INTERDEPENDENCE OF

US INDUSTRY SECTORS

USING VECTOR AUTOREGRESSION

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ABSTRACT

In this study, we explore the interdependence among different US industries by examining their correlations of the stock portfolios. Furthermore, we focus on the dynamics of their interdependent relations during peaceful and volatile periods; as such relations may change due to different sensitivities of each industry to the macroeconomic conditions. More specifically, we apply Vector Autoregression (VAR) methodology on the US industry portfolios and we use variance decomposition and generalized impulse response functions to identify the strength of the impact of each industry on the others.

Based on different portfolio returns of the US industries during 1962 to 2008, we find if the pattern of the dynamic relations of the industries change in different periods. We also deduce the most influential and sensitive sectors in the US domestic market. In addition, we find the direction, strength and durability of the shocks using generalized impulse response function (GIRF).

1. INTRODUCTION

Empirical evidence and preliminary studies suggest that sectors within a domestic market are inter-related to various extents. Depending on the degree of interdependence, new information or shocks originating in a sector are transferred with different speeds and magnitudes to other sectors. In this study, we examine such existence and strength of interdependencies of major sectors in the US domestic market. To achieve this goal, we apply the methodologies of Vector Autoregression (VAR), Generalized Impulse Response Function (GIRF) and Variance Decomposition (VD). These generalized techniques have an advantage over other commonly used decomposition procedures because they are invariant to the ordering of the variables considered in the investigation and hence they produce more reliable results. For our study we use daily and weekly returns of US industry portfolio consisting of seven sectors[1] and the US market portfolio. Apart from the US market returns, we also control for other exogenous variables. We also analyze the dynamic changes in the relationships of the industry divisions during peaceful and volatile time periods.

Determination of interdependence of sectors is important for fully understanding and predicting the behavior of a domestic market. First, the degree of interdependence provides a measure of sensitivity of the sectors relative to shocks originating in other sectors of the market. Secondly, the transmission mechanism of shocks from sector to sector plays an important role in shaping the dynamics of the market. Therefore, understanding the transmission mechanism is crucial to understand and predict the overall market behavior. Third, this study is also relevant

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[1] These sectors (divisions) are based on the industry groups from 1-digit level Standard Industrial Classification (SIC) codes and ranges from July 1962 to December 2008.

for comprehending how such relationships may manifest differently during peaceful or volatile period of times.

Let us consider a sector on which some sectors are more dependent as compared to others. The relatively sensitive sectors with respect to this particular sector are more vulnerable to shocks originating in this sector. The direction and propagation of shocks in the market depend on the level of sensitivity of the sectors relative to this particular sector. In order to understand the transmission mechanism within a domestic market, the knowledge about the speed of propagation of new information or shocks, the direction and magnitude of propagation of the shocks and the duration of responses on vulnerable sectors is important.

Investigation into dynamic linkages of the sectors within a market is crucial to everyone involved in the markets – market analysts, small and big investors, financial policy makers, etc. In formulation of policies, policy makers can account for the interdependencies in order to shelter some sectors from harm originating in others. Investors benefit from knowledge of the sensitivity of sectors due to interdependence. Industries that buy raw materials from and sell to different sectors are also interested in the relationships between sectors.

The 2008 US financial crisis is a catastrophic example as to how the crisis in one of the market sectors (the housing market in this case) rapidly evolved to a nationwide financial crisis and later on engulfed many countries around the world. The decline of the US housing market triggered financial crisis and the disruption of the US financial market. Amidst fears of investors and financial analysts, the instability of the finance sector spread to other sectors leading a downturn in the entire US economy and the crisis spread fast to other economies around the world. Events like the US financial crisis have raised the question – to what extent the

propagation of shocks within the sectors can be attributed to industrial interdependence of the sectors.

The phenomenon of interdependence has received abundant research attention. However, while the majority of extant research focuses on the correlations and interdependence of some of the major equity markets around the world, not much research has been applied to assess the interdependence of a comprehensive set of industry divisions within a country. In this study, we try to fill in this void. More specifically, we focus on the interdependence among seven US industries and we explore the dynamic changes of such relationships during peaceful and volatile periods.

Research work done at the industrial level of the equity market includes Chambers (1984), Guerrieri and Meliciani (2005). Chambers studied the agricultural and financial market interdependence in the short run. On the other hand, Guerrieri and Melilciani investigated the interdependence between manufacturing and producer services. However, it may be difficult to interpret their findings because they do not isolate the indirect channel of propagation through other sectors. In this study, we use VAR methodology based on all major sectors of the US market we apply variance decomposition to isolate such effects. As such, our results better capture the exogenous interrelationships between sectors and we believe that such exogenous effects truly proxy for the underlying nature of the interrelationship among the sectors.

