

Lagged Economic Exposure of Stock Returns: Role of Firm Nature of Business Effect

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Abstract

This study examines the role of firm nature of business effect (financial vs. non-financial) in determining the lagged effect of economic factors on stock returns. Study applied generalized autoregressive conditional heteroskedasticity model GARCH (1, 1). The results of the study indicate that with the increase in lags from lag one to lag five, the significant impact of exchange rate on stock returns of financial firms becomes more and more negative while for the non-financial firms, it becomes more and more positive (from lag one to lag four). Results further indicated that the negative significant relation of risk free rate with stock returns of both financial and non-financial firms is maximized at one lag. However, the negative significant relation of inflation with stock returns of financial firms is maximized at lag two while in the case of non-financial firms, it is maximized at lag one. In this vein, it is also found that with the increase in lags from lag one to lag four, for both the financial and non-financial firms, the significant impact of inflation on stock returns shifts from negative to positive. Moreover, the statistically significant and positive influence of real activity on stock returns is maximized at one lag, while in the case of non-financial firms; it is maximized at two lags. Further, results also reported that the maximization of significant positive influence of money supply on stock returns exists at fifth lag for both financial and non-financial firms. In addition, the significant impact of money supply on stock returns becomes more and more positive with the increases in lags from lag one to lag five. Focusing on oil prices, the results further established that two lags is the most common lag for the statistically significant and positive impact of oil prices on stock returns; while, three lags is the most common lag for negative and significant impact of oil prices on stock returns. Finally, we reveal that macroeconomic indicators have lagged effect that varies with respect to firm nature of business, representing the role of nature of business effect.

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Introduction

Stock market being a very important part of financial system is a key player in stabilizing the financial sector to foster the economic growth of a country. Stock market reflects health of the economy to rest of the world (Singh, 2010). Signifying the role of economic indicators in detecting the business overall systematic risk and cash flow, the connectivity between the macroeconomic factors and capital market is instinctively intoxicating (Arnold and Vrugt, 2006; Chinzara, 2011).

Motivations for Firm Nature of Business Effect (Financial vs. Non-Financial)

The study of financial vs. non-financial firms is of significance for several reasons. Firstly, the academics and policymakers concurred that financial firms are different from non-financial firms in an economy due to administrative role for payment mechanism, influential role in transmission of monetary policy to the various economic settings in the country and sectoral allocation of credit (Saunders and Cornett, 2006). Financial firms are very likely to indicate response to various shocks which are different from the non-financial firms (Elyasiani *et al.*, 2007). Further, the spillover effect is most likely to exist among the financial firms than non-financial firms, which can significantly and quickly pass to the whole economy (Kaufman, 1994; Elyasiani *et al.*, 2007). Secondly, due to technological changes, deregulations and financial innovations², the inter-association between the financial firms and financial market has been put under immense changes (Allen and Santomero, 1997; Elyasiani *et al.*, 2007). More so, Mustafa *et al.* (2009) documented that financial firms are different from the non-financial firms due to many reasons. For instance, they both widely differ in term of their nature of business, board structure, fiduciary responsibilities along with accountability, functionality of the state & regulators and management (Mustafa *et al.*, 2009)³. In a related argument, Elyasiani and

² Specifically in Pakistan, these deregulations include: removal of caps on deposit and lending rates, elimination of credit ceiling, reducing the marginal requirements, subsidized and mandatory credit schemes and launching IT system for efficient flow of information are among others. However, technological changes include: e-banking, use of MIS for strategic developments and introduction of risk-management system (RMS) (ADB Report 2008; IMF Country Report, 2010). More so, with respect to Pakistani financial market (i.e. stock market), these changes include: implementing the code of corporate governance, establishing code of conduct for brokers, control through circuit breakers, electronic entry book system, no restriction on transfer of dividend and capital gain, no prior approval for issuance and transfer of shares to the foreigners, setting up a National Clearing Company to promote clearing and settlement activities (IMF Country Report, 2010; Iqbal, 2012).

