpha_2\Delta\mathrm{NPA}_{t} + \alpha_3\Delta\mathrm{NPA}_{t-1} + \alpha_4\Delta\mathrm{NPA}_{t-2} + \alpha_5\Delta\mathrm{Loans}_t \\ & + \alpha_6\mathrm{SIZE}_{t\text{-}1} + \alpha_7\Delta\mathrm{GDP}_t + \alpha_8\mathrm{CSRET}_t + \alpha_9\Delta\mathrm{UE}_t + \varepsilon_t\end{aligned} \tag{1}$$

$$\begin{aligned}\mathrm{LLP}_t = {}& \alpha_0 + \alpha_1\Delta\mathrm{NPA}_{t+1} + \alpha_2\Delta\mathrm{NPA}_{t} + \alpha_3\Delta\mathrm{NPA}_{t-1} + \alpha_4\Delta\mathrm{NPA}_{t-2} + \alpha_5\Delta\mathrm{Loans}_t \\ & + \alpha_6\mathrm{SIZE}_{t\text{-}1} + \alpha_7\Delta\mathrm{GDP}_t + \alpha_8\mathrm{CSRET}_t + \alpha_9\Delta\mathrm{UE}_t + \alpha_{10}\mathrm{LLA}_{t\text{-}1} + \varepsilon_t\end{aligned} \tag{2}$$

$$\begin{aligned}\mathrm{LLP}_t = {}& \alpha_0 + \alpha_1\Delta\mathrm{NPA}_{t+1} + \alpha_2\Delta\mathrm{NPA}_{t} + \alpha_3\Delta\mathrm{NPA}_{t-1} + \alpha_4\Delta\mathrm{NPA}_{t-2} + \alpha_5\Delta\mathrm{Loans}_t \\ & + \alpha_6\mathrm{SIZE}_{t\text{-}1} + \alpha_7\Delta\mathrm{GDP}_t + \alpha_8\mathrm{CSRET}_t + \alpha_9\Delta\mathrm{UE}_t + \alpha_{11}\mathrm{NCO}_t + \varepsilon_t\end{aligned} \tag{3}$$

$$\begin{aligned}\mathrm{LLP}_t = {}& \alpha_0 + \alpha_1\Delta\mathrm{NPA}_{t+1} + \alpha_2\Delta\mathrm{NPA}_{t} + \alpha_3\Delta\mathrm{NPA}_{t-1} + \alpha_4\Delta\mathrm{NPA}_{t-2} + \alpha_5\Delta\mathrm{Loans}_t \\ & + \alpha_6\mathrm{SIZE}_{t\text{-}1} + \alpha_7\Delta\mathrm{GDP}_t + \alpha_8\mathrm{CSRET}_t + \alpha_9\Delta\mathrm{UE}_t + \alpha_{10}\mathrm{LLA}_{t\text{-}1} + \alpha_{11}\mathrm{NCO}_t + \varepsilon_t\end{aligned} \tag{4}$$

I scale the following variables by lagged total loans in order to mitigate heteroskedasticity:

LLP	Loan loss provisions
ΔNPA	Change in Non-Accrual Loans and Loans 90 days or more past due from the previous quarter.
ΔLoans	Change in total loans from the previous quarter.

LLA Loan loss allowance at the beginning of the quarter.
NCO Net Charge offs (total charge offs minus total recoveries)

The remaining variables are

SIZE Natural log of total assets
ΔGDP Percentage change in GDP over the quarter
CSRET Return on the Case-Shiller Real Estate Index during the quarter
ΔUE Percentage change in unemployment rate during the quarter.

In addition to testing the 4 extant models, I create a new model that includes loan type variables. I compare the new model shown in equation 5 with the previous four models.

$$\begin{aligned} LLP_t = {} & \alpha_0 + \alpha_1 \Delta NPA_{t+1} + \alpha_2 \Delta NPA_t + \alpha_3 \Delta NPA_{t-1} + \alpha_4 \Delta NPA_{t-2} + \alpha_5 \Delta Loans_t + \alpha_6 SIZE_{t-1} + \alpha_7 \Delta GDP_t + \alpha_8 CSRET_t \\ & + \alpha_9 \Delta UE_t + \alpha_{10} LLA_{t-1} + \alpha_{11} NCO_t + \alpha_{12} \Delta NPCC_t + \alpha_{13} \Delta NPRE_t + \alpha_{14} \Delta NPCOM_t + \alpha_{15} \Delta NPIND_t + \varepsilon_t \end{aligned} \quad (5)$$

The additional loan type variables shown in this model are:

ΔNPCC Change from the previous quarter in non-accrual credit card loans and credit card loans 90 days or more past due.
ΔNPRE Change from the previous quarter in non-accrual real estate loans and real estate loans 90 days or more past due.
ΔNPCOM Change from the previous quarter in non-accrual commercial loans and commercial loans 90 days or more past due.
ΔNPIND Change from the previous quarter in non-accrual individual loans (other than credit card loans) and individual loans 90 days or more past due.

The purpose of all of the above models is to separate loan loss provisions into discretionary and nondiscretionary components. The adjusted r-squared from each model is compared to determine which of the models does the best job of predicting loan loss provisions. This is the first test. For subsequent tests, the fitted value from each regression is the proxy for the nondiscretionary component of loan loss provisions. The residual from each regression is the proxy for discretionary loan loss provisions.

Discretionary and nondiscretionary components of loan loss provisions have predictable persistence characteristics. If managers use their discretion to increase (decrease) earnings in the current quarter then future earnings will be lower (higher) by an amount equal to the original discretion. The loan loss provision is a component of earnings so if managers use their discretion to increase (decrease) the loan loss provision in the current quarter then the loan loss provision will be naturally lower (higher) by an equal amount in future quarters. This suggests that as a component of earnings, and as a component of the loan loss provision, the discretionary loan loss provision should be more transient than the nondiscretionary component. One measure of how well the models isolate discretion is how closely their discretionary and nondiscretionary components conform to their expected characteristics.

Persistence Tests

This paper uses three different tests to examine the transitory nature of the discretionary component of loan loss provisions from each of the discretionary loan loss provision models. Two of those three tests simultaneously test the nondiscretionary component. The models are rated according to the lack of persistence of the discretionary component and the presence of persistence for the nondiscretionary component. First, I test the earnings persistence of the discretionary and nondiscretionary loan loss provisions using equation 6.

$$PPP_{t+1} = \alpha_0 + \alpha_1 PPP_t + \alpha_2 NDLLP_t + \alpha_3 DLLP_t + \varepsilon_\tau \tag{6}$$

Where:

PPP represents preprovision profit, which is operating profit without including the loan loss provision. Another definition is net income before taxes, extraordinary items, discontinued operations, and the loan loss provision. It is scaled by total loans.

NDLLP is the fitted value from the discretionary loan loss provision model being tested

DLLP is the residual from the discretionary loan loss provision model being tested.

All of the variables are scaled by lagged total loans. Preprovision profit is scaled directly. The discretionary and nondiscretionary loan loss provisions are scaled indirectly since they are derived from models where the dependent and independent variables have been scaled by total loans.

The second test of persistence is a regression of future loan loss provisions on the discretionary and nondiscretionary components of the loan loss provision. These variables have been previously defined. Models with larger coefficients on nondiscretionary loan loss provisions and smaller or more negative coefficients on discretionary loan loss provisions are consistent with isolating a greater proportion of managerial discretion. Equation 7 describes the persistence test using loan loss provisions.

$$LLP_{t+1} = \alpha_0 + \alpha_1 NDLLP_t + a_2 DLLP_t + \varepsilon_\tau \tag{7}$$

The final test of persistence is a vector autoregression of the discretionary loan loss provision as shown in equation 8. A vector autoregression of nondiscretionary loan loss provision is not performed because it is not clear what the persistence properties of nondiscretionary loan loss provisions should be in a vector autoregression. The discretionary component in this test should produce a negative coefficient. As stated before, if managers use their discretion in the current period to increase (decrease) earnings by lowering (increasing) the loan loss provision account then at some future point the same account must be increased (decreased). All of the reversal from managerial discretion should show up in the discretionary loan loss component since managers have some control over this component. They have less control over the nondiscretionary component that is based on the size and credit quality of the loan portfolio and this depends primarily on customer and macroeconomic characteristics.

$$DLLP_{t+1} = \alpha_0 + \alpha_1 DLLP_t + \varepsilon_\tau \tag{8}$$

Data and Sample Selection

The Federal Deposit Insurance Corporation (FDIC) collects quarterly reports for all FDIC insured institutions including Bank Call Reports and Thrift Financial Reports. This data is currently available on their website for quarters starting in the fourth quarter of 1992. I collected data from all quarters starting with 1992 quarter 4 through 2013 quarter 3 for this study. The data can be collected for individual banks, bank groups, and for all reporting banks. I collected data for all reporting banks using the following URL: www2.fdic.gov/sdi/download_large_list_outside.asp.

The following selection criteria are used to arrive at the study's final sample. First, call report data must be available for all of the variables used in the analysis. Second, lagged loans must be at least $1 million. Third, the following variables are excluded if their magnitudes exceeded (plus or minus) 100% of the total value of lagged loans: loan loss provisions, changes in nonperforming assets (including the lead and lagged values), change in loans, loan loss allowance, and net charge offs. Requirements 2 and 3 are included to mitigate potential heteroskedasticity problems and to reduce the possibility that data errors are included in the analysis. Requirements 2 and 3 do not materially affect the results of the study.

Call report data is available for 823,016 bank-quarter observations from 1992 quarter 4 thru 2013 quarter 3. There are 729,638 bank-quarter observations with data for all of the variables available in the study. Of the 93,378 lost observations approximately a third are due to the need for lead and lagged values in the analysis. The remaining observations are lost because not all banks report all data items every quarter. Additionally, the size requirement excluded 1,265 observations and 1,445 observations are excluded because of extreme data values. The final sample contains 726,928 bank-quarter observations.

Table 1: Descriptive Statistics for Variables Used in the Discretionary Loan Loss Provision Models

	Mean	Minimum	25th Percentile	Median	75th Percentile	Maximum	Standard Deviation
LLP_t	0.0012	-0.5380	0.0000	0.0005	0.0012	0.3522	0.0041
ΔNPA_{t+1}	0.0002	-0.6380	-0.0018	0.0000	0.0019	0.9865	0.0103
ΔNPA_t	0.0002	-0.6380	-0.0018	0.0000	0.0019	0.5168	0.0097
ΔNPA_{t-1}	0.0003	-0.6380	-0.0018	0.0000	0.0019	0.8578	0.0100
ΔNPA_{t-2}	0.0003	-0.6380	-0.0018	0.0000	0.0019	0.9865	0.0102
$\Delta LOAN_t$	0.0242	-0.9998	-0.0094	0.0161	0.0455	0.9999	0.0768
$SIZE_t$	11.6433	7.5622	10.7366	11.4854	12.3368	21.3901	1.3640
ΔGDP_t	0.0116	-0.0200	0.0093	0.0121	0.0157	0.1297	0.0067
$CSRET_t$	0.0095	-0.0736	-0.0020	0.0127	0.0280	0.0716	0.0264
ΔUE_t	0.0000	-0.0107	-0.0017	-0.0010	0.0007	0.0140	0.0030
LLA_{t-1}	0.0156	0.0000	0.0105	0.0135	0.0180	0.9123	0.0110
NCO_t	0.0010	-0.3282	0.0000	0.0001	0.0008	0.5113	0.0036
$\Delta NPCC_t$	0.0000	-0.0791	0.0000	0.0000	0.0000	0.1596	0.0007
$\Delta NPRE_t$	0.0002	-0.6380	-0.0010	0.0000	0.0011	0.3707	0.0078
$\Delta NPCOM_t$	0.0000	-0.5414	-0.0002	0.0000	0.0001	0.4186	0.0047
$\Delta NPIND_t$	0.0000	-0.1817	-0.0001	0.0000	0.0001	0.1844	0.0016

Table 1 shows descriptive statistics for the variables used in the discretionary loan loss provision models. The data includes 726,928 observations during the period 1992 quarter 4 through 2013 quarter 3. All variables except for size and the macroeconomic variables (GDP, CSARET, UE) are deflated by lagged loans and are excluded if they exceed a magnitude of 100% of lagged loans. For example, the mean of LLP is .0012 suggesting that on average loan loss provisions are 0.12% of lagged loans.
LLP: Loan Loss Provision
ΔNPA *: Change in Nonaccrual Loans and Loans 90 days or more past due from the previous quarter.*
ΔLOAN *: Change in total loans from the previous quarter.*
SIZE: Natural logarithm of total assets
ΔGDP *: Percentage Change in gross domestic product during the quarter*
CSRET: Return on the Case-Shiller Real Estate Index during the quarter,
ΔUE *: Change in unemployment during the quarter*
LLA: Loan loss allowance at the beginning of the quarter.
NCO: Net charge offs during the quarter.
ΔNPCC *: Change in Nonaccrual Credit Card Loans and Credit Card Loans 90 days or more past due from the previous quarter.*
ΔNPRE *: Change in Nonaccrual Real Estate Loans and Real Estate Loans 90 days or more past due from the previous quarter.*
ΔNPCOM *: Change in Nonaccrual Commercial Loans and Commercial Loans 90 days or more past due from the previous quarter.*
ΔNPIND *: Change in Nonaccrual Individual Loans and Individual Loans 90 days or more past due from the previous quarter.*

Table 1 provides descriptive statistics for the variables used in the discretionary loan loss provision models. The data period covers from 1992 quarter 4 through 2013 quarter 3. However, because of the need for lead and lagged variables the observations in the study range from 1993 quarter 2 through 2013 quarter 2. There are 726,928 observations for all of the variables. The macroeconomic variables are expressed in percentage change terms, the size variable is in logarithmic form, and all of the other variables are expressed as a proportion of lagged loans. Row 1 of table 1 shows that the mean of loan loss provision is 0.0012. This suggests that on average the loan loss provision is 0.12% of lagged loans. The macroeconomic variables are expressed as a percentage change during the quarter. The mean of ΔGDP is 0.0116 suggesting that GDP has increased on average by 1.16% per quarter during this period. The mean of SIZE is expressed as the natural logarithm of total assets. All of the firm specific variables (except for SIZE) have minimums and maximums that are less than plus or minus one hundred percent of lagged loans since observations with values greater than this were excluded.

RESULTS

Table 2 provides the regression results from equations 1-5. All of the discretionary loan loss provision models are well specified. All of the variables in all of the models are highly significant and all variables except for one have the expected sign. The loan quality variable ΔNPA, including its lead and lagged values are all positively related to loan loss provisions (LLP). An increase in nonperforming loans corresponds to a deterioration of loan quality. This causes managers to increase loan loss provisions.

A discussion of the results from Model 1 in Table 2 follows. The same general discussion applies to all of the models. The coefficient of 0.0336 on ΔNPA shown in the first column of regression results suggests that on average managers increase the loan loss provision by 3.36 cents for every dollar increase in nonperforming loans. In other words, managers expect that about 3.36% of increases in nonperforming loans will be uncollectible. Changes to the size of the loan portfolio are also positively related to loan loss provisions. The coefficient of 0.001 on ΔLoans suggests that managers expect that 0.1% of new loans will be uncollectible and thus the loan loss provision is increased by this amount. The SIZE variable is positively related to loan loss provisions suggesting that on average larger banks deduct a higher proportion of loans from income through the loan loss provision account.

The macroeconomic variables are all highly significant and have the expected sign. The coefficient on ΔGDP of -0.0116 suggests that an increase in GDP over the quarter is associated with managers lowering the loan loss provision account. The coefficient of 0.0007 on ΔUE suggests that managers increase the loan loss provision accounting when unemployment increases. Finally the coefficient of -0.0046 on CSRET suggests that managers decrease the loan loss provision account when the value of real estate increases. Taken together these results suggest that as the economy improves managers lower the loan loss provision account since they expect to collect on a higher proportion of loans when the economy is doing well.

The loan loss allowance account (LLA) coefficient switches signs between regression models 2 and 4. The coefficient on loan loss allowance in Model 2 is 0.062. It is positive and highly significant. In Model 4, the coefficient on loan loss allowance is -0.0103 and it is negative and highly significant. The difference between the two models is the inclusion of net charge offs (NCO). The loan loss allowance account proxies as another loan quality variable in Model 2. Managers that expect more future charge offs will need a larger loan loss allowance and so more current loan loss provisions will be needed to maintain the larger loan loss allowance.

In Model 4 the loan loss account proxies for the size and adequacy of the loan loss allowance account and not for expected charge offs (because charge offs are included in the regression). A larger loan loss allowance account suggests that it is more adequate to the amount of future charge offs. Since the regression in Model 4 includes charge offs, a larger loan loss allowance account suggests that reserves are more adequate to represent future charge offs and so need less replenishing through the loan loss provision account. The inclusion of charge offs causes the coefficient on loan loss allowance in Model 4 to switch signs.

Table 2: Models of Discretionary Loan Loss Provisions

	Model 1	Model 2	Model 3	Model 4	New Model with Loan Types
Intercept	-0.0010	-0.0021	-0.0001	0.0001	-0.0000
	(-23.4)***	(-50.0)***	(-2.3)**	(4.1)***	(-1.6)
ΔNPA_{t+1}	0.0121	0.0159	0.0158	0.0152	0.0155
	(26.5)***	(35.1)***	(47.7)***	(45.9)***	(47.1)***
ΔNPA_t	0.0336	0.0375	0.0570	0.0566	0.0258
	(68.1)***	(76.9)***	(158.8)***	(157.8)***	(18.3)***
ΔNPA_{t-1}	0.0427	0.0405	0.0209	0.0210	0.0209
	(89.6)***	(86.2)***	(60.3)***	(60.7)***	(60.7)***
ΔNPA_{t-2}	0.0318	0.0321	0.0126	0.0123	0.0127
	(68.8)***	(70.3)***	(37.4)***	(36.6)***	(38.1)***
$\Delta LOAN_t$	0.0010	0.0012	0.0040	0.0040	0.0036
	(16.0)***	(20.4)***	(88.7)***	(88.6)***	(81.8)***
$SIZE_t$	0.0002	0.0002	0.0000	0.0000	0.0000
	(58.5)***	(62.4)***	(17.0)***	(15.6)***	(16.6)***
ΔGDP_t	-0.0116	-0.0078	-0.0047	-0.0052	-0.0045
	(-11.5)***	(-7.8)***	(-6.4)***	(-7.1)***	(-6.1)***
$CSRET_t$	-0.0046	-0.0043	-0.0015	-0.0015	-0.0015
	(-22.5)***	(-21.7)***	(-10.1)***	(-10.1)***	(-10.0)***
ΔUE_t	0.0007	0.0009	0.0004	0.0003	0.0004
	(32.3)***	(41.9)***	(24.3)***	(22.0)***	(25.7)***
LLA_{t-1}		0.0620		-0.0103	
		(146.9)***		(-31.9)***	
NCO_t			0.7855	0.7946	0.7866
			(810.4)***	(786.5)***	(818.6)***
$\Delta NPCC_t$					0.5584
					(105.3)***
$\Delta NPRE_t$					0.0226
					(15.3)***
$\Delta NPCOM_t$					0.0540
					(34.2)***
$\Delta NPIND_t$					0.0141
					(5.2)***
Adjusted R-squared	0.0357	0.0635	0.4934	0.4941	0.5034

Table 2 shows the regression results for the five discretionary loan loss provision models (equations 1-5) examined. The dependent variable LLP is loan loss provisions. Model 5 is shown. The other models contain a subset of the variables in model 5.

$$LLP_t = \alpha_0 + \alpha_1 \Delta NPA_{t+1} + \alpha_2 \Delta NPA_t + \alpha_3 \Delta NPA_{t-1} + \alpha_4 \Delta NPA_{t-2} + \alpha_5 \Delta Loans_t + \alpha_6 SIZE_{t\text{-}1} + \alpha_7 \Delta GDP_t + \alpha_8 CSRET_t + \alpha_9 \Delta UE_t + \alpha_{10} LLA_{t\text{-}1} + \alpha_{11} NCO_t + \alpha_{12} \Delta NPCC_t + \alpha_{13} \Delta NPRE_t + \alpha_{14} \Delta NPCOM_t + \alpha_{15} \Delta NPIND_t + \varepsilon_t$$

*This analysis regresses loan loss provisions on variables other than managerial discretion that should affect it, including variables representing the credit quality of the loan portfolio and macroeconomic variables showing that state of the economy. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.*

LLP: Loan Loss Provision

ΔNPA *: Change in Nonaccrual Loans and Loans 90 days or more past due from the previous quarter.*

ΔLOAN *: Change in total loans from the previous quarter.*

SIZE: Natural logarithm of total assets

ΔGDP *: Percentage Change in gross domestic product during the quarter*

CSRET: Return on the Case-Shiller Real Estate Index during the quarter,

ΔUE *: Change in unemployment during the quarter*

LLA: Loan loss allowance at the beginning of the quarter.