We investigate the interdependence between the major US industry divisions (sectors) using vector autoregression, variance decomposition and generalized impulse response function, introduced by Pesaran and Shin (1998). The above techniques employed help to determine the degree of interdependence and speed of spillover of shocks between market divisions. The

generalized techniques have the advantage over the commonly used decomposition procedures that they are insensitive to the ordering of the divisions considered and hence, they produce more reliable results. We examine the direction, durability, stability and strength of the effect of shocks in one of the divisions on the other divisions.

To identify any change in the pattern of interdependence during volatile and peaceful periods, we conducted a similar VAR analysis for both the periods in addition to the whole sample period. We ranked the years from 1962 to 2008 in descending order according to the market volatility and we denote the top 30% as volatile period and bottom 30% as the peaceful period.

Figure 1 gives us an overview of the steps of this study. Step one is data collection, where we extracted the US industry division daily returns , the US stock market returns, the US inflation rate, US Gross Domestic Product, US interest rate and US unemployment rate. The second step of this study is data management; as the frequency of all the series was different, we converted them to daily and weekly frequencies using a C++ program. Third, we applied the VAR model, variance decomposition and impulse response function. At the last step, we draw inferences from the results.

Figure 1 : Steps of determining interdependence of US industry sectors using VAR.

Data Collection

Data Management (Frequency conversion, Subperiod seletction, etc)

VAR Estimation (IRF, VD, etc)

Result and Conclusion
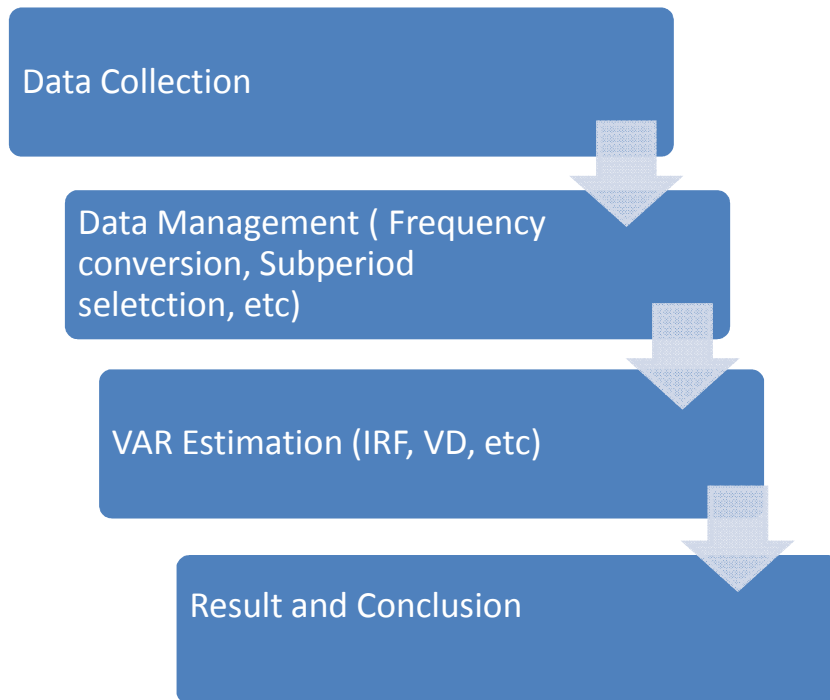
In this study we find that the correlations of the portfolio returns are generally high. The VAR of the daily returns portfolio shows that the first own lags of the sectors are generally significant. However, this isn't true for the weekly returns portfolios for full period and or for sub-periods. The pattern of impulse response graphs for all the sectors are similar for the daily returns portfolio. However in the weekly returns portfolio, the pattern of responses is different for different sectors. Also, the strength of the responses of the sectors in weekly portfolio is greater than the responses of daily portfolio. Another result we observe is that the same sectors highly impacts both daily and weekly portfolio for full period.

To obtain additional insight to the interdependence of sectors, we divide the entire weekly portfolio sample into peaceful and volatile sub-periods. We find that the correlations

between the sector returns during volatile period are less than the correlations between the returns for the entire period. An important difference between full time period and sub-period GIRF results is the strength of the responses to shocks. During sub-periods, the impulse responses are even higher than those of the full period. The responses of Manufacturing, Transportation and Retail Trade are consistent during full period and sub-periods. In contrast, the responses of the Service sector differ in all the data sets. The moderate responses of Services in daily portfolio change to highly turbulent responses in weekly portfolio. The magnitude is even larger during the volatile sub-period for Services. The responses of all other sectors to shocks in other sectors are different in different data sets.

The remainder of this report is organized as follows. Section 2 discusses about the concept of interdependence and previous work done in this regard. Section 3 describes the empirical methods. Section 4 presents a description of the data. We describe the preliminary statistics of the data, demonstrates the existence of dynamic interdependences among the eight divisions of the US industry in the full time period and in the sub periods. We conclude about the study, its contribution and results in section 5.