³ State Bank of Pakistan (SBP) set the Prudential Regulations XXIX for responsibilities of board of directors (BOD). In the light of these regulations, (i) a person directly or indirectly associated with the stock market cannot become the member of BOD, (ii) public disclosures are mandatory for the financial firms, and (iii) appointment of Compliance Officer at the financial firm, who is required to comply with the regulations and instruction issued by SBP from time to time. More so, SBP also liberalized the branch opening and closing for the banks (SBP, 2012).

Mansur (1998) stated that the presence of contagion effect for financial firms leaves the investors much more sensitive to changes in their volatility than the non-financial firms.

Moreover, it is also quite sensible to report that both the financial and non-financial sectors run together and act as a pillar for each other's supports in an economy (IMF Country Report, 2010). Therefore, any shock to one sector can flow the other. In Pakistan, both of these sectors (directly or indirectly) have been put under some stress due to security threats, energy shortage, rising energy prices, corporate governance issues (complex ownership and group structure), lack of compliance with and violations of corporate governance practices, inequitable issue of credit to the sectors, cheap loans to targeted priority sectors, loose credit controls, infected lending portfolio and inefficient governmental policies (IMF Country Report, 2010; 2012; Hameed *et al.*, 2013). In this manner, Khan *et al.* (2014) argued that presented studies ignored the firms nature of business effect particularly in emerging markets, therefore future studies must give due importance to the firm nature of business effect while investigating the behaviours of various dynamics of stock returns. The comparison of financial and non-financial firm with respect to these dimensions is of great significance for both the investors and policy makers. Since, the financial stocks are expected to be more volatile than the non-financial (Elyasiani and Mansur, 1998) hence it falls as critical comparison for portfolio diversification.

Therefore, it follows that the stock returns of financial firms can behave differently than the non-financial firms. Thus, there is every reason to conjecture that there is firm's nature of business effects in terms of lagged effect of economic factors on stock returns. Since the existing studies have ignored this potential research gap particularly in emerging markets like Pakistan, therefore this is the first such comprehensive attempt aiming to close this gap.

Motivation for Lagged Effect

There are several reasons for lagged effect of economic factors on stock returns. At first, the studies of Jones and Kual (1996) argued that statistically significant lagged effect of oil prices on stock returns declares that either stock markets are inefficient or the shock in economic factors (e.g. oil prices) brings variations in expected stock returns. Therefore, the spotlight of this phenomena spells that lagged effect of economic factors might occur either due to stock market inefficiency or through changes in expected returns.

Secondly, the proposed under-reaction hypothesis owns the lagged effect of economic factors on stock returns. In an interconnected research, one branch agrees with the fact that in short horizon investors in the stock market underreact; whereas, over the long horizon they overreact to the information (e.g. see the research models introduced by Barberis *et al.*, 1998; Daniel *et al.*, 1998; Hong and Stein, 1999; Poteshman, 2001). This hypothesis dictates that investor do not respond strong enough to the new information. Therefore, since the strong reaction by the investors takes time; consequently, information displays their effect after sometime. Further, in a closely related argument, Daniel *et al.* (1998) stated that the stock prices underreact to the publically available information signals; while, they overreact to the privately held information. The

information regarding macroeconomic factors is available on real time basis and at no cost, declaring it public information. Therefore, the under-reaction to the news regarding macroeconomic factors is very likely to take place in the stock market.

Further, Edward (1968) proposed conservatism hypothesis, another potential explanation of under-reaction. In the light of this hypothesis, the investors always hold a conservative approach to the publically announcements in such a way that investors gradually change their beliefs based on announcements. Moreover, on the part of the investors, there is always a propensity to treat the large portion of the announcement as temporary. Consequently, this leads them to at least partially ignore or disregard the information enclosed in the announcements.