NCO: Net charge offs during the quarter.

ΔNPCC *: Change in Nonaccrual Credit Card Loans and Credit Card Loans 90 days or more past due from the previous quarter.*

ΔNPRE *: Change in Nonaccrual Real Estate Loans and Real Estate Loans 90 days or more past due from the previous quarter.*

ΔNPCOM *: Change in Nonaccrual Commercial Loans and Commercial Loans 90 days or more past due from the previous quarter.*

ΔNPIND *: Change in Nonaccrual Individual Loans and Individual Loans 90 days or more past due from the previous quarter.*

The most significant variable in the regressions, by far, is the net charge off variable (NCO). As we go from Model 1 to Model 3 the inclusion of net charge offs increases the adjusted r-squared from 0.0357 to

0.4934. The coefficient of 0.7855 suggests that for every dollar of net charge offs the loan loss provision account increases by 78.55 cents.

The new loan type variables introduced in Model 5 are all highly significant. The new variables represent changes to the nonperforming loans in the specific categories of credit cards (ΔNPCC), real estate (ΔNPRE), commercial loans (ΔNPCOM), and individual loans (ΔNPIND). The coefficient on changes in nonperforming credit card loans 0.5844, is ten times as high as the coefficients on commercial loans and more than 25 times as high as the coefficient on real estate and individual loans. This dramatic difference highlights the importance of including different loan types separately in the analysis. The lower coefficients on nonperforming real estate and individual loans make sense since most of these loans require collateral. Essentially all real estate loans require the real estate property as collateral. Most individual loans (since credit card loans are accounted for separately) are automobile loans where the loan is collateralized with the vehicle.

The adjusted r-squared value from table 2 is the primary result used to compare the ability of the models to capture the information contained in loan loss provisions. The new model including loan types has the highest adjusted r-squared which is 0.5034. Models 3 and 4 that also include the net charge off variable are close behind with adjusted r-squareds of 0.4934, and 0.4941, respectively. Models 1 and 2 do not perform nearly as well with respect to adjusted r-squared. This is attributed to the lack of net charge offs in these models.

The remaining tables all examine results for the persistence of the discretionary and nondiscretionary components of loan loss provisions from each of the models. The models are rated based on how negative the discretionary component coefficients are and how positive the nondiscretionary component coefficients are in the persistence tests. Table 3 shows the results of regressing future earnings on current earnings components. The purpose of this regression is to examine the earnings persistence properties of the discretionary and nondiscretionary loan loss provision components. If the discretionary loan loss provision model isolates managerial discretion then the nondiscretionary loan loss provision component should be positive and significant and the discretionary loan loss provision component should be negative and significant.

All of the models reported in Table 3 have positive and highly significant coefficients on the preprovision profit variable. This is expected but not part of the persistence tests. Model 2 performs the best with respect to the earnings persistence of the nondiscretionary component. The coefficient on nondiscretionary loan loss provision is 0.2559 and is highly significant. Models 3-5 also produce positive and highly significant coefficients for nondiscretionary loan loss provision. The main test performed in Table 3 is an analysis of the persistence or actually the lack of persistence of the discretionary component of loan loss provision (DLLP). When managers use discretion to increase (decrease) the loan loss provision they are essentially lending (borrowing) from the loan loss allowance and that will naturally reverse at some future time. The discretionary loan loss provision should be negative if the models are completely isolating discretion. Model 3 is the only model that produces a negative and significant coefficient (-0.0078) on the discretionary loan loss provision. The new model I introduce also has a negative coefficient but it is not statistically significant at conventional levels. Since the models isolate a portion of discretion but do not completely isolate the discretionary behavior, the discretionary loan loss provision component represents a combination of discretionary and nondiscretionary components. Consequently, the coefficient on the discretionary loan loss provision component should be a weighted average of the pure discretionary coefficient and the nondiscretionary component coefficient. Thus, one measure of the effectiveness of the different models in isolating discretion is the extent that the coefficient on the discretionary component is less than the nondiscretionary component coefficient. Based on this analysis Model 3 isolates the greatest proportion of discretion and Model 5 (the new model introduced in this paper) is second best. The results in Table 3 are consistent with all of the models with the exception of model 1 isolating a portion of discretionary behavior.

Table 3: Earnings Persistence Test. Regression of Future Pretax Pre-provision Profit on Pretax Earnings Components

Model	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.0017 (75.7)***	0.0013 (68.1)***	0.0015 (110.0)***	0.0015 (110.5)***	0.0015 (110.6)***
PPP	0.7700 (875.8)***	0.7689 (873.4)***	0.7701 (876.1)***	0.7701 (876.2)***	0.7700 (875.9)***
NDLLP	-0.1110 (-7.4)***	0.2559 (22.6)***	0.0414 (10.2)***	0.0351 (8.6)***	0.0373 (9.3)***
DLLP	0.0212 (7.3)***	0.0003 (0.1)	-0.0078 (-1.9)**	-0.0017 (-0.4)	-0.0047 (-1.2)
Adjusted R-squared	0.5138	0.5141	0.5138	.5138	0.5138

Table 3 shows the results of regressing the future values of pretax provision profits on current pretax preprovision profit and the discretionary and nondiscretionary components of loan loss provisions. The model is specified as follows: $PPP_{t+1} = \alpha_0 + \alpha_1 PPP_t + \alpha_2 NDLLP_t + \alpha_3 DLLP_t + \varepsilon_\tau$ **, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.*
PPP: Preprovision profit. It is net income before taxes, loan loss provisions, and extraordinary items,, and discontinued operations..
NDLLP: Nondiscretionary loan loss provision. It is the fitted value from the respective discretionary loan loss provision model.
DLLP Discretionary loan loss provision. It is the residual from the respective discretionary loan loss provision model.

Table 4 provides the results of analyzing the persistence of discretionary and nondiscretionary loan loss provision components with respect to future loan loss provisions. The coefficients on both the nondiscretionary and discretionary components of loan loss provision are positive and highly significant for all of the models. The nondiscretionary component is expected to have a positive coefficient. However, the discretionary component should be negative if it is perfectly isolating managerial discretion. Since it is only partially isolating discretion, the coefficient on the discretionary component is a weighted average of the expected coefficients for the nondiscretionary and discretionary components.

Table 4: Loan Loss Provision Persistence Test. Results of Regressing Future Loan Loss Provisions on the Discretionary and Nondiscretionary Components of Loan Loss Provisions

Model	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.0002 (-19.0)***	-0.0001 (-10.5)***	0.0006 (116.0)***	0.0006 (117.1)***	0.0006 (114.5)***
NDLLP	1.1543 (178.0)***	1.0747 (222.1)***	0.4933 (281.4)***	0.4882 (278.5)***	0.5013 (289.1)***
DLLP	0.3547 (281.7)***	0.3333 (264.3)	0.2705 (156.3)**	0.2751 (158.8)	0.2578 (147.7)
Adjusted R-squared	0.1325	0.1409	0.1247	.1239	0.1266

Table 4 shows the results of regressing future loan loss provisions on the discretionary and nondiscretionary components of loan loss provisions. The model is specified as: $LLP_{t+1} = \alpha_0 + \alpha_1 NDLLP_t + a_2 DLLP_t + \varepsilon_\tau$ *. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.*
LLP: Loan loss provisions one quarter ahead.
NDLLP: Nondiscretionary loan loss provision. It is the fitted value from the respective discretionary loan loss provision model.
DLLP Discretionary loan loss provision. It is the residual from the respective discretionary loan loss provision model.

The lower the coefficient on the discretionary component the more consistent that model is with isolating discretion. All of the models have a lower coefficient on the discretionary component. This is consistent with all of the models isolating a portion of discretionary loan loss provisions. The model introduced in this paper outperforms the extant models in this test. The coefficient on the discretionary component is 0.2578 and is the lowest of all of the models suggesting that this model produces the discretionary component with the least persistence.

Table 5 provides the final persistence test for the discretionary loan loss provision models. As mentioned earlier any managerial discretion in the current period must eventually be offset by an equal and opposite amount of managerial discretion in the future. Future values of the discretionary loan loss provision (DLLP) are regressed on current values of discretionary loan loss provisions. The coefficient on the discretionary loan loss provision in the new model is 0.0101, which is the lowest of all of the models. The new model that includes the loan type variables produces the least persistent discretionary loan loss provision component that is consistent with isolating the greatest proportion of managerial discretion.

Table 5: Persistence Test for Discretionary Loan Loss Provisions.

	Model 1 $DLLP_{t+1} = \beta_0 + \beta_1 DLLP_t + \varepsilon_t$	Model 2	Model 3	Model 4	Model 5
Intercept	-0.0000 (-1.6)	-0.0000 (-1.1)	-0.0000 (-2.5)**	-0.0000 (-2.7)***	-0.0000 (-2.6)***
DLLP	0.3117 (270.3)***	0.2683 (229.7)***	0.0240 (20.1)***	0.0273 (22.8)***	0.0101 (8.4)***
Adjusted R-squared	0.0931	0.0690	0.0006	.0007	0.0001

*Table 5 shows the results of regressing future discretionary loan loss provisions on current discretionary loan loss provisions . *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. DLLP is discretionary loan loss provision. It is the residual from the respective discretionary loan loss provision model.*

CONCLUDING COMMENTS

The purpose of this paper is to provide evidence on the validity of discretionary loan loss provision models. There is very little published research on this topic and the conclusions from many research studies examining managerial discretion in the banking industry rely on the ability of these models to separate loan loss provisions into discretionary and nondiscretionary components. This paper develops a new model of discretionary loan loss provisions that incorporates specific types of loans such as credit cards, real estate, commercial, and individual loans. The paper then studies the validity of the new model and four extant models from the literature. One test examines the ability of the models to predict variation in the loan loss provision. The other tests analyze the persistence characteristics of the nondiscretionary and discretionary components from each of the models. The research uses bank call report data during the period 1992 quarter 4 through 2013 quarter 3. This data is publicly available for all banks that report to the Federal Deposit Insurance Corporation (FDIC).

The new model has the highest adjusted r-squared and is therefore the best performer in predicting loan loss provisions. The addition of nonperforming credit card loans is particularly significant and its coefficient has a magnitude many times the size of other nonperforming loan categories. The discretionary component from the new model is the best performer for two of the three persistence tests and is the second best performer for the third persistence test. The results are consistent with most of the models isolating a portion of managerial discretion. Taken together, the results are consistent with the new model outperforming the other models currently used in the literature.

This study has several limitations. First, the analysis focuses on four models used by Beatty and Liao (2013) that capture the factors used in nine models from the literature. Examining the nine models directly would provide more information about the effectiveness of extant models. Since Beatty and Liao (2013) essentially include the entire set of variables used in the literature it seems likely that extant models will not perform as well. A big limitation is that researchers only have proxies for managerial discretion. Managers do not actually report their discretion. The analysis examines characteristics of discretion that are necessary for discretion to have taken place. Ideally, factors that are both necessary and sufficient to show discretion could be identified.

Future research could examine a number of issues. First, since discretionary loan loss provision models are essentially the banking parallel of discretionary accrual models and since discretionary accrual models have been tested extensively, virtually all of the tests examining the validity of these models could be applied to discretionary loan loss provision models. The power and specification of discretionary loan loss provision models could be examined as in Dechow, Sloan, and Sweeeney (1995). Reversal tests, the Vuong test, and accrual estimation error tests could also be studied. Second, additional variables could be included in developing a better discretionary loan loss provision model. Additional loan type variables could be added to the model—such as loans for sale, restructured loans, loans where interested has not yet been collected—and then all of these could be further disaggregated into real estate, credit card, commercial, industrial, government, farm, foreign, and individual loans. The loan variables could also be disaggregated geographically. Finally, the loan loss allowance account could be examined instead of the loan loss provision account. The development of a discretionary loan loss allowance model would be a new way to look at managerial discretion. The loan loss allowance account is essentially the balance sheet accumulation of unused loan loss provisions. Since it is a balance sheet account it is fundamentally more related to the loan credit quality accounts used in discretionary loan loss provision models. The discretionary and nondiscretionary components of the loan loss provision could also be derived from a discretionary loan loss allowance account.

REFERENCES

Ahmed, A., Takeda C., and Thomas S. (1999), "Bank Loan Loss Provisions: A Reexamination of Capital Management, Earnings Management, and Signaling Effects," Journal of Accounting and Economics, vol. 28, p. 1-25.

Beatty, A., Chamberlain, S., and Magliolo J. (1995), "Managing Financial Reports of Commercial Banks: The Influence of Taxes, Regulatory Capital, and Earnings," *Journal of Accounting Research,* vol. 33, p. 231-261.

Beatty, A., and Liao, S., (2013), "Financial Accounting in the Banking Industry: A Review of the Empirical Literature," Ohio State University, Working Paper.

Beaver, W., and Engel E. (1996), "Discretionary Behavior with Respect to Allowance for Loan Losses and the Behavior of Securities Prices," *Journal of Accounting and Economics,* vol. 22, p. 177-206.

Beck, P., and Narayanmoorthy, G., (2013), "Did the SEC Impact Banks' Loan Loss Reserve Policies and Their Informativeness?," *Journal of Accounting and Economics,* vol. 56, p. 42-65.

Bouvatier, V., Lepetit, L., and Strobel, F. (2014), "Bank Income Smoothing, Ownership Concentration and the Regulatory Environment," *Journal of Banking and Finance,* vol. 41, p. 253-270.

Bushman, R., and Williams C., (2012), "Accounting Discretion, Loan Loss Provisioning, and Discipline of Banks' Risk-Taking," *Journal of Accounting and Economics,* vol. 54, p. 1-18.

Collins, D., and Hribar, P., (2002), "Errors in Estimating Accruals: Implications for Empirical Research, " *Journal of Accounting Research*, vol. 40, p. 105-134.

Collins, J., Shackelford, D., and Wahlen, J. (1995), "Bank Differences in the Coordination of Regulatory Capital, Earnings, and Taxes," *Journal of Accounting Research,* vol. 33, p. 263-291.

DeAngelo, L. (1988), "Managerial competition, information costs, and corporate governance: The use of accounting performance measures in proxy contests," Journal of Accounting and Economics, vol. 10, p. 3-36.

Dechow, P., Sloan, R., and Sweeney, A., (1995), "Detecting Earnings Management," *The Accounting Review*, vol. 70, p. 193-225.

Dechow, P., Hutton, A., Kim, J., and Sloan R. (2012), "Detecting Earnings Management: A New Approach", *Journal of Accounting Research*, vol. 50, p. 275-334.

Gebhardt, G., and Novotny-Farkas Z. (2011), "Mandatory IFRS Adoption and Accounting Quality of European Banks," *Journal of Business Finance and Accounting,* vol. 38, p. 289-333.

Guay, W., Kothari, S., and Watts, R., (1996), "A Market-Based Evaluation of Discretionary Accrual Models, *Journal of Accounting Research,* vol. 34, p. 83-115.

Handorf, W., and Zhu, L. (2006), "US Bank Loan-Loss Provisions, Economic Conditions, and Regulatory Guidance," *Journal of Applied Finance,* vol. 16, p. 97-114.

Hansen, G. (2002), "The Effect of Structural Changes on Discretionary Accrual Estimates: Some Implications for Earnings Management Research", *Asia-Pacific Journal of Accounting and Economics*, vol. 9, p. 71-86.

Healy, P. (1985), "The Effect of Bonus Schemes on Accounting Decisions," *Journal of Accounting and Economics,* vol. 7, p. 85-107.

Healy, P., and Wahlen J. (1999), "A Review of the Earnings Management Literature and its Implications for Standards Setting," *Accounting Horizons,* vol. 13, p. 365-383.

Jones, J., (1991), "Earnings Management During Import Relief Investigations," *Journal of Accounting Research,* vol. 29, p. 193-228.

Jones, K., Krishnan, G., and Melendrez, K., (2008), "Do Models of Discretionary Accruals Detect Actual Cases of Fraudulent and Restated Earnings? An Empirical Evaluation,", *Contemporary Accounting Research*, vol. 25, p. 499-531.

Kanagaretnam, K., Krishnan, G., and Lobo G. (2010), "An Empirical Analysis of Auditor Independence in the Banking Industry," *The Accounting Review*, vol., 85, p. 2011-2046.

Kanagaretnam, K., Krishnan, G., and Lobo G. (2009), "Is The Market Valuation of Banks' Loan Loss Provision Conditional on Auditor Reputation?," *Journal of Banking and Finance,* vol. 33, p. 1039-1047.

Kanagaretnam, K., Mathieu, R., and Lobo, G. (2003), "Managerial Incentives for Income Smoothing through Bank Loan Loss Provisions," *Review of Quantitative Finance and Accounting,* vol. 20, p. 63-80.

Kanagaretnam K., Yang, D., and Lobo, G. (2004), "Joint Tests of Signaling and Income Smoothing Through Bank Loan Loss Provisions. *Contemporary Accounting Research,* vol. 21, p. 843-884.

Kanagaretnam K., Yang, D., and Lobo, G. (2005), "Determinants of Signaling by Banks through Loan Loss Provisions," *Journal of Business Research,* vol. 58, p. 312-320.

Kilic, E., Lobo G., Ranasinghe T., and Sivaramakrishnan K. (2013). "The Impact of SFAS 133 on Income Smoothing by Banks Through Loan Loss Provisions," *The Accounting Review,* vol. 88, p. 233-260.

Kim, M., and Kross W. (1988), "The Impact of the 1989 Change in Bank Capital Standards on Loan Loss Provisions and Loan Write-Offs," *Journal of Accounting and Economics,* vol. 25, p. 69-99.

Kothari, S.P. (2001), "Capital Markets Research in Accounting," *Journal of Accounting and Economics*, vol. 31, p. 105-231.

Liu, C., and Ryan, S., (2006), "Income Smoothing over the Business Cycle: Changes in Banks' Coordinated management of Provisions for Loan Losses and Loan Charge-offs From the pre-1990 Bust to the 1990s Boom," *The Accounting Review*, vol. 81, p. 421-441.

Medeiros, O., Dantas, J., and Lustosa, P., (2012), "An Extended Model For Estimating Discretionary Loan Loss Provisions in Brazilian Banks", University of Brasilia Working Paper.

Perez, D., Salas, J., and Salas-Fumas, V. (2008), "Earnings and Capital Management in Alternative Loan Loss Provision Regulatory Regimes," *European Accounting Review*, vol. 17, p. 423-445.

Wahlen, J. (1994), "The Nature of Information in Commercial Bank Loan Loss Disclosures," *The Accounting Review*, vol. 69, p. 455-478.

ACKNOWLEDGEMENT

I would like to thank the journal editors, Mercedes Jalbert and Dr. Terrance Jalbert, two anonymous referees, and participants at the 2014 GCBF Costa Rica Conference for their helpful comments and suggestions. Any errors are my own.

BIOGRAPHY

Dr. Glen Hansen has an MBA from Brigham Young University and a PHD from the University of Rochester. His teaching and research interests are in analyzing financial statements. He has worked and consulted in the investment industry for the past twelve years and has recently returned full-time to academia. He is an Associate Professor of Accounting at Utica College. He can be contacted at: School of Business and Justice Studies, 118 DePerno Hall, Utica College, 1600 Burrstone Road, New Hartford, NY 14469. Phone: 315-792-3372. Email: gahansen@utica.edu

International Journal of Business and Finance Research
Vol. 9, No. 2, 2015, pp. 69-76
ISSN: 1931-0269 (print)
ISSN: 2157-0698 (online)

IBFR
www.theIBFR.org

IMPACT OF FOREIGN EXCHANGE RESERVES ON NIGERIAN STOCK MARKET

Olayinka Olufisayo Akinlo, Obafemi Awolowo University, Ile-Ife, Nigeria

ABSTRACT

This paper investigates the relationship between foreign exchange reserves and stock market development in Nigeria over the period 1981-2011. We use a multivariate framework incorporating an interest rate variable. The results show that a long run relationship exists among exchange rate reserves, interest rates and stock market development. Foreign reserves have a positive effect on stock market growth. Bidirectional causality exists between interest rates and stock market growth. Finally, a bidirectional relationship exists between interest rates and foreign reserves.