2. LITERATURE REVIEW

The phenomenon of interdependence across international financial markets has been the subject of extensive empirical investigation. Early empirical work includes Grubel (1968), Agmon (1972), Grubel and Fadner (1971), Lessard (1973, 1974, 1976), and so on. Granger and Morgenstern (1970) noted that in case of financial crisis, those linkages between markets that did exist were likely to be much stronger. Hilliard (1979) confirmed this in his study of markets during the 1973-1974 OPEC crisis. Hilliard found quite strong linkages between markets during this period. Other examples of study of interdependences include: Errunza and Losq (1985) assessed the degree of interdependence for returns among international stock markets and found that the first moments of equity returns among the stock markets exhibit high degree of interaction. Another direction of investigation has been focused on the interdependence of the second moments, i.e., volatility transmissions, among international markets. Recent papers (e.g., Hamao, Masulis, Ng, (1990); Theodossion and Lee, 1993; Koutmos and Booth, 1995; Liu and Pan, 1997; In, Kim, Yoon and Viney (2001); Jang and Sul (2002); Leong and Felmminglam (2003); Darrat and Benkato (2003); Cifarelli and Paladino (2004); Hoti (2005) have explored volatility transmissions in addition to interdependence and spillover effects of international markets. Liu and Pan suggest that the U.S. market is more influential than Japanese market in transmitting returns and volatilities to the other Asian markets. Jang and Sul (2002) studied at how the co-movement of Asian stock markets changed in the past, during and after the Asian Financial Crisis, and concluded that the co-movement among the Asian markets increased during the financial crisis period.

At the industrial level, there have been studies to explore whether differences in co-movement of equity returns can be attributed to differences in industrial structure. Heston and

Rouwenhorst (1994) examined the influence of industrial structure on the cross-sectional volatility and correlation structure of country index returns for 12 European countries between 1978 and 1992. They find that industrial structure explains very little of the cross-sectional difference in country return volatility, and that the low correlation between country indices is almost completely due to country-specific sources of return variation. Roll (1992) investigated the same issue. Griffin and Karolyi (1998) re-examined the extent to which gains from international diversification are due to differences in industrial structure across countries. They find that the variation in country index returns cannot be attributed to the industrial structure and that the differences in the proportion of variation in industry index returns that are captured by country and industry factors.

To the best of our knowledge, none of these research studies above focus on the interdependence at the industrial level of within all divisions of the US market. The goal of this project is to examine the inter-relation of the sectors of the US equity market.

The interdependence is generally examined using techniques such as correlation, VAR, IRF and VD. Panton, Lessig, and Joy (1976) and Hilliard (1979) are examples of studies using simple correlation. Eun and Shim (1989) use VAR to study the transmission of shocks across nine major stock markets. They find spillover effects to be substantial, multilateral and dominated by the United States[2]. Based on VAR analysis, Elyasiani, Perera and Puri (1998) find little evidence of linkages among the small Sri Lankan equity market and the United States and Asian markets considered in their study. Horvath, Kandil and Sharma (1998) adopted a structural

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[2] The markets examined are Australia, Canada, France, Germany, Hong Kong, Japan, Switzerland, the United Kingdom and the United States.

VAR model to examine the German disinflationary spillover to France and Italy[3]. They find that the German price shocks did have a spillover effect on the rates of inflation in France and Italy. Fry (2004) has also used a structural VAR system to examine the US and Japan impact on Australian economy. Market interdependence has also been examined within the context of cointegration analysis. Examples include Chan, Gup and Pan (1992), Arshanapalli, Douka and Lang (1995), Ghosh, Saidi and Johnson (1999) and Chen, Firth and Rui (2002). The first three studies examine the linkages between the United States and the Asian markets. Chen, Firth and Rui (2002) examine the linkages across six Latin American stock markets, including Argentina, Brazil, Chile, Colombia, Mexico and Venezuela. They find that stock prices in the six countries they consider are cointegrated which indicate the prevalence of a stable long-run relationship. Ferna´ndez-Serrano and Sosvilla-Rivero (2003) examine the relationship between the US and Latin American country stock indices. They find that several cointegrating relationships exist between the Dow–Jones and/or S&P 500 index and the Brazilian, Mexican, Argentine, Chilean and Venezuelan indices, especially once the structural breaks induced by financial crises are taken into consideration.

In line with the above efforts, in our study we employ the methods of VAR, GIRF and VD to assess the relationships between US industry sectors. We focus on the magnitude, duration and direction of shocks of the sectors on each other. In our study we chose the generalized approach (GIRF) over the more traditional orthogonalized approach because we are interested in only exogenous shocks. And the generalized approach helps to isolate the responses by filtering the indirect effect/ shocks and hence produce more realistic results. In the following section we

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[3] Germany, France, Italy all belong to the European Monetary System.

discuss in details about the methodology used our study and how the methods help us to study interdependence.