Thus, all the afore-mentioned arguments from the financial literature dictate the significance of lagged effect of economic factors on stock returns. Therefore, this research for the first time particularly in emerging markets, empirically explores the lagged effect of economic factors on stock returns at the firm level. Taken together, based upon negligence of existing scholar and recommendation of Khan *et al.* (2014), it can be of vital importance to further explore that how does the lagged effect of economic factors on stock returns vary with respect to firm trading nature.

Data and Description

Financial firms and non-financial firms are segregated on the basis of their difference in nature of business. There are 160 non-financial firms against 48 financial firms which belong to banking, insurance and financial services sectors in this study. Hence, monthly stock returns for these firms from 1998 to 2018, are obtained from Pakistan Stock Exchange website and Business Recorder. Monthly data is applied as it enables to confine long term movements and prevent the impact of delays in clearing and settlements which influences stocks over shorter interval and prevents issue of spurious correlation (Patra & Poshekale, 2006; Beirne *et al.*, 2009).

The fact that most of data series reflect serial correlation together with rejection of normality motivates and suggests that application of GARCH type models can considerably improve explanation of the return series (Elyaisani *et al.* 2011; Mandimika & Chinzara, 2012). More so, both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests declare that all data series are stationary.

Methodology

The measurement of lagged effect of each of the economic factors on stock returns with respect to firm trading nature is determined by applying the following GARCH (1, 1) model:

$$R_{it} = \beta_0 + \beta_1 EV_t + \beta_2 EV_{t-1} + \beta_3 EV_{t-2} + \beta_4 EV_{t-3} + \beta_5 EV_{t-4} + \beta_6 EV_{t-5} + e_{it} \quad (1)$$

Where R_{it} indicates the stock return of firm i at month t . Further, EV displays the respective economic factor whose lagged effect is to be tested on stock returns. However, $t-1$ to $t-5$ represents the lag one to lag five for the respective economic factor. Same equation is repeatedly used for each economic variable separately in order to determine

its lagged effect on stock returns of each firm. Those economic factors include: Exchange Rate (EXR), Risk Free Rate (RFR), Consumer Price Index (CPI), Industrial Production Index (IPI), Money Supply (M2) and Oil Prices (OIL).

Empirical Findings and Discussion

Table 1 shows the lagged effect of economic variable on stock returns of financial vs. non-financial firms. For exchange rate, following three evidences are revealed. Firstly, in the case of both financial as well as non-financial firms, the statistically significant and positive lagged effect of exchange rate is maximized at four lags- for about 13 percent and 18 percent of the financial and non-financial firms respectively. But, for significant negative effect of exchange rate on stock returns, lag five in the case of financial firms and lag two for non-financial firm's stands as maximized lags. For example, 25 percent of the financial firms at lag five and 16 percent of the non-financial firms at lag two are significant negative variant against exchange rate changes. It declares that for significant positive effect of exchange rate on stock returns, four lags is the most common lag for both the cases, while for significant negative effect of exchange rate on stock returns, five lags in the case of financial firms and two lags in the case of non-financial firms are the most common lags. The second feature indicates that lagged effect of exchange rate does not exist regardless of firm nature of business. Such that financial firms do not hold any statistically significant and positive effect of exchange rate on stock returns at lag five. The third and final evidence commands that with the increase in lags from lag one to lag five, the significant impact of exchange rate on stock returns of financial firms becomes more and more negative while for the non-financial firms, it becomes more and more positive (from lag one to lag four). Such as, for financial firms, the significant negative relation of exchange rate with stock returns increases from around 4 percent of the firms at lag one to 25 percent of the firms at lag five, whereas, for non-financial firms, the significant positive impact of exchange rate increases from around 4 percent at lag one to about 18 percent of the firms at lag four.

Next, results have indicated some prolific directions for risk free rate. Firstly, it is evident that statistically significant positive lagged effect of risk free rate on stock returns is maximized at two lags for both financial as well as non-financial firms; however, the negative significant effect is maximized at lag one for both the cases. Such as, around 25 percent of the financial against 8 percent of the non-financial firms are positive and significant variant against risk free rate at lag two, while about 13 percent of the financial firms and 22 percent of the non-financial firms are significant negative variant against changes in risk free rate at lag one. Secondly, at lag one and three, there isn't any significant positive and negative effect of risk free rate on stock returns of the financial firms, respectively. It follows that risk free rate do not show lagged effect on firm stock returns regardless of their nature of business.