JEL: E62

KEYWORDS: Foreign Exchange Reserves, Stock Market

INTRODUCTION

The relationship between foreign exchange reserves and stock market development has started to receive attention in the literature. The debate centers on whether foreign exchange reserves cause stock market growth or stock market growth causes foreign reserves; or whether a two-way relationship exists. The nature of the relationship between the two has significant policy implications. For example, a finding that supports positive unidirectional causality from foreign reserves to stock market is an indication that reduction in foreign reserves will adversely affect stock market. On the other hand, a unidirectional causality that runs from stock market development to foreign reserves shows that reduction in stock market activities will negatively affect foreign exchange reserves. However, if the relationship is bidirectional, it means the two are mutually beneficial.

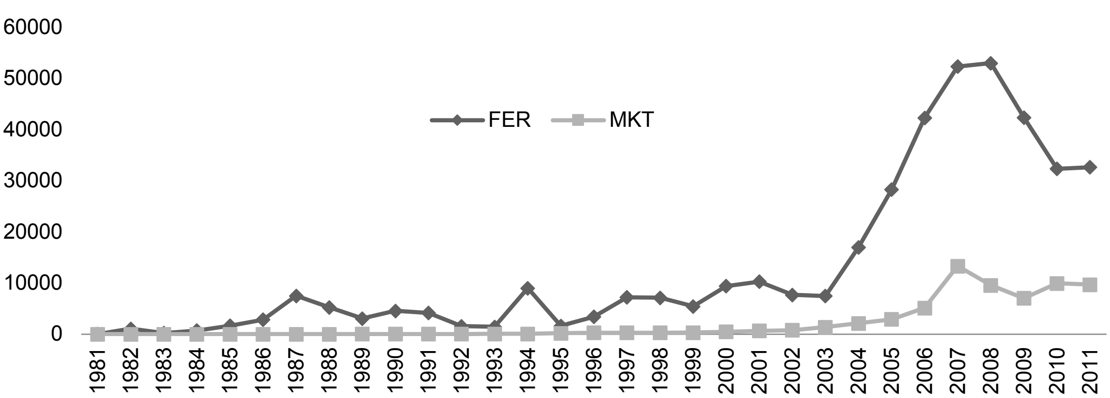
Figure 1 shows that both stock market capitalization and foreign reserves witnessed significant growth over the years in Nigeria. Total market capitalization increased from N5 billion in 1981 to N180 billion in 1995. The figure increased to N13,294.6 billion in 2007. The phenomenal increase in stock market capitalization can be attributed to the various reforms introduced by the monetary authority in Nigeria following adjustment programs in mid 1986. However, total market capitalization dropped from N13,294.6 billion in 2007 to N7,030.8 billion in 2009. The figure increased to N9,672.6 billion in 2011.

In the same vein, foreign exchange reserves showed remarkable growth over the years. It increased from $2441.60 million in December 1981 to $7,504.59 million in December 1987. The figure dropped to $1429.59 million in 1993. There was sharp increase from$1,429.59million in December 1993 to $9,009.11 million in December 1994. This was a result of stringent demand management policies introduced by the Military Government in that year. The figure increased to $10,267.1 million in December 2001 though there was a major deceleration in 1995. Foreign reserves experienced sharp increase from 2004 to 2008 but dropped in 2009 to 2011. This might not be unconnected with the world economic recession that occurred during the end of last decade.

Interestingly, the government has introduced several measures in the recent past to enhance growth of the stock market as well as boost foreign exchange reserves. To fully understand the implication of these policies, it is important to understand the nature of the relationship between stock market development and foreign reserves. This of course constitutes the main objective of this paper.

The paper is organized as follows: in section 2, we provide a review of empirical literature on the relationship between stock market development and foreign reserves. Section 3 describes the methodology and data used in estimation. Section 4 provides the estimates and discussion of findings. Section 5 concludes the paper.

Figure 1: Plots of Foreign Exchange Reserves and Stock Market Development



This figure plots foreign exchange reserves and stock market development.

REVIEW OF EMPIRICAL LITERATURE

Many empirical works exist on the determinants of stock market developments or the impact of macroeconomic fundamentals such as inflation, exchange rate, trade balance among others on stock market development (Nishat and Shaheen 2004, Gay, 2008, Dimitrova 2005, Hussain 2009). However, few of these studies focus specifically on the nexus of the relationship between foreign exchange reserves and stock market development. Bhattacharya and Mookherjee (2003) analyzed the causal relationship between stock market and exchange rates, foreign exchange reserves and value of trade balance. They adopted the Toda and Yamamoto (1995) Granger non-causality methodology for the sample period April 1990 to March 2001. The results showed no causal link between stock prices and effective exchange rates, foreign exchange reserves as well as trade balance.

One study that examined factors that determine stock market development without necessarily incorporating foreign exchange reserves is Nishat and Shaheen (2004). They examined the impact of macroeconomic variables such as industrial product index, consumer price index and money supply on the Karachi Stock Market. The study adopted a vector error correction model and found a causal relationship between stock market development and the economy. The results showed that industrial production was the largest positive determinant of Pakistani stock prices, while inflation was the largest negative determinant of stock prices. The result showed that macroeconomic variables Granger-caused stock price movements. Reverse causality was found in the case of industrial production.

Dimitrova (2005) examined the relationship between stock prices and exchange rates using multivariate analysis for the U.S. and U.K. The results of the analysis showed that a relationship exists between exchange rates and stock markets. However, the study asserted that this relationship would be positive when stock prices are the lead variable and negative when exchange rates are the lead variable. In the line, Doong, et al. (2005) showed bidirectional causality between stock prices and exchange rate for Indonesia, Korea, Malaysia and Thailand. However, the results showed significant negative relation between stock returns and contemporaneous change in the exchange rates for all countries studied except Thailand.

Sohail and Hussain (2009) examined the impact of macroeconomic variables on the stock market in India from 2002 and 2008. The results showed that inflation impacted stock returns negatively, while industrial production, real effective exchange rates and money supply had a significant positive effect on the stock returns in the long run. The study by Hussain (2009), focused on the impact of macroeconomic variables including foreign exchange reserves on the Kenyan stock market. The study used quarterly data for the period 1986 to 2008. The results show that after reforms in 1991, the foreign exchange rate and foreign exchange reserves had a significant effect on stock prices. However, variables such as industrial production index and capital formulation had no significant impact on stock prices.

Two known studies focused specifically on the relationship between foreign exchange reserve and stock market development. Elite Forex Signal (2013) examined the relationship between foreign exchange reserves and the Karachi stock market over the period 2001 and 2009. Using a simple linear regression model, the study showed positive but not significant relationship between foreign exchange reserves and the stock market. The study by Ray (2013) examined the relationship between foreign exchange reserves and stock market capitalization in India over the period 1990-2011. The results showed that foreign exchange reserves had a positive impact on stock market capitalization. Moreover, the results showed that there was unidirectional causality from foreign exchange reserves to stock market capitalization.

METHODOLOGY

To examine the relationship between foreign exchange reserves and stock market development a function in which stock market development depends on foreign reserves is formally stated as:

$$SMK = f(FER) \tag{1}$$

However, it is believed that other variables could have great impact on stock market growth. The omission of these variables could bias the direction of causality between stock market growth and foreign exchange reserves. In view of this, the study incorporates a control variable discount rate to avoid simultaneous bias in our regressions. Incorporation of a discount variable helps overcome the problem associated with bivariate analysis. Therefore equation (1) becomes

$$SMK = f(FER, INT) \tag{2}$$

Taking the log results in:

$$ln\, SMK_t = \alpha_1 + \alpha_2 lnFER + \alpha_3 INT + \mu_t) \tag{3}$$

Where *SMK* is stock market development incurred as market capitalization, *FER* is foreign exchange reserves and *INT* is the interest rate. In estimation, the study adopted the Engle-Granger (1987) two-step procedure. However, to test for robustness, the Johansen Juselius (1990) cointegration approach was adopted.

Data Measurement, Description and Sources

The data utilized are annual data for Nigeria over the period 1981-2011. The data are stock market capitalization, *SMK*, foreign reserves, *FER,* and interest rate, *INT*. The data were obtained from the Central

Bank of Nigeria, Statistical Bulletin (2011). All variables are expressed in logarithm. Descriptive statistics of the variables are as shown in Table 1. The descriptive statistics reveal that all the series display a high level of consistency as their mean and median are perpetually within the maximum and minimum values of the series. Also, the standard deviations are generally low showing that the deviations of the actual data from their mean values are small.

Table 1: Descriptive Statistics

	SMK	FER	INT
Mean	2078.5	12960	12.998
Median	262.60	7107.5	13.500
Maximum	13,295	53,000	26.000
Minimum	5.0000	11.000	6.0000
Std. Dev.	3733.6	16026	4.3848
Skewness	1.783	1.402	0.6702
Kurtosis	4.800	3.547	3.7772
Jarque-Bera	20.602*	10.536**	3.1008
Probability	0.00003	0.0052	0.2122
Sum	64,433	401,747	402.94
Sum Sq. Dev.	0.0000	0.0000	576.80
Observations	31	31	31

*Table 1 shows the results from descriptive statistics and the Jacque-Bera normality test. * and ** denote significance at 1% and 5% level respectively. This is established by the p-values under the Jarque-Bera values*

EMPIRICAL RESULTS

Table 2 presents the results of the unit root tests obtained using the Augmented-Dickey Fuller (Dickey and Fuller, 1979) and KPSS (Kwiatkowski-Phillips-Schmidt-Shin, 1992) tests. The results show that all the variables are integrated of order one or I(1).

Table 2: Unit Root Test

Series	ADF		KPSS	
	Level	1st difference	Level	1st difference
SMK (constant)	-0.264	-3.830	0.858	0.141
(constant and trend)	-2.885	-3.725	0.112	0.113
FER (constant)	-1.751	-4.821	0.772	0.304
(constant and trend)	-2.426	-4.950	0.085	0.135
INT (constant)	-1.847	-4.881	0.200	0.351
(constant and trend)	-1.793	-6.124	0.200	0.076

Critical values for ADF are -3.680, -2.968 and -2.623(constant only at level); -3.689, -2.972 and -2.625 (constant only at 1st difference); -4.310, 3.574 and -3.222 (constant and linear at level), (constant and linear at 1st difference)at 1%, 5% and 10% level of significance respectively. Critical values for KPSS test are 0.739, 0.463 and 0.347 (constant); 0.216, 0.146 and 0.119 (constant & linear) at 1%, 5% & 10% respectively.

Cointegration Results

As the variables are I(1) , we investigate whether or not stock market development, foreign exchange reserves and interest rate are cointegrated. To achieve this, we use the Engle-Granger two-step procedure. First, the static ordinary least squares (OLS) regression was estimated using the following equations:

$$ln\, SMK_t = \alpha_t + \beta_1 lnFER_t \quad (4)$$

and

$$ln\, SMK_t = \alpha_t + \beta_1 lnFER_t \; + \; \beta_2 lnINT_t \quad (5)$$

The results are reported in Table 3. Next, we examined the unit roots of residuals generated from the first step by using the ADF statistic. The results showed that the residuals are stationary at the 5% level of significance for equations 5 and 6 respectively. This simply means that there is a long run relationship between stock market development, foreign reserves and interest rates. The results in Table 3 show that foreign reserves have positive effect on stock market development.

Table 3 Engle-Granger First Step

Dependent Variable SMK		
	Equation 1	Equation 2
Constant	-5.359***	-2.069
	(-3.459)	(-0.810)
FER_t	1.229***	1.262***
	(6.913)	(7.232)
INT_t	---	-1.420
		(-1.595)*

*The figure in each cell is the regression coefficient while those underneath in parenthesis are t values. *** denotes significance at 1% while * denotes significance at 12% level.*

To check for robustness of the results, the study further employed Johansen-Juselius (1990) cointegration testing technique using the trace and the maximum eigenvalue statistics. The results are reported in Table 4. The results show that the null hypothesis of no cointegration can't be rejected at the 5 percent level for maximum eigenvalue and trace tests. The two tests both suggest one cointegrating vector meaning that long run relationship exists amongst the three variables.

Table 4: Johansen Cointegration Test

Null	**Alternative r**	**λ-max**	**Critical values**	**Trace**	**Critical values**
0	1	34.625**	21.132	46856**	29.798
≤1	2	8.745	14.265	12.230	15.495
≤2	3	3.485	3.841	3.486	3.841

*This table shows the Johansen cointegration test using λ-maximum and trace tests. The third and fourth columns show λ-max statistics and critical values while fifth and sixth column show the trace statistic and critical value. The r implies the number of cointegrating vectors and the critical values are from MacKinnon-Hang-Michelis table (1999). **reject null hypothesis at 5% level of significance.*

Granger Causality

When results show a cointegrating relationship among foreign reserves, stock market development and interest rates, there must be Granger causality in at least one direction. However, the direction of temporal causality between the variables is not indicated. The following bivariate regression was estimated to run examine Granger-causation:

$$ln\, SMK_t = \beta_0 + \sum ln\beta_i FER_{t-i} + \sum \delta_i \, lnINT_{t-i} + \varepsilon_t \quad (7)$$

$$ln\, FER_t = \beta_0 + \sum ln\beta_i SMK_{t-i} + \sum \delta_i \, lnINT_{t-i} + \varepsilon_t \quad (8)$$

$$ln\, INT_t = \beta_0 + \sum ln\beta_i SMK_{t-i} + \sum \delta_i \, lnFER_{t-i} + \varepsilon_t \quad (9)$$

The short run causal effects are obtained by the f-test of the lagged explanatory variables. Table 5 shows the results. The Granger causality test statistic reveals that interest rates Granger cause stock market growth. In the same way, interest rates Granger cause international reserves. The results show that both stock market growth and international reserves Granger cause interest rates. This shows bidirectional relation between stock market growth and interest as well as between interest rates and international reserves. The results show no evidence of causality between international reserves and stock market development.

Table5: Granger Causality Test

	$\Delta\ln(SMK)$	$\Delta\ln(FER)$	$\Delta\ln(INT)$
$\Delta\ln(SMK)$	--	1.16(0.33)	2.64(0.09)*
$\Delta\ln(FER)$	2.00(0.16)	--	5.69(0.01)***
$\Delta\ln(INT)$	2.60(0.09)*	2.79(0.08)*	--

*This table shows the Granger causality test results. *** denotes significance at 1% while * denotes significance at 12% level.*

The error correction causality estimates based on the equation are:

$$\Delta ln\ SMK_t = \alpha_0 + \sum \alpha_{li} \Delta ln\beta_i SMK_{t-i} + \sum \beta_{li}\, \Delta lnFER_{t-i} + \sum \delta_{li}\, \Delta lnINT_{t-i} + \gamma ccm_{t-1} + \varepsilon_{it} \quad (10)$$

Table 6 shows the result obtained by performing long run causality test and the short run adjustment to re-establish long run equilibrium-the joint significance of the sum of lagged terms of each explanatory variable and the ECT by joint F-test. Short run bidirectional causality is found between interest rates and both stock market growth and international reserves. The significance of the joint test in the international reserves and interest rate equations is consistent with the presence of bidirectional Granger causality between interest rates and international reserves on one hand and between interest rate and stock market growth on the other hand. Finally, significance of the error correction term on the interest rates equation is consistent with the result of cointegration among the three variables found using Engle-Granger and Johansen-Juselius tests.

Table 6: ECM Model

	ΔSMK	ΔFER	**ΔINT**	**ECT_{t-1}**	**Joint Test**
F statistic				t statistic	
ΔSMK	--	1.04(0.37)	2.74(0.08)*	-0.64	1.35(0.28)
ΔFER	1.55(0.23)	--	4.66(0.02)***	0.38	2.56(0.05)**
ΔINT	2.86(0.07)*	2.92(0.07)*	--	-1.98**	2.98(0.03)**

The values in parenthesis are the p-values. *' **' *** denote significance at 10%, 5% and 1% critical level respectively.

CONCLUSION

The goal of this paper was to examine the relationship between foreign exchange reserves and stock market growth. To achieve this goal, a multivariate modeling approach that introduced interest rate was undertaken. The study made use of annual data for Nigeria over the period 1981-2011 sourced from the CBN statistical data. The results showed among other things that a long run relationship existed among the variables at both bivariate and multivariate levels. Also, the results showed that foreign reserves had positive effect on stock market growth. The results from Granger causality showed that a bidirectional relationship existed between interest rates and stock market growth. In the same vein, there was a bidirectional relationship between interest rate and external reserves. Finally, the results showed the interest rate is very important in analyzing stock market-international reserves nexus.

The main implications of the findings are as follows: The Nigerian government needs to get the interest rate right to bolster stock market development and enhance international reserves in Nigeria. Moreover, efforts at enhancing international reserves will have a positive impact on stock market growth in Nigeria. A limitation of this study is that it has not considered the probable structural breaks during the period under consideration. Subsequent studies should apply unit root test allowing for structural breaks.

REFERENCES

Bhattacharya, B. & Mukherjee, J. (2003) "Causal Relationship between Stock Market and Exchange Rate, Foreign Exchange Reserves and Value of Trade Balance: A Case Study for India". Paper Presented at the fifth Annual Conference on Money and Finance in the Indian Economy.

Central Bank of Nigeria (CBN) (2011), Annual Statistical Bulletin, Abuja, Lagos.

Dickey, D. A. & Fuller, W.A. (1979) "Distribution of the Estimators for Autoregressive Time Series with a Unit Root," *Journal of the American Statistical Association*, vol.74, p. 427-431.

Dimitrova, D. (2005) "The Relationship between Exchange Rates and Stock Prices: Studies in Multivariate Model," *Issues in Political Economy,* vol. 14, p. 1-25

Doong, S. Ch., Yang, Sh.-Y., Wang, A. (2005) "The Dynamic Relationship and Pricing of Stocks and Exchange Rates: Empirical Evidence from Asian Emerging Markets", *Journal of American Academy of Business,* vol. 7(1), p. 118-123.

Elite Forex Signal (2013) "Impact of Foreign Reserves on Karachi Stock exchange Market of Pakistan" http://www.eliteforexsignals.com. Accessed November.

Engle, R.F. & Granger, C.W. (1987) "Co-integration and Error Correction: Representation, Estimation and Testing," *Econometrica*, vol. 55, p. 251-276.

Gay, R. D. (2008), "Effect of Macroeconomic Variables on Stock Market Returns for Four Emerging Economies – Brazil, Russia, India and China," *International Business & Economic Research Journal*, vol. 7(3), p. 1-8

Hussain, D. I. (2009) "Why does Pakistan Have to Accumulate Foreign Reserves? http://ishrathusain.iba.edu.pk/papers, p.1-22. Accessed November.

Johansen, S. & Juselius, K. (1990) "Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money," *Oxford Bulletin of Economics and Statistics*, vol. 52, p. 169-210.

Kwaitowski, D., Phillips, P. C. B., Schmidt, P & Shin, Y. (1992) "Testing the Null Hypothesis of Stationarity against the Alternative of a Unit Root: How Sure Are We that Economic Time Series Have a Unit Root", *Journal of Econometrics*, vol. 54, p.159-178.

Nishat, D. M., & Shaheen, R. (2004) "Macro-Economic Factors and Pakistani Equity Market", *Pakistani Development Review*, vol.43 (4), p.619-637.

Ray, S. (2012) "Foreign Exchange Reserve and its Impact on Stock Market Capitalization: Evidence from India," *Research on Humanities and Social Sciences*, vol. 2(2), p. 46-60.

Sohail, N., & Hussain, Z. (2009) "Long Run and Short Run Relationship between Macro Economic Variables and Stock Prices in Pakistan- The case of Lahore Stock Exchange", *Pakistan Economic and Social Review,* vol. 47, p. 183-198.

Toda, H. Y. & Yamamoto, T. (1995) "Statistical Inference in Vector Autoregressions with possibly Integrated Processes," *Journal of Econometrics*, vol. 66, p.225-250.

BIOGRAPHY

Akinlo, Olayinka O. is a senior Lecturer in the Department of Management and Accounting, Obafemi Awolowo University, Ile-Ife, Nigeria. She can be contacted at the Department and through email yinkakinlo@gmail.com, yakinlo@oauife.edu.ng or through telephone on +2348037193075.