3. METHODOLOGY

Interdependence suggests the prevalence of co-movement within a market and sector linkages. Presence of such a co-movement can be explored using the VAR framework. Once the VAR system is estimated, the dynamic responses of each of the sectors in the system to shocks or innovations in a particular sector can be traced out over a defined time horizon using the impulse response analysis. The speed with which innovations in a particular sector is transmitted to other sectors in the system indicates the responsiveness of sectors and the efficiency with which new information/ innovations, are transmitted between sectors. We study this mechanism of internal transmission of shocks with the help of impulse response functions. The size of a sectors' response to a shock indicates to what extent a sector is influenced. The VD analysis derives shares of innovations of each division in the system in the variation of the returns of each division. The VD reveals how strongly sectors are linked. We use the GIRF to further investigate these linkages and the efficiency with which innovations are transmitted between sectors. In the rest of this section, we discuss the details of VAR, IRF and VD.

In 1980, Christopher Sims proposed a new macroeconomic framework, unrestricted vector auto regressions (VAR) methodology which is one of the most successful, flexible and widely used tools for analysis of multivariate time series models today. The VAR model is a powerful tool to describe the dynamic behavior of economic and financial time series. According to Sims (1980), this methodology allows the investigation of the dynamic responses of the divisions included in the model to shocks generated in a given market, without imposing any theoretical restrictions. In simple words, VAR model can represent the correlation that exists among a set of variables. Some of the advantages of the VAR are that (1) the method doesn't require imposition of any restrictions; (2) there are subsequent tools of VAR which can be

employed to further investigate the duration of the shocks, the percentage of the variance explained by itself and other variables, etc. So, the VAR framework is often used to analyze and identify the relationships among the variables of interest. In case of any correlation between variables, the VAR model can attribute the changes in a particular variable (e.g. the market index) by expressing the changes in terms of its own lags and other variables and the lags of those variables. Having given this background, now we will look into the mathematical details of the VAR methodology.

The VAR is an extension of the univariate autoregressive model to multivariate time series. A univariate autoregression is a single equation, with a single variable linear model in which the present value of a variable is explained by its own lagged values. In its simplest form, a vector autoregression is an unrestricted reduced form model that expresses each variable as a linear function of a constant and the lags of that and each other variable in the system. This VAR system consists of n-equations, n variables model, in which each variable is explained by its own lagged values and the lagged values of the rest of the n-1 variables.

A VAR model of order p (VAR (p)) can be represented as:

$$R_{t,k} = C_0 + \sum_{i=0}^{p} \gamma_i R_{t-i,k} + u_t T$$

$t = 1, 2 \ldots T, \quad k = 1, 2 \ldots K \quad (1)$

R_t is a n*1 column vector of market returns, C_0 is a 1*n row vector, γ_i (i = 1,2,…p) is a n*n coefficient matrix, n is the lag length and u_t is the n*1 column vector of independently and identically distributed (*iid*) disturbances with zero mean and covariance matrix Ω for all values of t. The characteristics of the error term in a standard VAR model are following:

i. $E(u_t) = 0$

ii. $var(u_{it}) = \sigma_{ij}^2$, *is independent of time*

iii. $E(u_{it}, u_{it-k}) = 0$, *for all k > 0, i = 1,2, … n*

iv. $E(u_{1t}, u_{2t}) = \sigma_{ij}$, *i and j = 1, 2 … n*

It is assumed that the residual term (u_t) which has zero means, constant variances and is serially uncorrelated. Coming back to the VAR model, there are k equations in the model, each equation for a division of the industry. If the VAR (p) model is covariance stationary and there are no restrictions on the parameters of the model, each equation in the VAR (p) may be written as:

$$R_{t,k} = \sum_{i=0}^{\infty}\left(A_{in}u_{t-i,k}\right)$$

t = 1, 2 …T,   k = 1, 2…K   (2)

The tools of VAR analysis- Granger causality test, impulse response function and variance decomposition – all facilitate the understanding of the interrelationships among economic variables and in the formulation of a structured economic model. It is a standard practice to use these tools to report a VAR analysis. In the following section we will give a description of each of these tools used.

Granger (1969) defined the concept of causality that a cause cannot come after the effect. Thus, if a variable x affects a variable y, the former should have explanatory power to predict the values of the latter. A variable x Granger causes another variable y if the former variable x can be predicted better by using the past values of the latter variable y. So, Granger-causality examines whether the lagged values of a variable contains useful information to improve the prediction of another variable.