Further, for inflation results indicate following directions. Firstly, it is evident that statistically significant positive lagged effect of consumer price index on stock returns in maximized at four lags for both financial and non-financial firms. Such as, around 17 percent of the financial against 25 percent of the non-financial firms are positive and significant variant against consumer price index at lag four. However, the negative significant relation of inflation with stock returns of financial firms is highest at lag two

while in the case of non-financial firms, it is highest at lag one. For example, about 21 percent of the financial firms and 16 percent of the non-financial firms are significant and negative responsive to changes in consumer price index at lag two and lag one respectively. Secondly, at lag two, there isn't any significant positive effect of consumer price index on stock returns of the financial firms. Thus signifying that inflation do not hold lagged effect on firm returns regardless of their nature of business. Thirdly, results disclose that with the increase in lags from one to four, for both the financial and non-financial firms, the significant impact of inflation on stock returns shows a drifting trend from negative to positive. So much so that from lag one to four; for financial firms, the significant negative effect of inflation decreases from about 21 percent to almost 10 percent, but significant positive effect increases from about 4 percent to almost 17 percent, however, for non-financial firms, the significant negative effect of inflation decreases from about 16 percent to 6 percent but significant positive effect increases from 5 percent to almost 25 percent.

Moreover, with respect to industrial production index, two major findings are reported. Firstly, results exposed that in terms of significant positive effect, one-period lagged in the case of financial firms and two-period lagged for non-financial firms exists as the maximized lags, whereas in terms significant negative effect, it exists at five-period lagged for both the cases. For example, about 23 percent of the financial firms at lag one and 14 percent of the non-financial firms at lag two displayed significant positive response to industrial production index. On the other hand, at five-period lagged, about 15 percent of the financial firms against almost 16 percent of the non-financial firms are significant negative variant against the industrial production index. It declares that for significant negative effect, five lags is the most common lag for both the cases while for significant positive effect, one lag in the case of financial firms and two lags in the case of non-financial firms are the most common lags. The second interest of the results uncovers that for all the firms even at lag five, both the statistically significant positive and negative impact of real activity on stock returns persists. It follows that real activity leaves statistically significant effect on firm stock returns across all the lags, regardless of their nature of business.

Further, the results untie four findings for money supply. The first attribute shows that money supply has lagged effect on stock returns irrespective of firm nature of business (financial or non-financial nature). Secondly, by and large, the lagged effect of money supply is positive which is maximized in both the cases at lag five. In the case, the stock returns of around 42 percent of the financial firms in contrast to about 34 percent of the non-financial firms at lag five have shown significant positive relation with money supply. The third feature of the results uncovers that for both financial and non-financial firms, even at lag five, both the statistically significant positive and negative impact of money supply persists. Regardless of the sign, it ranges from about 2 percent to 43 percent of the financial firms and from 2 percent to 34 percent of the non-financial firms. It follows that money supply effects the firm stock returns across all the lags, regardless of their nature of business. Fourth, results declare that in both the cases, the significant impact of money supply on stock returns becomes more and more positive with the increase in lags from lag one to lag five. For financial firms, it rises from about 13 percent at lag one to around 43 percent at lag five, while for non-financial firms, it rises from about 16 percent at lag one to 34 percent at lag five.