International Journal of Business and Finance Research
Vol. 9, No. 2, 2015, pp. 77-91
ISSN: 1931-0269 (print)
ISSN: 2157-0698 (online)

IBFR
www.theIBFR.org

ANNOUNCEMENT EFFECT OF CASH DIVIDEND CHANGES AROUND EX-DIVIDEND DAYS：EVIDENCE FROM TAIWAN

Jack J.W. Yang, National Yunlin University of Science and Technology, Taiwan
Tsung-Hsin Wu, National Yunlin University of Science and Technology, Taiwan

ABSTRACT

Dividend policy has been a puzzle in corporate finance for many decades. So far, the dividend policy continues to be a puzzle in the strategic firm development process. This paper studied the effect of ex-dividend date for cash-dividend policy in the Taiwan Stock Exchange (TWSE) from 2001 to 2012. We try to demonstrate the existence of abnormal returns by examining stock trading situations before and after the ex-dividend date. We discovered the cumulative abnormal returns ratio reached 2.07% during the 10 days before and after the ex-dividend date. This paper further analyzes whether firms adopting cash-dividend changes have different abnormal returns on stock price performance depending on different variables. We discovered the average abnormal return ratio of the group with a cash dividend increase was 1.96%. The average abnormal return ratio of the group with a cash dividend decrease was 0.48%. Moreover, we analyze whether different industries impact cumulative abnormal return ratios. Finally, we discuss whether the cumulative abnormal return ratios were different before and after financial crisis.

JEL: G12, G14

KEYWORDS：Cash Dividend, Abnormal Returns, Event Study

INTRODUCTION

Dividend policy has been a puzzle in corporate finance for many decades. So far, the dividend policy continues to be a puzzle in the strategic firm development process. Elton and Gruber (1970) discovered the decrease of stock prices on the ex-dividend date was smaller than the total amount of the stock dividends paid out. This finding led to a body of literature examining stock price changes on ex-dividend dates. According to the dividend-signaling hypothesis, cash dividends function as a good signaling vehicle of a firm's future cash flow, thus implying that unanticipated dividend changes should be accompanied by share price changes in the same direction. Yilmaz and Gulay (2006) used data from the Istanbul Stock Exchange (ISE) from 1995 to 2003. They discovered that, due to the payout of cash dividends, stock prices before and after ex-dividend dates showed an increasing tendency. The decreasing range of the stock price was smaller than the amount of the dividends paid out, resulting in significant abnormal returns.

Taiwan stock market is one of the most important capital markets in Asia. The Taiwan Stock Exchange was founded in 1962. It has a history of about 50 years, and has developed from manual settlement to fully computerized operations today. The Taiwan stock market not only activates capital movements but also enables firms in Taiwan to acquire the funds needed for expansion. The complete stock market was a key factors leading to the economic expansion of Taiwan in the 1960s.

In the past, the majority of listed firms and investors in Taiwan valued stock dividends. However, stock dividends lead to equity inflation, and dilute the earnings. Moreover, a preference for cash dividend exists in the current market. The percentage of listed firms adopting cash-dividend payouts has shown a significant increase across all the listed firms. In 2001 it topped 10% for the first time, reaching 14.73%. Since then, the percentage has increased year by year, topping 50% in 2011. That is to say, one in every two firms now adopts the dividend policy of cash payouts. The cash dividend policy is a more important subject in Taiwan This paper studies the effect of ex-dividend date for cash-dividend policy. We try to prove the existence of abnormal returns by examining stock trading situations before and after the ex-dividend date. In Taiwan, if an investor buys the stock of a firm who adopts a cash-dividend payout at the closing price 11 days before the ex-dividend date, and sells them at the closing price 10 days after the ex-dividend date, the investor will obtain an average of about 2.07% abnormal returns, regardless of the transaction cost. We also investigate any difference in the investment behavior of investors with respect to the cash dividend changes in the Taiwan Stock Exchange (TWSE) from 2001 to 2012. We discovered the average abnormal return ratio of the group with a cash dividend increase was 1.96%. The average abnormal return ratio of the group with a cash dividend decrease was 0.48%. We conclude cumulative abnormal return ratios of the two groups is different. Moreover, we analyze whether different industries impact cumulative abnormal return ratios. And we discuss whether the cumulative abnormal return ratios were different before and after financial crisis.

The rest of this paper proceeds as follows. The next section provides a literature review of the subject of this study. Next, we describe data and methodology. Empirical results are presented in the following section. The final section is conclusions and some closing remarks.

LITERATURE REVIEW

Despite the rich literature on the overall issue of dividend policy and its relation to firm value. The dividend policy continues to be a puzzle in the strategic firm development process. Many researchers have investigated stock price reactions to announcements and implementations of various types of dividend payments, as well as the ex-dividend date behavior of stock prices. Ofer and Siegel (1987) believed that changes in dividends reflected the prediction in changes of earnings. DeAngelo (1992) pointed out that when a firm anticipated it would have stable cash flow in the future, it would tend to pay out cash dividends.

Much literature has pointed out that dividend declaration is accompanied by positive abnormal returns. For example, Miller and Rock (1985), and Allen et al. (2000) both considered the payout of dividends as positive information, while Guay and Harford (2000) proved that stock prices had a positive response to the declaration of cash dividends. Milonas et al. (2006) analyzes the ex-dividend day stock price behavior in the Chinese stock market. The findings from non-taxable stocks show that their price, on the ex-dividend day, falls by an amount that is not statistically different from the dividend. For the taxable sample, stock prices of small dividend yield stocks fall proportionally to the dividend paid. For the large dividend yield stocks, the price adjustment depends on the effective tax rate on dividend income. The overall findings are consistent with the tax hypothesis.

Elton and Gruber (1970) discovered the decrease of stock prices on the ex-dividend date was smaller than the total amount of the stock dividends paid out. This finding led to a body of literature examining stock price changes on ex-dividend dates. They believed this phenomenon occurred because the capital gains tax was higher than the tax on dividends. However, Pettit (1972) pointed out that a significant price increase follows announcements of dividend increases, and a significant price drop follows the announcement of cash dividend decreases whether the earnings performance was positive or negative. Aharony et al. (1980) discover that shareholders of firms announcing cash dividend increases realize positive abnormal returns and shareholders of firms decreasing cash dividends sustained negative abnormal returns during the 20 days surrounding the announcement day. Divecha and Morse (1983) show that the announcement effect of the cash dividend increases is positive.

Frank and Jagannathan (1998) drew a different conclusion from their study on the Hong Kong stock market. Both dividends and capital gains in Hong Kong are duty free. Under such a circumstance, according to the theory of the burden of taxation effectiveness, there should be no abnormal returns on ex-dividend dates. However, empirical evidence showed there were positive abnormal returns on ex-dividend dates, which were almost irrelevant to the amount of the stock dividends. Additionally, Bali and Hite (1998) studied the New York Stock Exchange (NYSE) and American Stock Exchange (ASE). They also discovered that, on ex-dividend dates, the decrease in stock prices was unequal to the dividends paid out.

Fehrs et al. (1988) discovered that on declaration dates, there was a significantly positive (negative) relationship between the returns and the increase (decrease) in dividends. The stock price response was directly correlated with the increase in dividends earned. Michaely et al. (1995) used materials from the NYSE and the ASE to study market responses to firms starting to pay out dividends and firms stopping dividends. They found that short-term stock price responses of firms stopping cash dividends were stronger than that for firms starting to pay cash dividends. Yilmaz and Gulay (2006) used materials from the Istanbul Stock Exchange (ISE) from 1995 to 2003. They discovered that, due to the payout of cash dividends, stock prices before and after ex-dividend dates showed an increasing trend. The decreasing stock price range was smaller than amount of dividends paid out and there exists significant abnormal returns.

Chen et al. (2009) used a sample of cash dividend changes from all listed A-share firms in China during the period from 2000 to 2004 to investigate the announcement effect of cash dividend changes and examine whether the dividend-signaling hypothesis holds in China's stock markets. The results indicate that the announcement of cash dividend changes has a positive influence on share prices, but only partly support the dividend-signaling hypothesis. The study also found that there is no great dissimilarity between the announcement effects of cash dividend changes for different stock markets in China. Yahyaee et al. (2011) show that announcements of dividend increases are associated with increased stock prices, while announcements of dividend decreases cause decreases in stock prices. Firms that do not change their dividends experience insignificant negative returns. These results contradict tax-based signaling models, which argue that higher taxes on dividends relative to capital gains are a necessary condition for dividends to be informative.

Xingzhi Kang (2013) used the sample from the securities listed and traded on the New York Stock Exchange and NASDAQ to research the impact of cash dividend announcement on the stock price. The results suggest that the average abnormal return and the average cumulative abnormal return, which are surrounding the event date, are not significantly equal to zero. In addition, Yang and Wu (2014) used a sample from all listed firms in Taiwan during the period from 2001 to 2011 to investigate the announcement effect of cash dividend. Finds that abnormal returns exist for listed Taiwan firms before and after the ex-dividend date. This paper further analyzes whether firms adopting cash-dividend payouts have different abnormal returns depending on three dimensions of cash-dividend payout ratio, stock trading turnover rate, and the firm size. The results indicate that there was insufficient evidence to show that the cumulative abnormal return ratios had any differences.

DATA AND METHODOLOGY

This paper retrieved the data on dividend policies of all listed firms from 1990 to 2012 from the Taiwan Economic Journal (TEJ) database. We studied the dividend payout situations for each firm during this period. We discovered that the percentage of listed firms paying out cash dividends was increasing year by year. This percentage topped 10% in 2001, and 50% by 2011.

This study used daily data to examine whether the dividend policy of paying out only cash dividends, adopted by listed firms, had an influence on stock prices. Related information on the dividend policies of listed firms from 2001 to 2012 was collected, and adjusted data on the closing prices was used to carry out an analysis on the anomaly of prices. The researchers tried to examine whether firms paying out just cash dividends showed abnormal price performances? If there were abnormal situations, then investors could use this anomaly to carry out arbitrage trades.

Firstly, with respect to data screening, this study covered daily data on prices for the ten trading days before and after the ex-dividend dates. The stocks selected conformed to the following criteria 1.) In the same year, only cash dividends are paid out. There were no stock dividends, capital increase, capital decrease or stock settlement, 2.) Data on trading prices 10 days before and 10 days after ex-dividend dates (expressed by [-10, + 10]) were complete, 3.) The cash-dividend payout is conducted only once a year.

The event study criteria was used to analyze samples screened out by the above rules to verify the existence of the ex-dividend date effect. The concept of abnormal returns, or so called excess returns, was used to examine the cash-dividend policy of listed firms, and whether there was a significant influence on stock prices.

The abnormal return $AR_{i,t}$ of stock *i* in period *t* was defined as the difference between the return $R_{i,t}$ of the stock and the market return M_t.

$$\therefore \ AR_{i,t} = R_{i,t} - M_t \tag{1}$$

Return $R_{i,t}$ of stock *i* in period *t* was defined as:

$$R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}} \tag{2}$$

Where $P_{i,t}$ and $P_{i,t-1}$ stand for the adjusted stock prices of the stock *i* in period *t* and *t-1* , respectively.

Additionally, the market return Mt has similar definition. This paper adopted the Market Index as the base for the market return. According to the above definition, the following mean abnormal return AR_t of stocks *n* in period *t* was obtained:

$$AR_t = \sum_{i=1}^{n} AR_{i,t} / n \tag{3}$$

With respect to the stocks of *n* firms, the cumulative mean abnormal returns (CMAR) for 10 days before and after the ex-dividend date could be expressed as follows:

$$CMAR_t = \sum_{t=-10}^{10} AR_t \tag{4}$$

EMPIRICAL RESULTS

A survey of the cash dividend policies adopted by listed firms in Taiwan revealed that from 1990 to 2012, the number of firms paying out only cash dividends showed an increasing trend from year to year. In 1990, the number of firms paying out cash dividends represented 2.01% of all listed firms, with the number increasing to 51.67% by 2012 as shown in Table 1. In 2001, the percentage topped 10% for the first time. As the method of cash dividend payout is widely used by listed firms in Taiwan, there is a strong motivation to examine abnormal returns for the trading stocks of firms adopting a cash-dividend policy.
There were 2,785 firms paying out only cash dividends from 2001 to 2012. Excluding firms without complete data, the samples includes 2,695 firms. These samples were collected from firms paying out cash

dividends during the 12 years from 2001 to 2012. The objective is to determine if abnormal returns exist as a result of ex-dividends.

Table 1： Percentage of Firms Paying Out Only Cash Dividends for All Listed Firms from 1990 to 2012

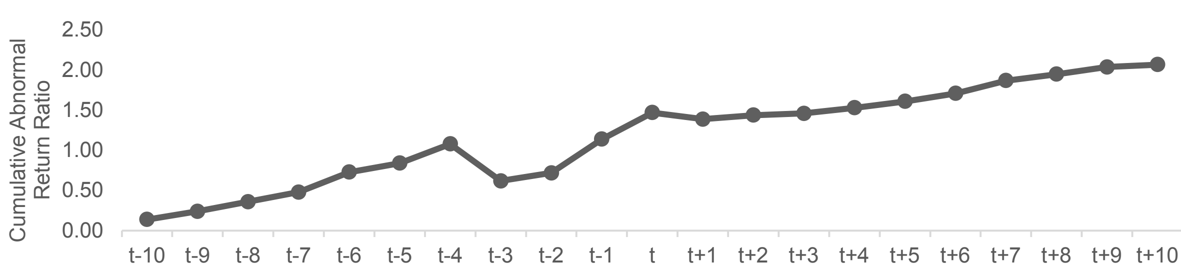
Year	The Total Number of Listed Firms	The Number of Firms Paying out Cash Dividends	Percentage
1990	199	4	2.01%
1991	221	14	6.33%
1992	256	12	4.69%
1993	285	12	4.21%
1994	313	11	3.51%
1995	347	19	5.48%
1996	382	8	2.09%
1997	404	9	2.23%
1998	437	17	3.89%
1999	462	22	4.76%
2000	531	52	9.79%
2001	584	86	14.73%
2002	638	113	17.71%
2003	669	115	17.19%
2004	697	135	19.37%
2005	691	163	23.59%
2006	688	188	27.33%
2007	698	199	28.51%
2008	718	228	31.75%
2009	741	335	45.21%
2010	758	377	49.74%
2011	790	428	54.18%
2012	809	418	51.67%

This table shows the number of firms paying out just cash dividends from 1990 to 2012. The results show an increasing tendency year by year. In 1990, the number of firms paying out cash dividends represented 2.01% of all listed firms, with the number increasing to 51.67% by 2012.

The Study of Abnormal Return Ratios during the Event Session

Next, we examine abnormal return ratios 10 days before and after the ex-dividend date, as well as on the actual ex-dividend date. During the time period of these 21 days, the 2,695 sample firms were preliminarily examined. We discovered the cumulative abnormal return ratio reached 2.07%. In other words, if an investor bought the stock 11 days before the ex-dividend date at the closing price, carried them, and then sold them 10 days after the ex-dividend date at the closing price, the investor could achieve an average excess return ratio of 2.07% as shown in Figure 1.

Figure 1： Cumulative Abnormal Return Ratio during the Event Session



This figure shows cumulative abnormal return ratios 10 days before and after the ex-dividend date, as well as on the actual ex-dividend date. During this 21 day time period, the 2,695 sample observations were preliminarily examined. The results show the cumulative abnormal return ratio reached 2.07%. t stands for ex-dividend date. Figures on the vertical axis stand for cumulative abnormal return ratios with the unit of %.

Second, the event session was divided into three parts for examination. We discovered the cumulative abnormal return ratio for the 10 days before the ex-dividend date was 1.14%, the abnormal return ratio on the ex-dividend date was 0.33%, and the cumulative abnormal return ratio of the 10 days after the ex-dividend date was 0.60%. The abnormal return ratio for holding the stocks before the ex-dividend date was almost twice that for holding them after the ex-dividend date.

Finally, the abnormal return ratio for each day of the event session was tested. Results show significant abnormal return ratios on the dividend dates of the 10th, 8th, 7th, 6th, 4th, 3rd, 2nd days and the day before the ex-dividend date as show in Table 2.

Table 2： Analysis of Abnormal Return Ratios before and after Ex-dividend Date

$Session_t$	AR Mean (%)	*t*-Statistic	CMAR (%)
−10	0.14	2.427 **	0.14
−9	0.10	1.353	0.24
−8	0.12	1.985 *	0.36
−7	0.12	2.110 *	0.48
−6	0.25	5.638 ***	0.73
−5	0.11	1.530	0.84
−4	0.24	5.584 ***	1.08
−3	-0.46	-16.342 ***	0.62
−2	0.10	2.031 *	0.72
−1	0.42	3.771 ***	1.14
0	0.33	5.120 ***	1.47
+1	-0.08	-1.960 *	1.39
+2	0.05	0.922	1.44
+3	0.02	0.475	1.46
+4	0.07	1.184	1.53
+5	0.08	1.694	1.61
+6	0.10	2.042 *	1.71
+7	0.16	2.178 *	1.87
+8	0.08	1.516	1.95
+9	0.09	1.290	2.04
+10	0.03	0.503	2.07

*This table shows the abnormal return ratio for each day of the event session. Results show the significant abnormal return ratios on the ex-dividend date and occurred on the 10th, 8th, 7th, 6th, 4th, 3rd, 2nd days and the day before the ex-dividend date. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

The Analysis of Abnormal Return Ratios with Cash-dividend Changes

We discovered the cumulative abnormal return ratio reached 2.07% above analysis. In other words, if an investor bought the stock 11 days before the ex-dividend date at the closing price, carried them, and then sold them 10 days after the ex-dividend date at the closing price, the investor could achieve an average excess return ratio of 2.07%.

According to the dividend-signaling hypothesis, published by Miller and Modigliani, cash dividends function as a good signaling vehicle of a firm's future cash flow, thus implying that unanticipated dividend changes should be accompanied by share price changes in the same direction. Therefore, we further analyze whether firms adopting cash-dividend changes have different abnormal returns on stock price. If a corporation with pure cash dividend in two years. We compare the cash dividend with the next year and classify these firms into two groups (with a cash dividend increase and a cash dividend decrease). We try to discover the influences of cash dividend changes on the cumulative abnormal returns of the stock price.

This paper tries to prove the existence of abnormal returns by examining stock trading situations before and after the ex-dividend date. Here we classify the firms into cash dividend increase and cash dividend decrease. The Market Index Adjustment Model of analyzing abnormal returns of stock prices was adopted. Then we analyze the data for abnormal returns before and after the ex-dividend date. The cumulative abnormal return ratios classification by cash dividend changes for each year are presented in Table 3. The average abnormal return ratios and the cumulative abnormal return ratios during the event session [- 10, + 10] are presented in Table 4 and Figure 2. We discovered the average abnormal return ratio of the group with a cash dividend increase was 1.96%. The average abnormal return ratio of the group with a cash dividend decrease was 0.48%.

Table 3: Cumulative Abnormal Return Ratios Classification by Cash Dividend Changes for Each Year

Year	Cumulative Abnormal Return Ratio [－10，＋10] Cash Dividend Decrease Group	Unit: % Cash Dividend Increase Group
2002	-1.93	-2.55
2003	-1.11	3.43
2004	1.80	0.90
2005	2.03	3.65
2006	3.13	4.85
2007	-0.28	0.94
2008	2.19	3.26
2009	-0.34	2.18
2010	-1.67	1.77
2011	1.67	0.97
2012	-0.18	2.16
Average	**0.48**	**1.96**

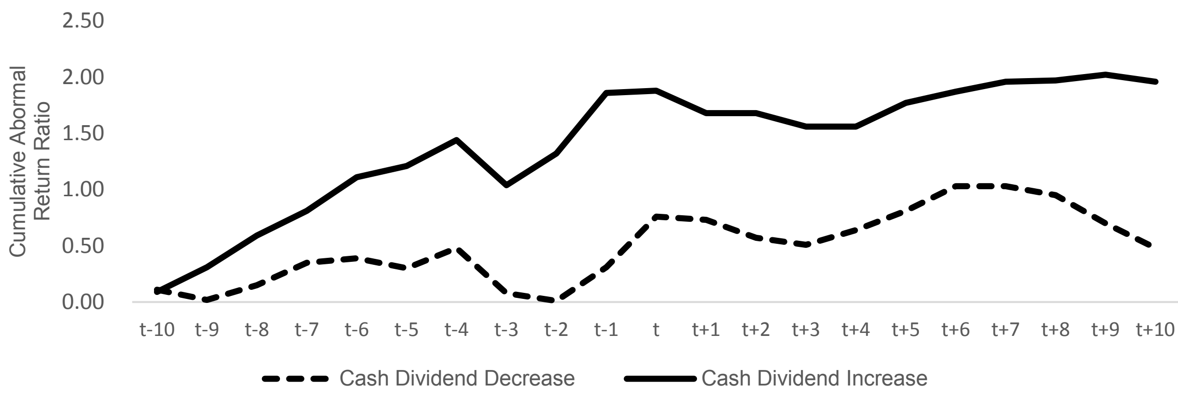
The cumulative abnormal return ratios classification by cash dividend changes for each year are presented in this table. Results show the average cumulative abnormal return ratio of the group with a cash dividend increase was 1.96%. The average cumulative abnormal return ratio of the group with a cash dividend decrease was 0.48%.