The second tool of the analysis is VD analysis. VD can explain the change in the value of the variable in a given period arising from changes in the same variable in addition to other variables in previous periods. A variable that is optimally forecast from its own lagged values will have all its forecast error variance accounted for by its own disturbances (Sims, 1982). Therefore, forecast error variance decomposition allows explaining the proportion of the movements in a sequence due to its own shocks versus shocks due to the other variables. It gives us the percentage of the variance of the error made in forecasting a given division due to a specific shock in own or amongst the group of divisions considered at a given horizon. The VD used in our study uses Cholesky decomposition with the following order: Construction, Manufacturing, Transportation, Wholesale, Retail, Finance and Services.

Impulse Response Function (IRF) is another tool of VAR and is obtained from the same VAR system. The response of the current and future values of each of the variables to one unit increase in the current value of anyone of the VAR errors can be detected using IRF. The underlying assumption is that the errors returns to zero in subsequent periods and that all other errors are equal to zero. In other words, IRF can trace out the response of the current and future values of each of the industry divisions to one-time (or one-unit) shock or innovation to one of the markets. As mentioned previously, the errors in any equation in VAR are usually serially uncorrelated by construction. Even so, there could be contemporaneous correlations across errors of different equations. If the innovations (errors) are correlated, a shock in one market will work through the system jointly with the innovations in the other markets, with which it is contemporaneously correlated. Generally these errors are orthogonalized through Cholesky decomposition so that the resulting covariance matrix is diagonal. Cholesky decomposition uses the inverse of the Cholesky factor of the residual covariance matrix to orthogonalize the

impulses. This method imposes an ordering of the variables in the VAR and attributes all of the effect of any common component to the variable that comes first in the VAR system. This essentially amounts to assuming that in a pre-specified ordering, a shock in the first division has an immediate impact on all other divisions in the VAR system. The second market has an immediate impact on all other divisions except the first one and so on. Thus, the ordering of the variables is important and the responses can change dramatically if the ordering is changed. Clearly this is a major disadvantage of the method which can result in non-unique and unreliable results. In only two cases the orthogonalized responses are invariant to the ordering of the variables. First case is when the covariance matrix is diagonal, or almost diagonal. Second is the case for impulse response analysis of the first variable in the VAR, but it is of little use. Even though we use the Cholesky decomposition as our example for the sake of discussion, this issue also applies to other similar decomposition methodologies, which do not consider the ordering difference in calculations.

In order to overcome this inherent problem, a structural VAR approach was developed in mid-1980's by Bernanke (1986), Blanchard and Quah (1989), Blanchard and Watson (1986), Shapiro and Watson (1988) and Sims (1986). The structural VAR imposes a priori restrictions on the covariance matrix of the structural errors and the contemporaneous and/or long run impulse responses to identify the IRF and VD. However, a major disadvantage of structural VAR is that as the model gets larger, the number of restrictions increases as well.

Because of the problems and limitations with both the orthogonalized approaches to VAR and structural VAR, the generalized approach to VAR was developed. Koop, Pesaran, and Potter (1996) advanced the concept for non-linear dynamic systems. Pesaran and Shin (1998) applied the concept to linear systems constructing an orthogonal set of innovations that does not depend

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on the ordering of the variables. The generalized impulse responses from an innovation to the j-th variable are derived by applying a variable specific Cholesky factor computed with the j-th variable at the top of the Cholesky ordering. Because, the generalized approach to impulse response analysis is independent of the order of the variables, the results are unique solution. This is a major advantage of the generalized approach over the structural VAR and other orthogonalized approaches to VAR. We apply this generalized framework to estimate the impulse response functions in the VAR model for this study.

4. DATA DESCRIPTION

In this project, we have used data of the US industry and market portfolio returns from 2nd July 1962 to 31st December 2008. This data was extracted from CRSP. We have considered seven out of ten divisions for our study. The divisions considered in the industry portfolio for the VAR analyses are Construction, Manufacturing, (Transportation, Communications, Electric, Gas and Sanitary Services), Wholesale Trade, Retail Trade, (Finance, Insurance and Real Estate), and Services. These divisions are based on the industry groups from 1-digit level Standard Industrial Classification (SIC) codes[4]. In the VAR analysis, we treat the industry portfolio returns as endogenous variables and the market portfolio return as an exogenous variable. In addition to the market returns, the other exogenous control variables used are US inflation rate, US interest rate and US gross domestic product (GDP). The industry portfolio is a value-weighted portfolio based on the underlying single stocks in each industry and the market portfolio is the equal-weighted portfolio of all the stocks traded. We have also applied VAR to equal weighted industry portfolio and value weighted market portfolio. The US interest rate is the daily 1-Year Treasury bill - Secondary Market Rate from 1959 to 2008. The frequency of the US inflation rate