In similar vein, two striking evidences are witnessed for oil prices. Firstly, in the case of both financial and non-financial firms, the statistically significant and positive effect of oil prices on stock returns is maximized at two lags. For example, almost 38 percent of the financial firms and 24 percent of the non-financial firms displayed significant positive response to oil prices at lag two. However, the statistically significant and negative effect of oil prices on stock returns is maximized at lag three. For example, at lag three, about 14 percent of the financial firms and non-financial firms each are significant and negative variant against oil prices changes. It declares that in the case of both financial and non-financial firms, for significant positive effect of oil prices on stock returns, two lags is the most common lag, while for significant negative effect, three lags is the most common lags. The second feature indicates that for financial firms zero cases are reported holding any statistically significant positive effect of oil prices on their stock returns at lag three. Hence, employing that oil prices do not affect the firm stock returns across all the lags, regardless of their nature of business.

The above empirical findings regarding lagged effect of economic factors on stock returns witness that Pakistani stock market is inefficient and there is firm nature of business effect. Second, these results empirically confirm the theoretical basis set by the under-reaction hypothesis (see Barberis *et al.*, 1998; Daniel *et al.*, 1998; Hong and Stein, 1999; Poteshman, 2001) establishing that there could be lagged effect of economic factors on stock returns and is central in predicting the return generation process.

Table 1. Results of GARCH (1, 1) Model –Nature of Business Effect

Lags	Firm Nature of Business		
	Lagged Effect of Exchange Rate		
		Financial Firms	Non-Financial Firms
Lag 1	Sig(+)	3(6.25)	7(4.38)
	Sig(-)	2(4.16)	16(10.00)
Lag 2	Sig(+)	2(4.17)	12(7.50)
	Sig(-)	5(10.42)	25(15.63)
Lag 3	Sig(+)	5(10.42)	22(13.75)
	Sig(-)	11(22.92)	15(9.38)
Lag 4	Sig(+)	6(12.50)	29(18.13)
	Sig(-)	3(6.25)	12(7.50)
Lag 5	Sig(+)	0(0.00)	17(10.63)
	Sig(-)	12(25.00)	19(11.88)
Lags	Lagged Effect of Risk Free Rate		
		Financial Firms	Non-Financial Firms
Lag 1	Sig(+)	0(0.00)	3(1.88)
	Sig(-)	6(12.50)	35(21.87)
Lag 2	Sig(+)	12(25.00)	12(7.50)
	Sig(-)	1(2.08)	14(8.75)
Lag 3	Sig(+)	7(14.58)	6(3.75)
	Sig(-)	0(0.00)	22(13.75)
Lag 4	Sig(+)	5(10.42)	8(5.00)
	Sig(-)	3(6.25)	12(7.50)

Lags	Firm Nature of Business		
	Lagged Effect of Exchange Rate		
		Financial Firms	Non-Financial Firms
Lag 5	Sig(+)	3(6.25)	9(5.63)
	Sig(-)	3(6.25)	10(6.25)
Lags	Lagged Effect of Consumer Price Index		
		Financial Firms	Non-Financial Firms
	Lag 1	Sig(+)	2(4.16)
	Sig(-)	10(20.83)	26(16.25)
Lag 2	Sig(+)	0(0.00)	33(20.63)
	Sig(-)	11(22.92)	17(10.63)
Lag 3	Sig(+)	1(2.08)	16(10.00)
	Sig(-)	10(20.83)	11(6.88)
Lag 4	Sig(+)	8(16.67)	40(25.00)
	Sig(-)	5(10.42)	10(6.25)
Lag 5	Sig(+)	1(2.08)	9(5.63)
	Sig(-)	4(8.34)	16(10.00)
Lags	Lagged Effect of Industrial Production Index		
		Financial Firms	Non-Financial Firms
	Lag 1	Sig(+)	11(22.92)
	Sig(-)	4(8.34)	9(5.63)
Lag 2	Sig(+)	8(16.67)	22(13.75)
	Sig(-)	1(2.08)	7(4.38)
Lag 3	Sig(+)	1(2.08)	11(6.88)
	Sig(-)	3(6.25)	7(4.38)
Lag 4	Sig(+)	6(12.50)	10(6.25)
	Sig(-)	2(4.16)	18(11.25)
Lag 5	Sig(+)	1(2.08)	13(8.12)
	Sig(-)	7(14.58)	26(16.25)
Lags	Lagged Effect of Money Supply		
		Financial Firms	Non-Financial Firms
	Lag 1	Sig(+)	6(12.50)
	Sig(-)	2(4.16)	5(3.13)
Lag 2	Sig(+)	16(33.34)	48(30.00)
	Sig(-)	1(2.08)	10(6.25)
Lag 3	Sig(+)	11(22.92)	36(22.50)
	Sig(-)	1(2.08)	8(5.00)
Lag 4	Sig(+)	11(22.92)	33(20.62)
	Sig(-)	1(2.08)	6(3.75)
Lag 5	Sig(+)	20(41.67)	55(34.38)
	Sig(-)	1(2.08)	3(1.88)
Lags	Lagged Effect of Oil Prices		
		Financial Firms	Non-Financial Firms
	Lag 1	Sig(+)	5(10.43)
	Sig(-)	1(2.08)	12(7.50)
Lag 2	Sig(+)	18(37.50)	38(23.75)