Table 4: Abnormal Return Ratios during the Event Session with Cash Dividend Changes

$Session_t$	Cash Dividend Decrease Group		Cash Dividend Increase Group	
	AR	CMAR	AR	CMAR
-10	0.11	0.11	0.09	0.09
-9	-0.09	0.02	0.22	0.31
-8	0.13	0.15	0.28	0.59
-7	0.20	0.35	0.22	0.81
-6	0.04	0.39	0.30	1.11
-5	-0.09	0.30	0.10	1.21
-4	0.18	0.48	0.23	1.44
-3	-0.40	0.08	-0.40	1.04
-2	-0.70	0.01	0.28	1.32
-1	0.30	0.31	0.54	1.86
0	0.45	0.76	0.02	1.88
+1	-0.03	0.73	-0.20	1.68
+2	-0.16	0.57	0.00	1.68
+3	-0.06	0.51	-0.12	1.56
+4	0.13	0.64	0.00	1.56
+5	0.17	0.81	0.21	1.77
+6	0.22	1.03	0.10	1.87
+7	0.00	1.03	0.08	1.96
+8	-0.08	0.95	0.01	1.97
+9	-0.25	0.70	0.05	2.02
+10	-0.22	0.48	-0.06	1.96

The average abnormal return ratios and the cumulative abnormal return ratios during the event session [- 10, + 10] with cash dividend changes are presented in this table. Results show the cumulative average abnormal return ratio of the group with a cash dividend increase was 1.96%. The cumulative average abnormal return ratio of the group with a cash dividend decrease was 0.48%.

Figure 2: Cumulative Abnormal Return Ratios Classification by Cash Dividend Changes



This figure shows cumulative abnormal return ratios classification by cash dividend increase and cash dividend decrease. The results show the cumulative abnormal return ratio of the group with a cash dividend increase was 1.96%. The average abnormal return ratio of the group with a cash dividend decrease was 0.48%. t stands for ex-dividend date. Figures on the vertical axis stand for cumulative abnormal return ratios with the unit of %.

Next we tested whether the cumulative abnormal return ratios were larger than zero. If μ is defined as the cumulative abnormal return ratio, then the hypothesis is stated:

$$H_0: \mu \leqq 0$$
$$H_1: \mu > 0$$

The results with respect to the cumulative abnormal return ratios of the group with a cash dividend increase, show significant at 1% level. With respect to the group with a cash dividend decrease were not significant. The cash dividend increase group reject the null hypothesis, indicating the cumulative return ratio was larger than zero. The cash dividend decrease group failed to reject the null hypothesis that we can't assert the cumulative abnormal return ratio was larger than zero as show in Table 5.

Table 5: The Analysis of Abnormal Return Ratios with Cash Dividend Changes

Classification	CMAR (%)	Standard Deviation	*t*-Statistic
Cash dividend decrease group	0.48	1.738	0.922
Cash dividend increase group	1.96	1.965	3.308 ***

*This table shows that, with respect to the cumulative abnormal return ratios of the group with a cash dividend increase, they were significant under the significance level of 1%. With respect to the group with a cash dividend decrease were not significant. The cash dividend increase group reject the null hypothesis, indicating the cumulative return ratio was larger than zero. The cash dividend decrease group failed to reject the null hypothesis that the cumulative abnormal return ratio was equal to or smaller than zero. Where ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

Next, we examine whether the cumulative abnormal return ratios of the group with a cash dividend increase were larger than the group with a cash dividend decrease. The following test was carried out:

$$H_0: \mu_1 - \mu_2 \leqq 0$$
$$H_1: \mu_1 - \mu_2 > 0$$

μ_1: equals the cumulative abnormal return ratios of the group with a cash dividend increase
μ_2: equals the cumulative abnormal return ratios of the group with a cash dividend decrease

Empirical results show a P-Value = 0.0383, at the significant level of α = 0.05, reject the null hypothesis.

There was sufficient evidence to conclude cumulative abnormal return ratios of the two groups is different. Therefore, we were able to assert that the cumulative abnormal return ratios of the group with a cash dividend increase were larger than those of the group with a cash dividend decrease.

<u>The Analysis of Abnormal Return Ratios with Different Industries</u>

The analysis between different industries is always a study object. In Taiwan, the total traded value of financial industry and electric industry almost topped 75%. Here we choose these two industries to examine whether different industries impact cumulative abnormal return ratios. Table 6 shows results that average abnormal return ratios for the group with financial industry was 1.15%, and for electric industry equals 1.88%. The average abnormal return ratios and the cumulative abnormal return ratios during the event session [- 10, + 10] are presented in Table 7 and Figure 3.

Table 6: Cumulative Abnormal Return Ratios Classification by Different Industries

Year	Cumulative Abnormal Return Ratio【－10，＋10】	Unit: %
	Financial Industry	**Electric Industry**
2001	2.55	5.50
2002	-6.24	-4.70
2003	3.76	0.86
2004	4.29	3.71
2005	1.05	5.03
2006	4.73	2.23
2007	-1.76	2.07
2008	-1.79	6.62
2009	0.57	-0.40
2010	1.06	-1.89
2011	3.65	1.96
2012	1.89	1.61
Average	**1.15**	**1.88**

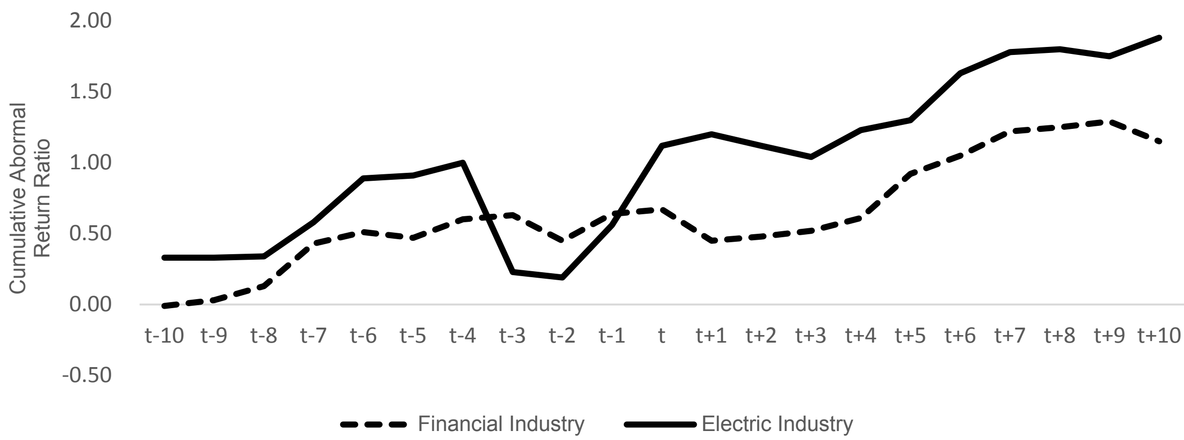
The cumulative abnormal return ratios of [- 10, + 10] for each year were discussed. It was discovered that the average cumulative abnormal return ratio of the group with financial industry was 1.15%, and the average cumulative abnormal return ratio of the group with electric industry was 1.88%.

Table 7: Abnormal Return Ratios during the Event Session with Different Industries

Session_t	Financial Industry		Electric Industry	
	AR	**CMAR**	**AR**	**CMAR**
-10	-0.01	-0.01	0.33	0.33
-9	0.04	0.03	0.00	0.33
-8	0.10	0.13	0.01	0.34
-7	0.30	0.43	0.24	0.58
-6	0.08	0.51	0.31	0.89
-5	-0.04	0.47	0.02	0.91
-4	0.13	0.60	0.09	1.00
-3	0.03	0.63	-0.77	0.23
-2	-0.18	0.45	-0.04	0.19
-1	0.19	0.64	0.37	0.56
0	0.03	0.67	0.56	1.12
+1	-0.22	0.45	0.08	1.20
+2	0.03	0.48	-0.08	1.12
+3	0.04	0.52	-0.08	1.04
+4	0.09	0.61	0.19	1.23
+5	0.31	0.92	0.06	1.30
+6	0.13	1.05	0.34	1.63
+7	0.17	1.22	0.15	1.78
+8	0.03	1.25	0.02	1.80
+9	0.04	1.29	-0.06	1.75
+10	-0.14	1.15	0.14	1.88

The average abnormal return ratios and the cumulative abnormal return ratios during the event session [- 10, + 10] of different industries are presented in this table. Results show the cumulative average abnormal return ratio of financial industry was 1.15%. The cumulative average abnormal return ratio of electric industry was 1.88%.

Figure 3: Cumulative Abnormal Return Ratios Classification by Different Industries



This figure shows cumulative abnormal return ratios classification by different industries. The results show the cumulative abnormal return ratio of financial industry was 1.15%. The cumulative average abnormal return ratio of electric industry was 1.88%. t stands for ex-dividend date. Figures on the vertical axis stand for cumulative abnormal return ratios with the unit of %.

The cumulative abnormal return ratios were further tested by the following hypothesis:

$H_0: \mu \leqq 0$

$H_1: \mu > 0$

μ: stands for the cumulative abnormal return ratio

Cumulative abnormal returns of the financial industry group, the results were not significant. For those with electric industry group, the results were significant at the 5% level. The financial industry group failed to reject the null hypothesis. We have not sufficient evidence to say the cumulative abnormal return ratio was larger than zero. The other electric industry group rejected the null hypothesis, indicating the cumulative abnormal return ratio was larger than zero as show in Table 8.

Table 8: The Analysis of Abnormal Return Ratios with Different Industries

Classification	AR mean (%)	Standard Deviation	*t*-Statistic
Financial Industry	1.15	3.166	1.255
Electric Industry	1.88	3.203	2.036 **

*This table shows that, with respect to the cumulative abnormal returns of the group with financial industry were not significant and with respect to those of the group with electric industry were significant at 5%. The financial industry group failed to reject the null hypothesis. We have not sufficient evidence to say the cumulative abnormal return ratio was greater than zero. The other electric industry group rejected the null hypothesis, indicating the cumulative abnormal return ratio was greater than zero. Where ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

Next, we identified where the cumulative abnormal return ratios of the electric industry group were larger than those of the financial industry group. The following test was carried out:

$H_0: \mu_1 - \mu_2 \geqq 0$

$H_1: \mu_1 - \mu_2 < 0$

μ_1: equals the cumulative abnormal return ratios of the group with a financial industry
μ_2: equals the cumulative abnormal return ratios of the group with an electric industry

The empirical results reveal a P-Value＝0.2884. There was insufficient evidence to show the cumulative abnormal return ratios of the two groups were different. Therefore, we cannot conclude the cumulative abnormal return ratios of the electric industry group were larger than those of the financial industry group.

The Analysis of Abnormal Return Ratios before and after Financial Crisis

The financial crisis of 2008 frequently referred to as the global financial crisis. It resulted in the threat of total collapse of large financial institutions, the bailout of banks and other businesses by national governments, and downturns in stock markets around the world. The reflection of the Taiwan stock market is Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX) from 9309 falls to 3955, decline 57.57% in half a year. We discuss whether the cumulative abnormal return ratios were different before and after financial crisis.

In this section, the sample are classified by the year before and after financial crisis. We find the average cumulative abnormal return ratios before crisis was 2.49% and the average cumulative abnormal return ratios after crisis was 1.56%. The results are presented in Table 9 and Figure 4.

Table 9: Abnormal Return Ratios during the Event Session Classification by Financial Crisis Event

Session	Before the Financial Crisis		After the Financial Crisis	
	AR	CMAR	AR	CMAR
-10	0.11	0.11	0.15	0.15
-9	0.11	0.22	0.10	0.25
-8	0.09	0.31	0.15	0.40
-7	0.10	0.41	0.15	0.55
-6	0.19	0.60	0.31	0.86
-5	0.13	0.73	0.09	0.95
-4	0.32	1.05	0.16	1.11
-3	-0.49	0.56	-0.44	0.67
-2	0.12	0.68	0.10	0.77
-1	0.53	1.21	0.31	1.08
0	0.42	1.63	0.23	1.31
+1	-0.04	1.59	-0.13	1.18
+2	0.10	1.69	0.00	1.18
+3	0.00	1.69	0.03	1.21
+4	0.14	1.83	-0.01	1.20
+5	0.06	1.89	0.11	1.31
+6	0.11	2.00	0.09	1.40
+7	0.26	2.26	0.04	1.44
+8	0.08	2.34	0.05	1.49
+9	0.19	2.53	-0.01	1.48
+10	-0.04	2.49	0.08	1.56

The average abnormal return ratios and the cumulative abnormal return ratios during the event session [- 10, + 10] before and after financial crisis are presented in this table. Results show the cumulative average abnormal return ratio are 2.49% and 1.56% respectively.

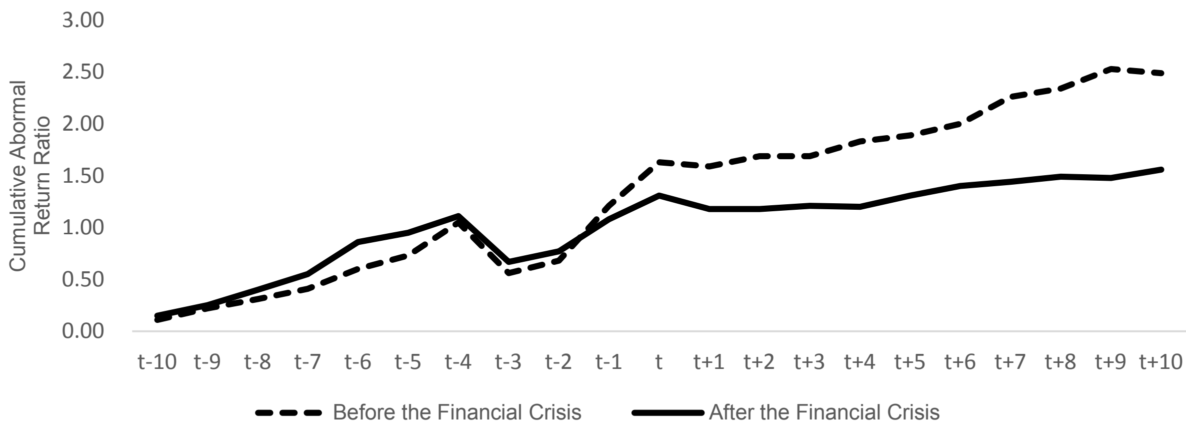
Next, we tested whether the cumulative abnormal return ratios were larger than zero. If μ is defined as the cumulative abnormal return, then the hypothesis is stated：

H_0 ： $\mu \leqq 0$

H_1 ： $\mu > 0$

The results with respect to the cumulative abnormal returns of the group before financial crisis, show significance at the 10% level. With respect to the group after financial crisis, significance occurs at the 5% level. Both groups rejected the null hypothesis, we have sufficient evidence to say the cumulative abnormal return ratio were larger than zero as shown in Table 10. Therefore, a preliminary conclusion was obtained that both groups before and after financial crisis had cumulative abnormal returns.

Figure 4： Cumulative Abnormal Return Ratios Classification by Financial Crisis Event



This figure shows cumulative abnormal return ratios classification by the year before and after financial crisis. The results show the cumulative abnormal return ratio were 2.49% and 1.56% respectively. t stands for ex-dividend date. Figures on the vertical axis stand for cumulative abnormal return ratios with the unit of %.

Table 10：The Analysis of Abnormal Return Ratios with Financial Crisis Event

Classification	AR mean (%)	Standard Deviation	*t*-Statistic
Before Financial Crisis	2.49	3.211	1.896 *
After Financial Crisis	1.56	1.158	3.307 **

*This table shows that, with respect to the cumulative abnormal return ratios of the group before financial crisis, they were significant under the significance level of 10%. With respect to the group after financial crisis were significant at the 5% level. Both groups rejected the null hypothesis, we have sufficient evidence to say the cumulative abnormal return ratio were larger than zero. Where ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

Next, we examine whether the cumulative abnormal return ratios of the group before financial crisis were larger than for those of the group after financial crisis. The following test was carried out:

$$H_0：\mu_1-\mu_2 \leqq 0$$

$$H_1：\mu_1-\mu_2 > 0$$

μ_1: equals the cumulative abnormal return ratios of the group before financial crisis
μ_2: equals the cumulative abnormal return ratios of the group after financial crisis

The empirical results showed that P-Value＝0.2614. There was insufficient evidence to show the cumulative abnormal return ratios of the two groups were different. Therefore, we were not able to assert that the cumulative abnormal return ratios of the group before financial crisis were larger than those of the group after financial crisis.

CONCLUSIONS

This paper adopts cash dividend samples from all listed firms in Taiwan during the period from 2001 to 2012, applying an event study in order to investigate the impact of cash-dividend policy on share prices. In this paper we examine the effect of ex-dividend date for cash-dividend policy, and tried to demonstrate the existence of abnormal returns by examining the stock trading situations before and after the ex-dividend date. In addition, we discuss the relationships between cash dividend changes and cumulative abnormal return ratios. We explored whether there were relationships between these variables and cumulative abnormal return ratios. Moreover, we analyze whether different industries impact cumulative abnormal return ratios. And we discuss whether the cumulative abnormal return ratios were different before and after financial crisis.

We used t-tests to determine whether cumulative abnormal returns exist. We found that cumulative abnormal returns exist during the period of 10 days before and after the ex-dividend date for firms adopting an exclusive cash-dividend policy for the year. If an investor buys the stocks of a firm which elects to pay only cash-dividends at the closing price 11 days before the ex-dividend date, and sells the stock at the closing price 10 days after the ex-dividend date, she will earn an average 2.07% abnormal return, regardless of the transaction cost.

Next, we took the cash dividend changes as a variable for classification. We used this variable to classify firms who paid only cash dividends into two groups. We examine if cumulative abnormal returns during the event session [- 10, +10] were different by this classification. The results showed the average abnormal return ratio of the group with a cash dividend increase was 1.96%. The average abnormal return ratio of the group with a cash dividend decrease was 0.48%. The cash dividend increase group reject the null hypothesis, indicating the cumulative return ratio was larger than zero. The cash dividend decrease group failed to reject the null hypothesis that we can't assert the cumulative abnormal return ratio was larger than zero.

Further, we examine whether the cumulative abnormal return ratios of the group with a cash dividend increase were larger than the group with a cash dividend decrease. Empirical results show a P-Value＝ 0.0383, at the significant level of $\alpha = 0.05$, reject the null hypothesis. Therefore, we were able to assert that the cumulative abnormal return ratios of the group with a cash dividend increase were larger than those of the group with a cash dividend decrease.

The results of our analysis for different industries reveal a P-Value＝0.2884. There was insufficient evidence to show the cumulative abnormal return ratios of the two groups were different. Therefore, we cannot conclude the cumulative abnormal return ratios of the electric industry group were larger than those of the financial industry group. Further, we examine whether the cumulative abnormal return ratios of the group before financial crisis were larger than for those of the group after financial crisis. The empirical results showed that P-Value＝0.2614. There was insufficient evidence to show the cumulative abnormal return ratios of the two groups were different.

In this paper, we use the Market Index Adjustment Model to analysis the abnormal return ratios. This assumes stock prices have a linear relationship with the Taiwan stock exchange capitalization weighted stock index. If not, then the abnormal return ratios could have statistic errors. Moreover, the Taiwan stock transaction market has a daily fluctuation range. The increasing or decreasing range of the opening price is limited in 7%. Thus, the stock price would be restricted. We discuss the dividend policy of the cash dividend changes. However, we did not analyze the effect between different nations and different scale of stock exchange market. This research is relegated to a future paper.