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[4] SIC codes are four digit numerical codes assigned by the U.S. government to business establishments. The SIC codes can be found in the website: http://www.osha.gov/pls/imis/sic_manual.html. The classification covers all sectors: agriculture, forestry, fishing, hunting, mining, construction, manufacturing, transportation, communications, electric, gas and sanitary services; wholesale trade; retail trade; finance; insurance and real estate; personal, business, professional, repair, recreation and other services; and public administration. Under 1 digit SIC code, the divisions are :

Division 0 -   Agriculture, Forestry, And Fishing
Division 1 -   Mining
Division 2 -   Construction
Division 3 -   Manufacturing
Division 4 -   Transportation, Communications, Electric, Gas And Sanitary Services
Division 5 -   Wholesale Trade
Division 6 -   Retail Trade
Division 7 -   Finance, Insurance, And Real Estate
Division 8 -   Services
Division 9 -   Public Administration

is monthly and the US unemployment rate is annual data. The market and the industry portfolio returns are daily returns. In table 1 we summarize the data used in this study.

We conduct the VAR test on both daily returns and weekly returns. As the daily returns tend to capture more noise and thus may render more difficult interpretation of the result, we convert the daily returns of the portfolios into weekly returns[5]. We still try the test based on daily data but we will focus on weekly data in the following section.

In addition to the whole sample period analysis, we decomposed the data into two sub-periods: peaceful periods and volatile periods to understand the market interdependence during different periods. We calculate the standard deviation of the market returns annually and rank the years in terms of the market volatility. On the basis of the ranking of market volatility, we identify peaceful and volatile periods. More specifically, we denote the top 30% as volatile period and bottom 30% as the peaceful period[6]. As a robustness check, we also simply divide the entire sample into top and bottom periods on ranking of their volatility and denote them volatile and peaceful, respectively. Apart from these approaches, we also decompose the entire data into peaceful and volatile sub periods based on the volatility of the Finance sector returns. We find similar results regardless of the different approaches. The full sample (weekly returns) consists of 2,426 observations and the daily returns consist of 11,706 observations[7].

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[5] The C++ program to generate weekly returns from daily returns is attached at the appendix of this report.

[6] Theoretically, the volatile periods in the US economy are considered as: 1970, 1973-1975, 1980-1982, 1990-1991, 2001 and 2008. On the basis of the annual standard deviation of the market returns, the volatile periods in the US economy is: 1974, 1980, 1982, 1987, 1997 – 2002 and 2008. As we can see, the periods are almost similar except a couple of years. The standard deviations for those years are also higher than the rest, but they were not in the top 30%.

[7] The first set of sub-periods volatile and peaceful period consist of 730 and 890 observations respectively and the second set of volatile and peaceful period consist of 1175 and 1251 observations.

5. RESULTS

As mentioned in the previous section, we analyzed the VAR of both daily and weekly returns in full period (1962 to 2008). We also examined the VAR on the weekly returns of the peaceful and volatile sub periods. We examined everything on both of the following two combinations:

i.   Value weighted industry portfolio and equal weighted market portfolio

ii.   Equal weighted industry portfolio and value weighted market portfolio

However, considering the space restrictions in this report we only discuss the VAR results for value weighted industry portfolio.

In the following, we first discuss about the statistics of the daily returns (value weighted industry portfolio returns) for the entire period and this will be followed by the discussion about the weekly returns for full period and the sub periods. Later on, we discuss about the VAR findings for different data sets. Starting from the next sub section, we discuss about the statistics of the daily returns.

5.1   Descriptive statistics

A summary of some statistical properties of all divisions for the entire sample period is given in table 2 and table 3 for daily value weighted industry portfolio and daily equal weighted industry portfolio respectively. The summary statistics of the market returns for daily frequency is shown in table 4. The preliminary statistics from table 2 show that: (1) the returns of all the

sectors of value weighted industry portfolio display negative skewness[8]; (2) the portfolio returns also show excess kurtosis, since the value of kurtosis is greater than 3.0. Therefore, the most industry portfolio returns are leptokurtic[9], i.e., the distributions have flatter tails than normal distribution; (3) the standard deviation of the Services (division 8) is the highest and 1.08%. Table 3 and table 4 show similar characteristics for the equal weighted portfolio returns and the market portfolio. Table 5 shows the correlation matrix for both value and equal weighted industry portfolios. Interestingly, the correlations of all the daily portfolio returns are very high with Services (division 8) as an exception.