Lags	Firm Nature of Business		
	Lagged Effect of Exchange Rate		
		Financial Firms	Non-Financial Firms
	Sig(-)	1(2.08)	10(6.25)
Lag 3	Sig(+)	0(0.00)	13(8.13)
	Sig(-)	7(14.58)	23(14.38)
Lag 4	Sig(+)	8(16.67)	27(16.88)
	Sig(-)	2(4.16)	18(11.25)
Lag 5	Sig(+)	3(6.25)	14(8.75)
	Sig(-)	4(8.34)	17(10.63)

By mean of applying GARCH (1, 1) model, it shows lagged effect of each of the macroeconomic variable on firm stock returns w.r.t firm nature of business up to five lags by displaying number of firms in each nature and their level of statistically significant positive and negative trends at each lag. Further, results are also converted into percentage for each category at each lag and reported in parenthesis.

Conclusions and Recommendations

It is found that four lags is the most common lag for significant positive impact of exchange rate on stock returns in both the cases; whereas, five lags for financial firms and two lags for non-financial firms is the most common lag indicating significant but negative impact of exchange rate on stock returns. Further, it is also concluded that with the increase in lags from lag one to lag five, the significant impact of exchange rate on stock returns of financial firms becomes more and more negative while for the non-financial firms, it becomes more and more positive (from lag one to lag four). Next, for risk free rate, results have indicated that the negative significant relation of risk free rate with stock returns of both financial and non-financial firms is maximized at one lag. Further, findings have furnished some fruitful directions by concluding that statistically significant positive lagged effect of inflation on stock returns in maximized at four lags for both financial and non-financial firms. However, the negative significant relation of inflation with stock returns of financial firms is maximized at lag two while in the case of non-financial firms, it is maximized at lag one. In this vein, it is also concluded that with the increase in lags from lag one to lag four, for both the financial and non-financial firms, the significant impact of inflation on stock returns shifts from negative to positive. Moreover, the statistically significant and positive influence of real activity on stock returns is maximized at one lag, while in the case of non-financial firms; it is maximized at two lags.

Further, it is also concluded that the maximization of significant positive influence of money supply on stock returns exists at fifth lag for both the cases. Hence, in both the cases, the significant impact of money supply on stock returns becomes more and more positive with the increases in lags from lag one to lag five. Focusing on oil prices, the results further established that two lags is the most common lag for the statistically significant and positive impact of oil prices on stock returns; while, three lags is the most common lag for negative and significant impact of oil prices on stock returns.

Therefore, the authorities must take curative measures to stabilize the local currency against the foreign; consequently motivating the investors through confidence building, helping them to take some effective decisions by relaying on precise and perfect forecasting of financial contention. State Bank of Pakistan should build a very careful

monitoring system with the intentions of getting maximum benefit of such monetary instrument. Further, the policy makers should closely address the firm's features while establishing a policy to control the oil price rise in the economy for boosting the business activities.

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