Finally, we note the sample data showed the cumulative abnormal return ratio of the 10 day period before the ex-dividend date was higher than that of the 10 day period after the ex-dividend date. However, since 2012 the competent authority has been charging an additional 2% of the dividends paid out as a supplementary fee for healthcare. This fee increases the cost to investors who participate in ex-right and ex-dividend payments, and decrease their willingness to get involved in ex-right and ex-dividend payments. Therefore, the phenomena mentioned in this paper may be reversed. Further research will determine the impact of this tax.

REFERENCES

Aharony, Joseph; Jones, Charles P.; Swary, Itzhak. (1980) "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis" *Journal of Finance*, Vol. 35 Issue 4, p1001-1016.

Allen, Franklin., Bernardo, Antonio E. and Welch, Ivo. (2000) "A Theory of Dividends Based on Tax Clienteles," *Journal of Finance,* 55, no. 6: p.2499-2536.

Bali, Rakesh and Hite, Gailen L. (1998) "Ex-Dividend Day Stock Price Behavior: Discreteness or Tax-Induced Clienteles?" *Journal of Financial Economics* 47: p.127-159.

Dar-Hsin Chen, Hsiang-Hsi Liu, and Cheng-Ting Huang. (2009) "The Announcement Effect of Cash Dividend Changes on Share Prices - An Empirical Analysis of China." *The Chinese Economy*, vol. 42, no. 1, p.62-85.

DeAngelo, Harry., DeAngelo, Linda and Skinner, Douglas J. (1992) "Dividends and Losses." *Journal of Finance* 47, no. 5: p.1837-1863.

Divecha, Arjun and Dale Morse. (1983) "Market Responses to Dividend Increases and Changes in Payout Ratios." *Journal of Financial and Quantitative Analysis* Vol. 18 Issue 2, p.163-173.

Elton, Edwin J. and Gruber, Martin J. (1970) "Marginal Stockholder Tax Rates and the Clientele Effect." *Review of Economics and Statistics* 52, no. 1: p.68-74.

Fehrs, Donald H., Benesh, Gary A. and Peterson, David R. (1988) "Evidence of a Relation between Stock Price Reactions around Cash Dividend Changes and Yields." *Journal of Financial Research* 11, no. 2 (summer): p.111-123.

Frank, Murray and Jagannathan, Ravi. (1998) "Why Do Stock Prices Drop by Less than the Value of the Dividend? Evidence from a Country without Taxes." *Journal of Financial Economics* 47, no. 2: p.161-188.

Guay, Wayne and Harford, Jarrad. (2000) "The cash-flow permanence and information content of dividend increases versus repurchases." *Journal of Financial Economics* 57, no. 3: p.385-415.

Khamis H. Al-Yahyaee, Toan M. Pham, Terry S. Walter. (2011) "The information content of cash dividend announcements in a unique environment." *Journal of Banking & Finance*. Vol. 35 Issue 3, p.606-612.

Michaely, Roni, Thaler, Richard H. and Womack, Kent L. (1995) "Price Reactions to Dividend Initiations and Omissions: Overreaction or Drift." *Journal of Finance* 50, no. 2 (June): p.573-608.

Miller, Merton H. and Rock, Kevin. (1985) "Dividend Policy under Asymmetric Information." *Journal of Finance* 40, no. 4: p.1031-1051.

Milonas, Nikolaos T.; Travlos, Nickolaos G.; Xiao, Jason Zezhong; Tan, Cunkai. (2006) "The ex-dividend day stock price behavior in the Chinese stock market." *Pacific-Basin Finance Journal.* Vol. 14 Issue 2, p.155-174.

Ofer, Aharon R. and Siegel, Daniel R. (1987) "Corporate Financial Policy, Information, and Market Expectations: An Empirical Investigation of Dividends." *Journal of Finance* 42, no. 4: p.889-911.

Pettit, R. Richardson, (1972) "Dividend Announcements, Security Performance, and Capital Market Efficiency", *Journal of Finance* 27, p.993-1007.

Xingzhi Kang. (2013) "The Impact of Cash Dividends on Stock Prices in the U.S." A research project submitted to Saint Mary's University, Halifax, Nova Scotia, Canada.

Yang, Jack J. and Tsung-Hsin Wu. (2014) "Price and Volume Reactions to Cash Dividend Announcement: Evidence from Taiwan." *International Journal of Business & Finance Research*, Vol. 8 Issue 4, p.83-96.

Yilmaz, Mustafa Kemal and Gulay, Guhzan. (2006) "Dividend Policies and Price-Volume Reactions to Cash Dividends on the Stock Market." *Emerging Markets Finance & Trade* 42, no. 4: p.19-49.

ACKNOWLEDGEMENT

The authors are grateful to Terrance Jalbert, PhD and two anonymous referees for helpful comments on an earlier version of this paper. We appreciate excellent comments made by the editor in chief and two anonymous reviewers, resulting in a significant improvement in the quality of this paper. Any errors are our own.

BIOGRAPHY

Jack J.W. Yang is a professor at the Department of Finance, National Yunlin University of Science and Technology, Taiwan, Email: yangjw@yuntech.edu.tw

Tsung-Hsin Wu is a doctoral student at the Department of Finance, National Yunlin University of Science and Technology, Taiwan, Email: g9724806@yuntech.edu.tw (Corresponding author)

International Journal of Business and Finance Research
Vol. 9, No. 2, 2015, pp. 93-104
ISSN: 1931-0269 (print)
ISSN: 2157-0698 (online)

www.theIBFR.org

IS THERE ASYMMETRIC INFORMATION ABOUT SYSTEMATIC FACTORS? EVIDENCE FROM COMMONALITY IN LIQUIDITY

Rahul Ravi, Concordia University

ABSTRACT

This paper provides an empirical investigation of the hypothesis that there exists information asymmetry about systematic factors. Using a sample of 112 exchange traded funds (ETF) we provide evidence in support of this hypothesis. Furthermore, through the analysis of the the adverse selection component of the bid-ask spreads (lambdas) of these ETFs and all common stocks trading on the NYSE and the NASDAQ from January 1999 to December 2003, we provide strong evidence of commonality in the adverse selection component of liquidity. We use the estimated lambda of Standard and Poor's Depository Receipts (SPDRs) as a measure of information asymmetry about the U.S. equity market and find that these are (i) positively correlated with the lambdas of other exchange traded funds (ii) related to the lambdas on individual equity securities and (iii) they can be explained by measures of uncertainty about the aggregate market.

JEL: D82, G19

KEYWORDS: Liquidity, Information Asymmetry, Commonality

INTRODUCTION

The market microstructure literature posits inventory risk and asymmetric information risk as the two drivers of liquidity. Chordia, Roll, and Subrahmanyam (2000) document commonality in liquidity. They use commonality to reveal the existence of asymmetric information effects on liquidity, but provide no evidence that asymmetric information has common components. We examine the liquidity of exchange traded funds (ETFs) and provide evidence that the asymmetric information portion of liquidity has common determinants. More specifically, we show that there is asymmetric information about systematic factors. Typically, the microstructure literature assumes that informed traders are privy to firm specific information such as a pending merger or product development. This idiosyncratic information would be diversified away in a large portfolio and knowledge about any one firm in the portfolio would not prove very useful in predicting the return on the portfolio (Hughes, Liu and Liu, 2007). Subrahmanyam (1991), Gorton and Pennacchi (1993) present models where the bundling of claims on individual assets into composite claims reduces informed traders' informational advantage.

As portfolios get large, the impact of asset specific information gets arbitrarily small and the adverse selection component of liquidity (lambda) will have to come through asymmetric information about common factors. Whether there is asymmetric information about systematic components of asset returns has not been determined. Subrahmanyam (1991) entertains the possibility and includes factor informed traders in his model. Aboody et al. (2005); Francis et. al. 2005; and Easley, Hvidkjaer, and O'Hara (2002) present models that allows for a common component in private information. Chordia, Roll, and Subrahmanyam (2002) consider asymmetric information for the aggregate market unlikely and adopt the inventory paradigm to explain the relation between order imbalances and market wide returns.

Knowing whether there is a common component to adverse selection is important for the following reasons. First, there is disagreement about its existence. Second, Gorton and Pennacchi (1993) show that the microstructure impact of idiosyncratic private information cannot be diversified away. Easley, Hvidkjaer, and O'Hara (2002), and Easley and O'Hara (2004) show that cumulative idiosyncratic information asymmetry affects asset returns. Asymmetric information about systematic factors is non- diversifiable and depending on its magnitude, also affects expected returns. Third, most textbooks on investing include sections on "Top Down" strategies and tactical asset allocation. Such approaches to investing rely on investors being able to avoid (select) asset categories or industries that will do relatively poorly (well). Absent information asymmetry about systematic factors, the value of these approaches is questionable. We use trading data on Standard and Poor's Depository Receipts (SPDRs), other ETFs, and, equities traded on the NYSE and NASDAQ to provide evidence on commonality in the adverse selection component of liquidity. Our evidence is consistent with investors facing asymmetric information costs even when trading well diversified baskets of securities. The magnitude of these costs is inversely related to the degree of diversification. The SPDR is the most diversified of the ETFs we employ so we use its lambda as a measure of asymmetric information about market wide information. We relate the lambdas on the other ETFs to the SPDR lambda and find that the SPDR lambda explains considerable time series variation in the lambdas of other ETFs. Further, we find that the SPDR lambda explains time series variation in the lambdas of individual equities. Finally, we present evidence that SPDR lambdas are reliably related to measures of aggregate market uncertainty. The remainder of the paper continues as follows. In Section 2 we present a brief literature review and our empirical predictions. Section 3 discusses our data and our estimation technique. In Section 4 we present our results. We conclude in Section 5.

LITERATURE REVIEW AND EMPIRICAL PREDICTIONS

Information asymmetry among investors has been widely studied in the field of financial economics. However, there still remains considerable lack of consensus as to the nature of the risk posed by it. On the theoretical front, models such as Easley, Hvidkjaer, and O'Hara (2002), Easley and O'Hara (2004), Garleanu and Pedersen (2004)) argue that information risk is not diversifiable. Therefore, information asymmetry risk must be priced, because uninformed investors need to be compensated for the risk of systematically losing out to better informed investors. However, a competing line of reasoning, represented by Hughes, Liu and Liu (2007) and Lambert, Leuz and Verrecchia (2007) argue that information risk is either fully diversifiable when the economy is large enough or has been captured by existing risk measures. Lambert Leuz and Verrecchia (2012) takes the latter line of argument further by presenting a rational expectations model with perfect competion where informational differences across investors affect asset returns not through information asymmetry per se, but through the difference in their precisions. On the empirical front, using the probability of informed trading (PIN) measure, Easley, Hvidkjaer, and O'Hara (2002) provide evidence consistent with information asymmetry affecting asset returns. However, the findings of Duarte and Young (2009) casts serious doubts on the credibility of the PIN measure. They find that PIN is priced because it captures illiquidity rather than information asymmetry. Similarly, Akay, Cyree, Griffiths and Winters (2012) in their study of PIN have suggested that in the T-bill markets, PIN could be picking up the activities of discretionary liquidity traders.

This paper contributes to the above debate by providing some new empirical evidence which could potentially further our understanding of the information risk in the financial market. We build this paper arround the notion that information asymmetry arrises not only from the knowledge of firm-specific information, but also from a superior ability to process information (Kim and Verrechia, 1997). This information could be firm-specific, or sector-specific, or market-wide (Chordia, et al. 2000; Gilson, et al. 2001). It could even be something unconnected to the firm, such as the trading environment (Easley et. al., 1998). The paper is structured into two parts. First part attempts to demonstrate the existence of systematic information asymmetry, and the second part explores its relationship with firm level information asymmetry. The first part of this paper exploits the insights from Subrahmanyam (1991) and Gorton and

Pennacchi (1993) to identify market-wide, sector and firm level information asymmetry. These studies argue that the bundling of claims on individual assets into composite claims or baskets of securities reduces the informational advantage of the informed traders'. This would suggest that the greater the level of diversification, the lower the adverse selection cost of trading that asset in the market. We thus make predictions about levels of information asymmetries and their correlation structure across a set of broadbased, sector, and international ETFs (exchange traded funds) and a set of U.S. traded common stocks.

The general idea is that SPDRs and other Broad-based ETFs should reflect primarily market wide uncertainty and therefore have low, but positive levels of asymmetric information. The level of a Broad-based ETF's information asymmetry should be related to its level of diversification. We expect a positive correlation between the lambdas of Broad-based ETFs. Sector ETFs should have market wide asymmetry, and also asymmetry related to the industry component of their returns which by construction is a component of portfolio returns. This suggests Sector ETFs should have higher lambdas than Broad-based ETFs. Since Sector ETF lambdas will have a market component, we predict a positive correlation between SPDR and Sector lambdas. Based on the informational arguments for home bias, we expect high levels of asymmetric information about International ETFs Brennan and Cao (1997). However, we do not expect that the asymmetric information about domestic systematic factors that would drive the lambdas on SPDRs to be related to the lambdas on International ETFs. While we expect that International ETF lambdas will be greater than SPDR lambdas, we expect that the lambdas will be uncorrelated.

Individual equities that trade on U.S. exchanges should have three components to their information environment. First is market-wide information, second is information about the industry, and finally there is the idiosyncratic information. Based on this decomposition, we expect the lambdas on individual equities to be greater than that on SPDRs because of the two addition sources of asymmetry. We also expect that lambdas on individual equities are positively correlated with SPDR lambdas through the common component of information about systematic factors.We are not the first researchers to investigate the impact of order flow on the pricing of composite or basket securities. Neal and Wheatley (1998) examine lambdas for a sample of closed-end funds and a sample of matched individual equities. They argue that closed-end funds are transparent relative to operating companies and that therefore there should be less asymmetric information about closed end funds. Using a sample of 17 closed-end funds and 17 matched control firms they report estimates of lambda that are large and significant in both samples. Neal and Wheatley interpret their evidence as suggesting that adverse selection might arise from factors other than a firm's liquidation value.

Our study differs from Neal and Wheatley in the following ways. First the ETFs we examine are more diversified than the closed end funds they examine. The positive lambdas Neal and Wheatley observe could have come through the variability of the idiosyncratic information of the securities in the basket. Second, there is greater trading activity in our sample of ETFs. Low variation in liquidity trading would result in high estimates of lambda. Third, we employ 112 ETFs as compared to 17 closed-end funds. Fourth, ETFs have very low discounts as copared to the closed end fund discounts. Discounts are a potential source of information asymmetry. Pontiff (1997) reports that the average closed-end fund's monthly return volatility exceeds that of its underlying assets by 64%. This suggests that closed-end funds are less transparent than Neal and Wheatley assume. Finally, examining the lambdas through the lens of Subrahmanyam (1991), we attempt to explain any positive ETF lambdas observed.

DATA AND METHODOLOGY

Data

We employ SPDRs, other Broad Based ETFs, International ETFs, and Sector ETFs in this study. Our sample covers the period from January 1999 to December 2003. We start in 1999 because although SPDRs began trading on the AMEX in February 1993, Sector ETFs did not begin trading until December 1998. The exponential increase in high frequency trading as well as the increased prevalance of alternate trading venues such as dark pools post 2003 could potentially confound our time series results. Therefore, we choose to stop the analysis end of 2003. We begin with a total of 146 ETFs (SPDRs, 63 other Broad-Based, 47 sector and 34 International) before applying screens to the data. Our first screen requires the ETF to have data available on NYSE Trade-and-Quote database (TAQ) and the Center for Research in Security Prices (CRSP) database. Additionally, sample ETFs must have a price of at least \$5.00 and must have traded at least 24 month (two years) to be included into our sample. The final ETF sample consists of SPDRs, 41 other Broad-Based, 37 Sector and 34 International ETFs.

Table 1 presents detailed descriptive statistics for the sample. The sample size increases from 29 ETFs in 1999 to 112 ETFs in 2003. Panel A presents information on the capitalization of the ETFs. In 1999 the typical Broad-based ETF contains \$5 billion and the total Broad-based class has a capitalization of approximately \$32 billion. The SPDR market capitalization in 1999 is \$3.6 billion. Sector ETFs contained \$2.7 billion with the average Sector ETF having \$192 million in assets. While there were more International ETFs at this time, the typical International ETF is smaller (\$78 million) as is the International class (\$1.3 billion). There is tremendous growth in Broadbased ETFs between 1999 and 2000. The capitalization of Broad-based and International ETFs increase to \$17.67 billion. The growth is through an increase in smaller ETFs as can be seen in approximate halving of the average ETF size. Broad-based ETFs were hit quite hard by the breaking of the tech-stock bubble. Sector and International ETFs better weathered the market downturn. Over the sample period the total capitalization in all three classes increases and in 2003 the combined capitalization the sample ETFs is \$96.5 billion. On December 31, 2003 the SPDR market capitalization is \$44 billion.

Table 1: Some Descriptive Statistics For the Set of 112 ETFs Included in This Study

	Broad Based		Sector		International	
	Mean	Sum	Mean	Sum	Mean	Sum
Panel A: Market Capitalization (in \$Mill)						
1999	5,308	31,849	192	2,717	78	1,328
2000	2,653	49,520	139	2,831	89	1,749
2001	964	29,066	116	3,412	78	1,814
2002	1,705	60,805	151	5,366	187	4,865
2003	2,040	80,061	250	8,818	277	7,660
Panel B: trading volume (in millions of shares traded)						
1999	4,563	27,380	304	4,302	166	2,830
2000	1,737	32,721	313	6,356	141	2,786
2001	1,680	50,833	277	8,229	139	3,216
2002	3,395	121,088	484	17,254	335	8,723
2003	3,614	142,156	492	17,333	675	18,684

This table presents sample descriptive statistic. Panel A presents the average and total market capitalization (in millions USD) of Broadbased, Sector and International ETF's, from 1999 through 2003 (our sample period). Panel B presents the corresponding average and total trading volume (in millions of shares traded).

Panel B presents information on the trading volume of the ETFs. Broad-based ETF total trading volume in 2003 is 5 times higher than the trading volume in 1999. For Sector and International ETFs the increases are 4 times and 6.6 times respectively. In 2003 the typical Broad-based ETF has a trading volume of 3.6 billion shares, which is about one-half of Microsoft's 2003 trading volume and twice that of General Motors' 2003 trading volume. The trading volume of SPDRS in 2003 is 10.36 billon shares. We also employ two samples of common stocks traded on the NYSE and NASDAQ. We use the first sample to perform our tests on the levels of ETF and common stock lambdas. In this sample common stocks are matched to ETFs each month based on the average share price, trading volume, and the standard deviation of daily returns. We use daily data from the CRSP database for this matching procedure. For each ETF we select the common stock with characteristics that minimize the following equation.

$$Score_{j,k} = \left(\frac{P_{stock,i,k} - P_{ETF,j,k}}{P_{stock,i,k} + P_{ETF,j,k}} \right)^2 + \left(\frac{V_{stock,i,k} - V_{ETF,j,k}}{V_{stock,i,k} + V_{ETF,j,k}} \right)^2 + \left(\frac{\sigma_{stock,i,k} - \sigma_{ETF,j,k}}{\sigma_{stock,i,k} + \sigma_{ETF,j,k}} \right)^2 \quad (1)$$

Where P is the price of the stock or ETF, V is the trading volume of the stock or ETF, and σ is standard deviation of returns for the stock or ETF. This matching is designed to reduce disparity in the inventory and order processing components of trading costs. Table 2 presents information on the matches. In all three ETF categories the price matches are quite close with the largest average deviation being \$2.94 for the Broad-based ETFs. The broad-based matching firms are closer in terms of trading volume than either the Sector or International matching equities. Finally, we note that the matching process yields substantial differences in the standard deviation of returns. This is to be expected, as the returns on portfolios are lower than those on individual equities. Because of the imperfections in our matching, we control for differences in these characteristics in our cross-sectional examination of levels of lambda.

The second sample is used to examine the correlation between SPDR lambdas and the lambdas of common equities. We do not use the control sample described above because the matching firm can change from month to month. We start with all NYSE and NASDAQ stocks and apply the following screens. We include only common stocks with at least 24 months of data available in both the CRSP and the TAQ databases over the sample period. To avoid undue influence from extreme observations, we exclude all stocks with an average monthly price less than \$5 and greater than \$500. This yields 2649 NYSE firms and 4470 NASDAQ firms, giving us a total of 7119 stocks.