Now we come to the discussion about the statistical properties of the weekly portfolios for the full period and also for the sub-periods. The general characteristics of the weekly value weighted industry portfolio returns for the entire sample period along with the two sets of sub-periods (Peaceful and Volatile sub periods) have been presented in table 6. And the general characteristics of the weekly equal weighted industry portfolio returns for the entire sample period have been presented in table 7. Both the weekly value and equal weighted industry portfolios display negative skewness. However, unlike the weekly value weighted industry portfolios for full period, the peaceful and volatile sub periods are not completely negative skewed. Rather, the returns of most of the divisions during the sub periods show positive skewness. Also, the weekly portfolios show excess kurtosis similar to the daily returns. However, the kurtosis of the portfolio for the entire period is much higher than the kurtosis of the volatile and the peaceful periods. Particularly during the sub periods, the kurtosis is mostly

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[8] Skewness is a measure of the degree of asymmetry of a distribution. As a result, the median and mean can be different for some data sets.

[9] Leptokurtic is the case of excess positive kurtosis. A leptokurtic distribution has more acute peak around the mean (and therefore the probability that a leptokurtic distributed variable is located near the mean has a higher probability than a normally distributed variable).

between 4 and 5.0. Interestingly, the standard deviation during the volatile period is almost twice the standard deviation during the full period. The standard deviation of the second set of volatile period[10] is approximately thrice the full period. Table 8 shows the correlation matrix for both value weighted industry portfolios for full period, peaceful and volatile sub periods. The correlations of the daily value weighted portfolio for the entire period are higher than the weekly portfolio for the entire period. Interestingly, in table 8 we can see that the correlations between the sector returns during the volatile sub period is less than the correlations between weekly portfolio returns for the entire period. And the correlations during peaceful sub period are higher than the correlations during full period. The correlation of sectors in peaceful times is higher because generally there is absence of shocks in peaceful periods and as a result of which the market plays a significant role in the performance of the sectors. However in volatile periods, the relatively sensitive sectors react faster to certain shocks as compared to other sectors. Therefore, in volatile periods the interdependence of the sectors is more prominent and plays a more important role in determining the sectors' behavior. So correlations between sectors in volatile period are relatively less than the correlations during other periods. Hence, the study of our interdependence assumes more significance in light of such volatile periods.

Finally in the following sub-sections, we discuss the VAR findings for different data sets.

5.2 Findings based on VAR

5.2.1 Daily returns portfolio

We first apply VAR to daily data which includes a constant and 6 lags for each equation. We show the estimation results in table 9. The columns of table 9 denote the divisions of the

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[10] This volatile period is chosen from the top 50% volatile market returns.

industry portfolio and the rows denote the variables and their lags (both endogenous and exogenous) along with their lags. Corresponding to each variable's lag, there are two rows. The first row indicates the coefficient in the estimated VAR model and the second row indicates the value of t-statistics. According to the estimated VAR coefficients, own first lags are mostly significant except for Services (division 8). The results show that the first lag (day one) of Transportation, Communications, Electric, Gas and Sanitary Services is significant for all other divisions. A few dominant divisions influencing most of the other divisions are: 1st lag of Retail Trade (6th division), Construction (2nd division) and the 7th division (Finance, Insurance and Real Estate) and the 3rd lag of Manufacturing (3rd division). Amongst the significant exogenous variables, the coefficients of US interest rate, the US inflation rate and the daily market returns are significant to all the divisions.

Now we will discuss about the results of the GIRF (Generalized Impulse Response Function) and VD (Variance Decomposition). The IRF traces the effect of a one-time (one SD) shock to one of the innovations on current and future values of the endogenous variables i.e., it traces the dynamic responses of the divisions in the model to innovations in a given market. The patterns of the GIRF effects are examined over ten lags (days). For daily returns this period is long enough for the shocks to be absorbed in all the divisions. Table 10 presents the table of GIRF and figure 2 illustrates the generalized impulse responses of all the divisions to various one-unit volatility shocks. To begin with, the top left chart in figure 2 displays the response of Construction (Division 2) to one-unit volatility shock from all the divisions including itself. The next graph shows the responses of Manufacturing (Division 3) to generalized one SD innovations from all the divisions and so on. The x-axis of the graphs represents the number of lags and the y-axis represents the percentage deviations in divisions over time after one-time

shock. From figure 2, we can see that the impulse responses of all the sectors are absorbed within a short period of time. More specifically, the responses to the shock effects from most of the divisions die down within seven to eight lags (seven to eight days) after the shock is introduced. In any case, the responses never persist beyond nine days. However, the turbulence of responses is absorbed mostly after three to four days. Mostly all the responses to shocks in different divisions follow the same trend. An interesting pattern in this case is that, after lag two, the impulse responses (deviations) are always negative and they bounce back to positive from the third lag (day). During the initial first two days the impulse responses steeply die down and in the next four to five days they are mostly less than 0.001% before dying down completely. For the first day, the effect of division on itself is the highest.