Table 2: Matching Sample Descriptive Statistics

Cat	ETF Price	ETF Trading Vol	σ_{ETF}	Stk_Prc	Stock Trading Vol	σ_{stock}
Broad based	79.60	25,611,673	0.0133	76.65	20,670,124	0.0325
Sector	43.07	1,926,838	0.0161	42.91	16,556,207	0.0326
International	21.19	1,792,150	0.0170	20.98	10,585,622	0.0323

Equation (1) is used for matching ETFs in various categories (broadbased, Sector, and International) with a set of common stocks trading on the same exchange. This table presents the average price, trading volume, and standard deviation for the set of ETFs and corresponding set of matched stocks.

Intraday, transaction level, trade and quote data for all ETFs and stocks are retrieved from the NYSE TAQ database, while the monthly closing price, return volatility and trading volume are obtained from the CRSP. To avoid the influence of any possible recording errors in TAQ, we exclude all quotes with a raw spread greater than \$6.5 and with a percentage spread greater than 10%. The TAQ database does not eliminate auto-quotes (passive quotes by secondary market dealers). This can cause quoted spreads to be artificially inflated. Since there is no reliable way to filter out auto-quotes in TAQ, only BBO (best bid or offer)-eligible primary market (NYSE) quotes are used. Quotes established before the opening of the market or after the close are discarded. Negative bid-ask spread quotations, negative transaction prices, and negative quoted depths are discarded. Trades with non-standard settlement conditions are excluded. The first trade of each day is discarded to avoid the effects of the opening procedure. Following Lee and Ready (1991), any quote less than five seconds prior to the trade is ignored and the first one at least five seconds prior to the trade is retained.

<u>Measuring Lambda</u>

We estimate the level of adverse selection component of bid-ask spreads using the advocated by Lin, Sanger, and Booth (1995) (Hereafter referred to as LSB). We have also run our analysis using the adverse selection cost component as proposed by, Glosten and Harris (1988) and Neal and Wheatley (1998). Our results are robust to the methodology selected. For the sake of brevity, we report only the results corresponding to Lin, Sanger, and Booth (1995) estimation. This method is based on the approaches in Stoll

(1989) and Huang and Stoll (1997). LSB use a regression approach to estimate the proportion of the effective spread that can be attributed to information asymmetry. The main idea is that the quote revision reflects the adverse selection component of the spread, while the change in the transaction price reflects order processing costs and bid-ask bounce.

In the LSB model, information revealed by the trade at time t is reflected in quote revisions, $B_t = B_{t-1} + \lambda S_{t-1}$ and $A_t = A_{t-1} + \lambda S_{t-1}$, where B_{t-1} and A_{t-1} are the prevailing bid and ask prices at time t, and λ can be interpreted as the proportion of the effective spread due to adverse selection. $S_{t-1} = P_{t-1} - Q_{t-1}$ is one-half of the effective spread. Here, P_t is the transaction price and Q_{t-1} is the quote midpoint at time t. The revision in the quote mid point is expressed as:

$$\begin{aligned} \Delta Q_t &= \lambda S_{t-1} + \varepsilon_t \\ S_t &= \theta S_{t-1} + \eta_t \end{aligned} \qquad (2)$$

where, $\Delta Q_t = Q_t - Q_{t-1}$ and $Q_t = (B_t + A_t)/2$. θ represents the order processing cost component of the spread and (1-λ–θ) represents the inventory cost component of the bid-ask spread.

RESULTS

Table 3 presents descriptive statistics for lambda (scaled by price) for the sample ETFs and their matched common equities. The average adverse selection cost of trading a Broad-based ETF is 0.36¢ per share. For Sector and International ETFs the corresponding numbers are 0.65¢ and 1.74¢ per share. A similar pattern is found in the median estimates. The higher lambda in the Sector ETFs is consistent with the idea that diversification reduces the adverse selection component of transactions costs, and suggests that some of the asymmetric information could be about industry factors. International ETFs' higher lambdas are consistent with the information explanations of home bias.

We also see that the lambdas of the matched common equities are higher than lambdas of the ETFs. For the equities matched to Broad-based ETFs, estimated adverse selection costs are 0.68¢ per share. The equities matched to Sector and International ETFs have estimated adverse selection costs of 1.23¢ and 3.04¢ per share. These differences are both economically and statistically significant. It is also interesting to compare the average lambda of the common equities matched to the Broad-based and Sector ETFs to that of the International ETFs. The adverse selection cost of trading an international portfolio is twice as large as that of trading a high priced and heavily traded domestic equity and approximately the same as trading a medium priced share with relatively high trading volume. Examination of the differences in lambda in each calendar year shows that the estimated differences are stable over the sample period. Panel B of the table shows that estimated differences are stable over the sample period.

Table 3: Distribution of the Adverse Selection Cost Component of the Spread

	ETF		Stock		Mean Difference
	Mean	Median	Mean	Median	
Broad based	0.0036***	0.003	0.0068***	0.0061	-0.0031***
Sector	0.0065***	0.005	0.0138***	0.0123	-0.0073***
International	0.0174***	0.0134	0.0359***	0.0304	-0.0185***

*This table presents the mean and median adverse selection costs (estimated using equation (2)) scaled by price for the set of ETFs and the corresponding set of matched stocks. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively. The last column tests for the difference in mean between ETFs and the set of matched stocks.*

Transaction costs are affected by prices, trading volume, and volatility. Our matching process attempted to control for these characteristics, but as shown in Table 2 ETFs and their matched equities still differ along these dimensions. We utilize a multivariate regression to test for differences in the levels of adverse selection costs of trading controlling for differences in, trading volume, and volatility. We estimate the following regression

$$\lambda/P = \alpha + \beta_0 \times P + \beta_1 \times \sigma + \beta_2 \times \ln(vol) + \beta_3 \times D_{cat} + \varepsilon \quad (3)$$

The dependent variable is the adverse selection cost component of the spread (λ) (scaled by share price). The independent variables are share price (P), Share volatility (σ), natural logarithm of the trading volume, and dummy variable (D_{cat}) that takes the value 0 for the base case category and the value 1 for the comparison category. Table 4 presents estimates of β_3 (the coefficient on D_{cat}) and their corresponding t-statistics. The table columns present the base cases while the rows represent the comparison group. The conclusions for Table 3 robust to controlling for stock price, trading volume and volatility. Sector ETFs adverse selection cost of trading, on average exceeds the adverse selection cost of trading in broad based ETF by 0.11¢. Interestingly, comparison of Broad-based and Sector ETFs to International ETFs show them to have similar differences in the adverse selection component of trading of approximately 1¢.

Table 4 also sheds more light on the relative levels of asymmetric information about international portfolios and domestic equities. After controlling for differences in stock price, trading volume and volatility, the average International ETF's lambda is 0.68¢ greater than the lambda of the common equities matched to Broad-based ETFs, is insignificantly different from the lambdas of equities matched to Sector ETFs, and is 1.76¢ less than the lambda of their own matched equities. These results indicate that there is more asymmetric information about systematic factors in foreign countries than there is about idiosyncratic factors for some domestic equities.

Table 4: Comparing the Adverse Selection Cost of Trading

	Broad Based	(1)	(2)	(3)	(4)
Sector ETF (1)	0.0011***				
	(4.21)				
International ETF (2)	0.0105***	0.0110***			
	(6.259)	(11.492)			
Broad Based (Matched Stocks) (3)	0.0028***	0.0023***	-0.0068***		
	(15.804)	(3.026)	(-3.572)		
Sector (Matched Stocks) (4)	0.0069***	0.0082***	0.0011	0.0033***	
	(7.365)	(9.862)	(0.753)	(3.705)	
International (Matched Stocks) (5)	0.0302***	0.0289***	0.0176***	0.0258***	0.0176***
	(7.697)	(9.721)	(7.511)	(6.83)	(7.445)

*The numbers presented in this table are the D_{CAT} coefficients β_3 from equation (3): $\lambda/P = \alpha+\beta_0\times P+\beta_1\times\sigma+\beta_2\times\ln(vol)+\beta_3\times D_{cat}+\varepsilon$. The table columns present the base cases while the rows represent the comparison group. Eg: Controlling for stock price, trading volume and volatility, sector ETFs adverse selection cost of trading, on average exceeds the adverse selection cost of trading in broad based ETF by \$0.0011 or 0.11 cents. The numbers in the parenthesis present the t-statistics. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively.*

Having established patterns in levels of lambdas consistent with diversification of idiosyncratic asymmetric information, we now look at the correlation structure of the lambda estimates. Table 5 presents results from estimating the following regression for non-SPDR Broad-based, Sector, and International ETFs.

$$\left(\lambda_{ETF}/P_{ETF}\right) = \alpha + \beta_0\left(\lambda_{SPY}/P_{SPY}\right) + \beta_1 \ln(vol_{ETF}) + \beta_2 \ln(P_{ETF}) + \varepsilon \quad (4)$$

We are interested in the coefficient estimates of β_0 and the R^2 of the regressions. The first column presents the results using the monthly average lambda of Broad-based ETFs in each month as the dependent variable. The estimate of β_0 is positive and significant. After controlling for price and volume differences between SPDRs and other Broad-based ETFs, the SPDR lambda explains variation in the adverse selection component of other market tracking ETFs. This is consistent with there being a common component in adverse selection risk. The adjusted R^2 is 0.69, indicating that SPDR lambdas capture a considerable amount of the variation on the adverse selection costs of trading Broad-based ETFs. In the second column we employ monthly average lambda of Sector ETFs in each month as the dependent variable. Here too we see a positive and significant relation between SPDR lambdas and Sector lambdas. The magnitude of the estimate of β_0 for Sector lambdas is 1.48 and is over four times as large as the estimate of β_0 for Broad-based ETFs. This suggests that the level of market-wide information asymmetry is related to the adverse selection costs of individual assets. The lower adjusted R^2 (0.39) is consistent with variation in Sector ETFs that is related to idiosyncratic sector information. In the third column monthly average lambda for International ETFs are used as the dependent variable. As predicted, SPDR lambdas are not related to the lambdas of International ETFs. Since SPDR lambdas reflect asymmetry about the U.S. market and the lambdas of International ETFs reflect asymmetry about non-U.S. markets, there should be no relation between the lambda estimates.

Table 5: Commonality in Adverse Selection Cost of Trading

	Broad Based	Sector	International
(Constant)	0.0123**	0.0098	0.0502***
	(2.168)	(1.429)	(3.735)
λ_{spy}/P_{spy}	0.3368***	1.4816***	1.3185
	(3.875)	(5.363)	(1.234)
ln (Vol)	0.0005	0.0002	-0.0014
	(1.605)	(0.33)	(-1.204)
ln (P)	-0.0037***	-0.0023**	-0.0070*
	(-4.522)	(-2.28)	(-1.701)
R^2	0.6903	0.3903	0.1113

This table estimates equation (4): $\left(\lambda_{ETF}/P_{ETF}\right) = \alpha + \beta_0\left(\lambda_{SPY}/P_{SPY}\right) + \beta_1 \ln\left(vol_{ETF}\right) + \beta_2 \ln\left(P_{ETF}\right) + \varepsilon$. Where The dependent variable is the *category average 'adverse selection cost component of the spread* λ_{ETF} *scaled by price* P_{ETF}. *The Independent variables are adverse selection cost of trading SPDR share* λ_{SPY}, *scaled by SPDR share price, the average trading volume* vol_{ETF} *and the natural logarithm of the average trading price* $\ln\left(P_{ETF}\right)$. *The numbers in the parenthesis present the t-statistics. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively.*

The levels and correlation structure of the lambda estimates are consistent with there being a commonality in the adverse selection component of liquidity. Our next tests try to relate the common component to measures of overall uncertainty about the market. We begin by extracting the principal component of the lambdas from the various ETFs. Principal component analysis uses the information in all of the estimated ETF lambdas to find an index that best explains the variance in the original ETF's lambdas. We use only the first principal component as it explains 88%, 75%, and 45% of the variability of the average lambdas of Broad-based, Sector, and International ETFs respectively.

We use the following variables as proxies for the level of market wide uncertainty. Bessembinder, Chan, and Seguin (1996) interpret the open interest in S&P 500 futures contracts on the CBOE as a measure of cross sectional divergence of opinion. Open interest is a measure of net demand for the market, and if there are not shocks to tastes and endowments variation in open interest reflects differences in opinion. We use the open interest at the beginning of the month over which lambdas are estimated. We also control for the lagged return on the market. We do this for two reasons. First, Shleifer and Summers (1990) suggest that uncertainty about market sentiment is related to higher required rates of return and higher risk premiums. Market wide price increases are consistent with lower discount rates and a reduction in sentiment risk. Second, high market returns can result form positive feedback trading. Such returns draw uninformed investors into the market, which lowers the average amount of adverse selection. We present the result form the following regression in Table 6.

$$CF_t = \beta_0 + \beta_1 CF_{t-1} + \beta_2 Ln(OI)_{t-1} + \beta_3 r_{S\&P500,t-1} + \varepsilon_t \qquad (5)$$

We control for the lagged common factor CF_{t-1} and are interested in the estimates of β_2, and β_3.

Table 6: Exploring the Common Factor Causality

	1	2	3	4	5
(Constant)	-50.66***	-0.01	-29.57***	-29.78***	-28.51***
	(-7.94)	(-0.10)	(-3.06)	(-3.28)	(-3.17)
CF			0.32*	0.40**	0.42***
			(2.08)	(2.65)	(3.21)
$Ln(OI)_{t-1}$	4.07***		2.30**	2.39***	2.29***
	(7.94)		(2.96)	(3.25)	(3.18)
$r_m - r_f$		-4.34*		-4.37**	
		(-1.68)		(-2.58)	
$r_{S\&P,500(t-1)}$					-4.90***
					(-3.07)
Adj. R^2	0.554	0.035	0.619	0.656	0.670

This table presents the results of estimating equation (5) $CF_t = \beta_0 + \beta_1 CF_{t-1} + \beta_2 Ln(OI)_{t-1} + \beta_3 r_{S\&P500,t-1} + \varepsilon_t$. CF (common factor) is the first *principal component extracted (by year) from the adverse selection cost components of various ETFs. It represents the crosssectional commonality in adverse selection among the sample ETFs. Ln(OI) is the natural logarithm of the numbrer of outstanding S&P open interest contracts.* (r_m-r_f) *is the excess return on the market, and* $r_{S\&P,500(t-1)}$ *is the lagged return on the S&P 500 index. The numbers in the parenthesis present the t-statistics. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively.*

We begin by examining the impact of uncertainty and prior returns individually. The results in Column 1 show that the level of market wide adverse selection is positively and significantly related to the lagged open interest in the S&P 500 futures contract. Since this measure is associated with higher levels of disagreement about the direction of the market, this result is consistent with asymmetric information about systematic factors. We also note that this measure of market-wide uncertainty explains 55% of the time series variation in the common component of market-wide adverse selection risk. Column 2 shows the relation between the principal component and lagged excess return on the market. The coefficient is negative as predicted and the relation is significant at the 10% level. Lagged returns explain less of the time series variation in the principal component. The adjusted R^2 is 3.5%.

In Column 3 we include the control for the lagged common factor along with the lagged open interest variable. There is evidence of positive autocorrelation in the common factor. The estimate of β_1 is 0.32 and is significant at the 5% level. Controlling for the lagged common factor reduces the magnitude of the impact of the lagged open interest variable, but it is still positively and significantly related to market-wide adverse selection. In Columns 4 and 5 we control for the lagged common factor and include the open interest variable and lagged market returns. We again see evidence of positive autocorrelation in the common factor. We also observe that the relation between market-wide uncertainty and adverse selection is positive and significant. Finally, controlling for the autocorrelation in the common factor and market-wide uncertainty strengthens the relation between prior market returns and the common component of adverse selection. The p-values decrease from 0.098 to 0.012 when we employ the excess return on the CRSP value-weighted index and to 0.00 when we use the return on the S&P 500. The results in Table 6 are support our hypothesis that the measured adverse selection component of the trading costs of ETFs is related to asymmetric information about systematic factors. The common factor of market wide adverse selection increases with aggregate market uncertainty and decreases as the proportion of uninformed traders in the market increases. We now present evidence on the relation between the common component of liquidity related to adverse selection and the estimated lambdas of individual equities. Here we employ the 7,119 common stocks listed on the NYSE and NASDAQ over our sample period. We estimate a lambda for each stock in each month using a full month's trading record. We then relate the firm specific lambdas to (i) the SPDR lambda and (ii) the first principal component estimated from the time series of all the stocks and ETFs trading in the market. This may be interpreted as a proxy for market-wide adverse selection. We use the following regression models for studying the above two relations respectively:

$$\left(\lambda_{Stock} / P_{Stock}\right) = \alpha + \beta_0 \left(\lambda_{SPY} / P_{SPY}\right) + \beta_1 \ln\left(vol_{Stock}\right) + \beta_2 \ln\left(P_{Stock}\right) + \varepsilon \tag{6}$$

$$\left(\lambda_{Stock} / P_{Stock}\right) = \alpha + \beta_0 CF + \beta_1 \ln\left(vol_{Stock}\right) + \beta_2 \ln\left(P_{Stock}\right) + \varepsilon \tag{7}$$

Table 7: Present Descriptive Statistics on Estimates of β_0 For Each Specification

Exchange		**Negative Beta**	**Positive Beta**	**Sum**
Table 7 (Panel A): Commonality in Adverse Selection Cost of Trading				
NYSE	Not Significant	395	375	770
	Significant	913	966	1,879
NASDAQ	Not Significant	522	727	1,249
	Significant	344	2,877	3,221
Total		2,174	4,945	7,119
Table 7 (Panel B): Commonality in adverse selection cost of trading				
NYSE	Not Significant	471	502	973
	Significant	495	1,181	1,676
NASDAQ	Not Significant	534	1,055	1,589
	Significant	173	2,708	2,881
Total		1,673	5,446	7,119

Panel A of this table presents the counts for β_0 from equation (6): $\left(\lambda_{Stock} / P_{Stock}\right) = \alpha + \beta_0 \left(\lambda_{SPY} / P_{SPY}\right) + \beta_1 \ln\left(vol_{Stock}\right) + \beta_2 \ln\left(P_{Stock}\right) + \varepsilon$ Panel B presents the corresponding results from estimatng (7): $\left(\lambda_{Stock} / P_{Stock}\right) = \alpha + \beta_0 CF + \beta_1 \ln\left(vol_{Stock}\right) + \beta_2 \ln\left(P_{Stock}\right) + \varepsilon$.

Panel A of Table 7 shows the results when the SPDR lambda is used to measure the common component of adverse selection risk. For NYSE firms there is an approximately half of the stocks have lambdas that are positively associated with the SPDR lambda and 72% of the positive estimates of β_0 are significant. Interestingly, a similar pattern emerges in NYSE stocks whose lambdas are negatively related to the SPDR lambda. Earlier we mentioned the possibility of a relation between the level of market-wide information asymmetry and the adverse selection component of the bid-ask spread on individual stocks. The negative relation between SPDR lambdas and firm specific lambdas also points to this possibility. The mean adjusted R^2 is 15.01% for NYSE firms. For the NASDAQ regressions the mean adjusted R^2 is 19.30%. The consistently high R^2 point to a commonality in the adverse selection component in liquidity.

Panel B of Table 7 presents summary statistics for estimates of β_0 when we use the common factor of ETF lambdas as our independent variable. We still observe some estimates of negative estimates. For NYSE firms the positive estimates of β_0 now make up 63% of the estimates (as opposed to 51% in Panel A) and only 50% of the negative estimates are significant (as opposed to 68% in Panel A). For NASDAQ stocks positive and significant estimates of β_0 make up 61% of the estimates. Only 3% of the estimates are negative and significant. The adjusted R^2 from these regressions are also high, consistent with commonality in the adverse selection component of liquidity.

CONCLUDING COMMENTS

This study provides an empirical investigation into the existence of market-wide (systematic) asymmetric cost of trading in the financial market. We examine three related hypothesis: (a) there exists asymmetric cost of trading even a highly diversified basket security; (b) this cost increases as the level of diversification of the basket security decreases; (c) the marketwide asymmetric cost of trading determines the asymmetric cost of trading individual stocks. Using intraday transaction level data on Standard and Poor's Depository Receipts (SPDRs), 145 other ETFs, and all common equities traded on the NYSE and NASDAQ, we provide evidence on commonality in the adverse selection component of liquidity. Our evidence is consistent with investors facing asymmetric information costs even when trading well diversified baskets of securities. The magnitude of these costs is inversely related to the degree of diversification. The SPDR is the most diversified of the ETFs we employ so we use its lambda as a measure of asymmetric information about market wide information.

We relate the lambdas on the other ETFs to the SPDR lambda and find that the SPDR lambda explains considerable time series variation in the lambdas of other ETFs. Further, we find that the SPDR lambda explains time series variation in the lambdas of individual equities. Finally, we present evidence that SPDR lambdas are reliably related to measures of aggregate market uncertainty. One limitation of this study is that due to its design which required the use of ETFs, the analysis is limited to five years only. Future research could extend the sample period by using closed end funds instead of ETFs as proxies for market-wide and sector level costs. Alternatively, principal component analysis could potentially be used to extract common factors from individual stock level data. These factors could potentially be used to proxy commonality in asymmetric information costs of trading.

REFERENCES

Aboody, David, John Hughes, and Jing Liu, 2005, Earnings quality, insider trading, and costs of capital, *Journal of Accounting Research* 43, 651-673.

Akay, O., Cyree K., Griffiths, M., Winters, D., 2012. What does PIN identify? Evidence from the T-bill market. *Journal of Financial Markets* 15, 29-46.

Bessembinder, H., K. Chan, & P. J. Seguin, (1996) "An empirical investigation of information, differences of opinion ,and trading activity", *Journal of Financial Economics*, 40, 105-134.

Brennan, M. & Cao, Henry, (1997) "International Portfolio Investment Flows", *Journal of Finance*, 52, 1851-80.

Chordia, T., R. Roll, & A. Subrahmanyam, (2000) "Commonality in liquidity", *Journal of Finance*, 56, 3-28.

Chordia, T., R. Roll, & A. Subrahmanyam, (2002) "Order imbalance, liquidity, and market returns", *Journal of Financial Economics*, 65, 111-130.

Duarte, J., and L. Young. 2009. Why Is PIN Priced? *Journal of Financial Economics* 91:119–38.

Easley D., S. Hvidkjaer, & M. O'Hara, (2002) "Is information risk a determinant of asset returns?", *Journal of Finance*, 57, 2185-2221.

Easley D., & M. O'Hara, (2004) "Information and the cost of capital", *Journal of Finance*, 59, 1553-1583.

Francis J, LaFond R, Olsson P, et al. (2005) The market pricing of accruals quality. *Journal of Accounting & Economics* 39: 295–327.

Garleanu, N. & Pedersen, L. (2004), 'Adverse selection and the required return', *Review of Financial Studies* 17(3), 643–665.

Glosten, L.R. & L. E. Harris (1988) “Estimating the components of the bid/ask spread”, *Journal of Financial Economics*, 21, 123-142.

Gorton, G. B., & G.G. Pennacchi, (1993) “Security baskets and index-linked securities”, *Journal of Business* 66, 1-27.

Huang, R.D. & H.R. Stoll, (1997) “The components of the bid-ask spread: A general approach”, *The Review of Financial Studies* 10, 995-1034.

Hughes, John, Jing Liu, and Jun Liu, 2007, Private information, diversification, and cost of capital, *The Accounting Review* 82, 705-729.

Lambert R, Leuz C and Verrecchia R (2007) Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research* 45: 385–420.

Lambert R, Leuz C and Verrecchia R (2012) Information asymmetry, information precision, and the cost of capital. *Review of Finance* 16: 1–29.

Lee, C., & M. Ready (1991) “Inferring trade direction from intraday data”, *The Journal of Finance* 46, 733-746.

Lin, J. C., G. C. Sanger, & G. G. Booth, (1995), “Trade size and components of the bid-ask spread”, *The Review of Financial Studies* 8, 1153-1183.

Neal, R., Wheatley S., (1998) “Adverse selection and bid-ask spreads: Evidence from closed-end funds”, *Journal of financial markets* 1, 121-149

Pontiff, J., 1997, Excess volatility and closed-end funds, *American Economic Review*, 87, 155-169.
Shleifer, A., & L. H. Summers (1990) “The noise trader approach to finance”, *The Journal of Economic Perspectives*, 4, 19-33.

Stoll, H, (1989) “Inferring the components of the bid/ask spread: theory and empirical tests”, *Journal of Finance*, 44, 115-34.

Subrahmanyam A., (1991) “A theory of trading in stock index futures”, *Review of Financial Studies*, 4, 17-51.

BIOGRAPHY

Rahul Ravi is an assistant professor at the John Molson School of Business, Concordia University in Montreal, Canada. He can be reached at rravi@jmsb.concordia.ca

REVIEWERS

The IBFR would like to thank the following members of the academic community and industry for their much appreciated contribution as reviewers.

Hisham Abdelbaki, University of Mansoura - Egypt
Isaac Oluwajoba Abereijo, Obafemi Awolowo University
Naser Abughazaleh, Gulf University For Science And Technology
Nsiah Acheampong, University of Phoenix
Vera Adamchik, University of Houston-Victoria
Iyabo Adeoye, National Horticultural Research Instittute, Ibadan, Nigeria.
Michael Adusei, Kwame Nkrumah University of Science And Technology
Mohd Ajlouni, Yarmouk University
Sylvester Akinbuli, University of Lagos
Anthony Akinlo, Obafemi Awolowo University
Yousuf Al-Busaidi, Sultan Qaboos University
Khaled Aljaaidi, Universiti Utara Malaysia
Hussein Al-tamimi, University of Sharjah
Paulo Alves, CMVM, ISCAL and Lusofona University
Ghazi Al-weshah, Albalqa Applied University
Glyn Atwal, Groupe Ecole Supérieure de Commerce de Rennes
Samar Baqer, Kuwait University College of Business Administration
Susan C. Baxter, Bethune-Cookman College
Nagib Bayoud, Tripoli University
Ahmet Bayraktar, Rutgers University
Kyle Brink, Western Michigan University
Giovanni Bronzetti, University of Calabria
Karel Bruna, University of Economics-Prague
Priyashni Chand, University of the South Pacific
Wan-Ju Chen, Diwan College of Management
Yahn-shir Chen, National Yunlin University of Science and Techology, Taiwan
Bea Chiang, The College of New Jersey
Te-kuang Chou, Southern Taiwan University
Shih Yung Chou, University of the Incarnate Word
Caryn Coatney, University of Southern Queensland
Iyanna College of Business Administration,
Michael Conyette, Okanagan College
Huang Department of Accounting, Economics & Finance,
Rajni Devi, The University of the South Pacific
Leonel Di Camillo, Universidad Austral
Steven Dunn, University of Wisconsin Oshkosh
Mahmoud Elgamal, Kuwait University
Ernesto Escobedo, Business Offices of Dr. Escobedo
Zaifeng Fan, University of Wisconsin whitewater
Perrine Ferauge University of Mons
Olga Ferraro, University of Calabria
William Francisco, Austin Peay State University
Peter Geczy, AIST
Lucia Gibilaro, University of Bergamo
Hongtao Guo, Salem State University
Danyelle Guyatt, University of Bath
Zulkifli Hasan, Islamic University College of Malaysia
Shahriar Hasan, Thompson Rivers University
Peng He, Investment Technology Group
Niall Hegarty, St. Johns University
Paulin Houanye, University of International Business and Education, School of Law
Daniel Hsiao, University of Minnesota Duluth
Xiaochu Hu, School of Public Policy, George Mason University
Jui-ying Hung, Chatoyang University of Technology
Fazeena Hussain, University of the South Pacific
Shilpa Iyanna, Abu Dhabi University
Sakshi Jain, University of Delhi
Raja Saquib Yusaf Janjua, CIIT
Yu Junye, Louisiana State University
Tejendra N. Kalia, Worcester State College
Gary Keller, Eastern Oregon University
Ann Galligan Kelley, Providence College
Ann Kelley, Providence college
Ifraz Khan, University of the South Pacific
Halil Kiymaz, Rollins College
Susan Kowalewski, DYouville College
Bamini Kpd Balakrishnan, Universiti Malaysia Sabah
Bohumil Král, University of Economics-Prague
Jan Kruger, Unisa School for Business Leadership
Christopher B. Kummer, Webster University-Vienna
Mei-mei Kuo, JinWen University of Science & Technology
Mary Layfield Ledbetter, Nova Southeastern University
John Ledgerwood, Embry-Riddle Aeronautical University
Yen-hsien Lee, Chung Yuan Christian University
Shulin Lin, Hsiuping University of Science and Technology
Yingchou Lin, Missouri Univ. of Science and Technology
Melissa Lotter, Tshwane University of Technology
Xin (Robert) Luo, Virginia State University
Andy Lynch, Southern New Hampshire University
Abeer Mahrous, Cairo university
Gladys Marquez-Navarro, Saint Louis University
Cheryl G. Max, IBM
Romilda Mazzotta, University of Calabria
Mary Beth Mccabe, National University
Avi Messica, Holon Institute of Technology
Scott Miller, Pepperdine University

REVIEWERS

The IBFR would like to thank the following members of the academic community and industry for their much appreciated contribution as reviewers.

Haydeé Aguilar, Universidad Autónoma De Aguascalientes

Bustamante Valenzuela Ana Cecilia, Universidad Autonoma De Baja California

María Antonieta Andrade Vallejo, Instituto Politécnico Nacional

Olga Lucía Anzola Morales, Universidad Externado De Colombia

Antonio Arbelo Alvarez, Universidad De La Laguna

Hector Luis Avila Baray, Instituto Tecnologico De Cd. Cuauhtemoc

Graciela Ayala Jiménez, Universidad Autónoma De Querétaro

Albanelis Campos Coa, Universidad De Oriente

Carlos Alberto Cano Plata, Universidad De Bogotá Jorge Tadeo Lozano

Alberto Cardenas, Instituto Tecnologico De Cd. Juarez

Edyamira Cardozo, Universidad Nacional Experimental De Guayana

Sheila Nora Katia Carrillo Incháustegui, Universidad Peruana Cayetano Heredia

Emma Casas Medina, Centro De Estudios Superiores Del Estado De Sonora

Benjamin Castillo Osorio, Universidad Pontificia Bolibvariana UPB-Seccional Montería

María Antonia Cervilla De Olivieri, Universidad Simón Bolívar

Cipriano Domigo Coronado García, Universidad Autónoma De Baja California

Semei Leopoldo Coronado Ramírez, Universidad De Guadalajara

Esther Eduviges Corral Quintero, Universidad Autónoma De Baja California

Dorie Cruz Ramirez, Universidad Autonoma Del Estado De Hidalgo /Esc. Superior De Cd. Sahagún

Tomás J. Cuevas-Contreras, Universidad Autónoma De Ciudad Juárez

Edna Isabel De La Garza Martinez, Universidad Autónoma De Coahuila

Hilario De Latorre Perez, Universidad Autonoma De Baja California

Javier De León Ledesma, Universidad De Las Palmas De Gran Canaria - Campus Universitario De Tafira

Hilario Díaz Guzmán, Universidad Popular Autónoma Del Estado De Puebla

Cesar Amador Díaz Pelayo, Universidad De Guadalajara, Centro Universitario Costa Sur

Avilés Elizabeth, Cicese

Ernesto Geovani Figueroa González, Universidad Juárez Del Estado De Durango

Ernesto Geovani Figueroa González, Universidad Juárez Del Estado De Durango

Carlos Fong Reynoso, Universidad De Guadalajara

Ana Karen Fraire, Universidad De Gualdalajara

Teresa García López, Instituto De Investigaciones Y Estudios Superiores De Las Ciencias Administrativas

Helbert Eli Gazca Santos, Instituto Tecnológico De Mérida

Denisse Gómez Bañuelos, Cesues

María Brenda González Herrera, Universidad Juárez Del Estado De Durango

Ana Ma. Guillén Jiménez, Universidad Autónoma De Baja California

Araceli Gutierrez, Universidad Autonoma De Aguascalientes

Andreina Hernandez, Universidad Central De Venezuela

Arturo Hernández, Universidad Tecnológica Centroamericana

Alejandro Hernández Trasobares, Universidad De Zaragoza

Alma Delia Inda, Universidad Autonoma Del Estado De Baja California

Carmen Leticia Jiménez González, Université De Montréal Montréal Qc Canadá.

Gaspar Alonso Jiménez Rentería, Instituto Tecnológico De Chihuahua

Lourdes Jordán Sales, Universidad De Las Palmas De Gran Canaria

Santiago León Ch., Universidad Marítima Del Caribe

Graciela López Méndez, Universidad De Guadalajara-Jalisco

Virginia Guadalupe López Torres, Universidad Autónoma De Baja California

Angel Machorro Rodríguez, Instituto Tecnológico De Orizaba

Cruz Elda Macias Teran, Universidad Autonoma De Baja California

Aracely Madrid, ITESM, Campus Chihuahua

Deneb Magaña Medina, Universidad Juárez Autónoma De Tabasco

Carlos Manosalvas, Universidad Estatal Amazónica

Gladys Yaneth Mariño Becerra, Universidad Pedagogica Y Tecnológica De Colombia

Omaira Cecilia Martínez Moreno, Universidad Autónoma De Baja California-México

Jesus Carlos Martinez Ruiz, Universidad Autonoma De Chihuahua

Alaitz Mendizabal, Universidad Del País Vasco

Alaitz Mendizabal Zubeldia, Universidad Del País Vasco/ Euskal Herriko Unibertsitatea

Fidel Antonio Mendoza Shaw, Universidad Estatal De Sonora

Juan Nicolás Montoya Monsalve, Universidad Nacional De Colombia-Manizales

Jennifer Mul Encalada, Universidad Autónoma De Yucatán

Gloria Muñoz Del Real, Universidad Autonoma De Baja California

Alberto Elías Muñoz Santiago, Fundación Universidad Del Norte

Bertha Guadalupe Ojeda García, Universidad Estatal De Sonora

Erika Olivas, Universidad Estatal De Sonora

Erick Orozco, Universidad Simon Bolivar

Rosa Martha Ortega Martínez, Universidad Juárez Del Estado De Durango

José Manuel Osorio Atondo, Centro De Estudios Superiores Del Estado De Sonora

Luz Stella Pemberthy Gallo, Universidad Del Cauca

Andres Pereyra Chan, Instituto Tecnologico De Merida

Andres Pereyra Chan, Instituto Tecnologico De Merida

Adrialy Perez, Universidad Estatal De Sonora

Hector Priego Huertas, Universidad De Colima

Juan Carlos Robledo Fernández, Universidad EAFIT-Medellin/Universidad Tecnologica De Bolivar-Cartagena

Natalia G. Romero Vivar, Universidad Estatal De Sonora

Humberto Rosso, Universidad Mayor De San Andres

José Gabriel Ruiz Andrade, Universidad Autónoma De Baja California-México

Antonio Salas, Universidad Autonoma De Chihuahua

Claudia Nora Salcido, Universidad Juarez Del Estado De Durango

Juan Manuel San Martín Reyna, Universidad Autónoma De Tamaulipas-México

Francisco Sanches Tomé, Instituto Politécnico da Guarda

Edelmira Sánchez, Universidad Autónoma de Ciudad Juárez

Deycy Janeth Sánchez Preciado, Universidad del Cauca

María Cristina Sánchez Romero, Instituto Tecnológico de Orizaba

María Dolores Sánchez-fernández, Universidade da Coruña

Luis Eduardo Sandoval Garrido, Universidad Militar de Nueva Granada

Pol Santandreu i Gràcia, Universitat de Barcelona, Santandreu Consultors

Victor Gustavo Sarasqueta, Universidad Argentina de la Empresa UADE

Jaime Andrés Sarmiento Espinel, Universidad Militar de Nueva Granada

Jesus Otoniel Sosa Rodriguez, Universidad De Colima

Edith Georgina Surdez Pérez, Universidad Juárez Autónoma De Tabasco

Jesús María Martín Terán Gastélum, Centro De Estudios Superiores Del Estado De Sonora

Jesus María Martín Terán Terán Gastélum, Centro De Estudios Superiores Del Estado De Sonora

Jesús María Martín Terán Gastélum, Centro De Estudios Superiores Del Estado De Sonora

Maria De La Paz Toldos Romero, Tecnologico De Monterrey, Campus Guadalajara

Abraham Vásquez Cruz, Universidad Veracruzana

Angel Wilhelm Vazquez, Universidad Autonoma Del Estado De Morelos

Lorena Vélez García, Universidad Autónoma De Baja California

Alejandro Villafañez Zamudio, Instituto Tecnologico de Matamoros

Hector Rosendo Villanueva Zamora, Universidad Mesoamericana

Oskar Villarreal Larrinaga, Universidad del País Vasco/Euskal Herriko Universitatea

Delimiro Alberto Visbal Cadavid, Universidad del Magdalena

Rosalva Diamantina Vásquez Mireles, Universidad Autónoma de Coahuila

Oscar Bernardo Reyes Real, Universidad de Colima

HOW TO PUBLISH

Submission Instructions

The Journal welcomes submissions for publication consideration. Complete directions for manuscript submission are available at the Journal website www.theIBFR.com/journal.htm. Papers may be submitted for initial review in any format. However, authors should take special care to address spelling and grammar issues prior to submission. Authors of accepted papers are required to precisely format their document according to the journal guidelines.

There is no charge for standard paper reviews. The normal review time for submissions is 90-120 days. However, authors desiring a quicker review may elect to pay an expedited review fee, which guarantees an inditial review within two weeks. Authors of accepted papers are required to pay a publication fee based on the manuscript length and number of authors. Please see our website for current publication and expedited review rates.

Authors submitting a manuscript for publication consideration must guarantee that the document contains the original work of the authors, has not been published elsewhere, and is not under publication consideration elsewhere. In addition, submission of a manuscript implies that the author is prepared to pay the publication fee should the manuscript be accepted.

Subscriptions

Individual and library subscriptions to the Journal are available. Please contact us by mail or by email to: admin@theibfr.com for updated information.

Contact Information

Mercedes Jalbert, Executive Editor
The IBFR
P.O. Box 4908
Hilo, HI 96720
editor@theIBFR.com

Website

www.theIBFR.org or www.theIBFR.com

PUBLICATION OPPORTUNITIES

Review of Business & Finance Studies

Review of Business & Finance Studies (ISSN: 2150-3338 print and 2156-8081 online) publishes high-quality studies in all areas of business, finance and related fields. Empirical, and theoretical papers as well as case studies are welcome. Cases can be based on real-world or hypothetical situations.

All papers submitted to the Journal are double-blind reviewed. The Journal is listed in Cabell's, Ulrich's Periodicals Directory The Journal is distributed in print, through EBSCO*Host,* ProQuest ABI/Inform and SSRN.

The journal accept rate is between 15 and 25 percent

Business Education and Acreditation (BEA)

Business Education & Accreditation publishes high-quality articles in all areas of business education, curriculum, educational methods, educational administration, advances in educational technology and accreditation. Theoretical, empirical and applied manuscripts are welcome for publication consideration.

All papers submitted to the Journal are double-blind reviewed. BEA is is listed in Cabell's and Ulrich's Periodicals Directory. The Journal is distributed in print, through EBSCO*Host,* ProQuest ABI/Inform and SSRN.

The journal acceptance rate is between 15 and 25 percent.

Accounting and Taxation (AT)

Accounting and Taxation (AT) publishes high-quality articles in all areas of accounting, auditing, taxation and related areas. Theoretical, empirical and applied manuscripts are welcome for publication consideration.

All papers submitted to the Journal are double-blind reviewed. AT is listed in Cabell's and Ulrich's Periodicals Directory. The Journal is distributed in print, through EBSCO*Host,* ProQuest ABI/Inform and SSRN.

The journal acceptance rate is between 5 and 15 percent.

Revista Global de Negocios

Revista Global de Negocis (RGN), a Spanish language Journal, publishes high-quality articles in all areas of business. Theoretical, empirical and applied manuscripts are welcome for publication consideration.

All papers submitted to the Journal are double-blind reviewed. RGN is distributed in print, through EBSCO*Host,* ProQuest ABI/Inform and SSRN.
RGN will be submitted to Ulrich's Periodicals Directory, colciencia, etc. The Journal is distributed in print, through EBSCO*Host,* ProQuest ABI/Inform and SSRN

The Journal acceptance rate is 20 percent.