While impulse response functions trace the effects of a shock to one endogenous variable on to the other variables in the VAR, VD separates the variation in an endogenous variable into the components of different divisions. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the endogenous variables. Figure 3 presents the graph of the VD for the divisions and table 11 presents the table of VD. We can see that the divisions themselves explain the highest percentage of their variance. The divisions themselves contribute at least 60% to their own variance. For instance, at the ten day horizon, the cumulative percentage of the Finance sector forecast error accounted for by the sectors ranges from 60% for Finance sector, 30% for Manufacturing sector, 9% for Construction and approximately zero for the rest of the sectors. In general, at most two other sectors apart from the sector itself attribute for the variance of a given sector. All other divisions contribute less than 30%. The same results can be seen from table 11. Finance sector explains about 60% or less of its variance. In comparison to other sectors, therefore the contribution of Finance to its

own variance is the least. The sectors Wholesale and Retail trade also contribute only about 60% to their variance.

5.2.2 Weekly returns portfolio

The second VAR estimation is on weekly data of value weighted industry portfolio return and equal weighted market return as presented in table 12. Since this is weekly data, the VAR includes a constant and four lags (one month) for each equation. The results of this VAR estimation are different from the daily results. Interestingly, unlike the daily data results, none of the own first lags are always significant. Also, there is no dominant division which significantly influences all other divisions. The significant exogenous variables are market returns and US interest rate.

Figure 4 illustrates the generalized impulse responses of all the weekly industry portfolio divisions to various one-unit volatilities. Figure 4 is similar to figure 2 discussed in the previous section. The GIRF presented in figure 4 shows a trend similar to the pattern seen in daily results of section 5.2. It is noticeable that the GIRF graphs for value weighted portfolio shows that the percentage deviations become negative after the second lag (i.e., after second week). They again bounce back to positive deviations after the third week and ultimately the effects die down completely in about six weeks. The GIRF table for weekly portfolio for the entire period (from July 1962 to December 2008) is given in table 13. The VD is shown in figure 5 and the VD table is shown in table 14. The VD results are very similar to the daily data. Each division at least explains 60% of its variance. Again, the Finance sector explains the least (only about 59%) of its variance as compared to other sectors.

5.2.3 Findings on subsamples of peaceful and volatile periods

Now, we will talk about the VAR results for the sub-periods[11]. As mentioned in section 4, we decomposed the full period data into two sub periods. The first set of sub periods consists of only the top and bottom 30% of the data and the second set consists of the entire period divided into two halves. Both of the sub periods are weekly data of value weighted industry portfolio and we find similar results for both the sets of sub-periods. Because of space constraint we only discuss about the results of the sub-periods consisting of 30% of the topmost and the most bottom market returns.

Table 15 and table 18 show the VAR results of peaceful and volatile sub-periods respectively. Like the full period results for value weighted portfolio, for both the peaceful and volatile periods own lags are not significant for most of the divisions. Again, like the weekly results there is no division which dominantly influences all other divisions. Only market returns amongst the exogenous variables significantly affect the divisions of the industry. The GIRF of the sub period (figure 6 and figure 8) follow the same pattern as discussed in section 5.3. However, the peaceful sub period shows more turbulence after lag two than the weekly portfolios for the entire period. The variance decomposition for the sub period (figure 7 and figure 9) shows that the most of the divisions explain more than 70% of their variance. Table 16, table 19, table 17 and table 20 shows the GIRF and VD of the peaceful and volatile sub-periods respectively.

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[11] The sub period considered here is the first set of sub period which consists of 60% of the extreme volatile market returns from the years 1962 to 2008.

5.3 Comparison of VAR results of all the data sets

The GIRF figures (figure 2 – daily full period, figure 4 – weekly full period, figure 6 – weekly peaceful sub-period and figure 8 – weekly volatile sub-period) of four different data sets reveal that the highest volatility response of each division is attributable to its own shocks, and the effect persists over eight to ten weeks. It is also interesting to note that the own effects or internal forces of the sectors are considerable in magnitude for all sectors for only the first two lags. From the second lag, the division is heavily influenced by shocks from other divisions. In other words, the self shocks plummet after the first couple of lags. One possible explanation is that the shocks from self sector are completely absorbed during the first two lags, which facilitates other sectors shocks to emerge after lag one. It is also seen that the prominent responses to shocks in divisions in the first lag becomes less prominent from lag two onwards. This again can be explained in the same way as mentioned above. The shocks from a given sector which are already absorbed in previous lags tend to influence less in the next lags.

Another interesting GIRF pattern is the turbulence and the duration. It appears that the impulse responses from daily data are much less turbulent as compared to the weekly data. For example, let us consider the impulse responses of Services sector (division 8) from figure 2 and figure 4 (the bottom-left charts). The responses of the Services sector to the one-unit volatility shocks from all the sectors in figure 2 are within 0.1%. Also, all the responses are approximately zero after the third lag for daily portfolio. In contrast, the magnitude and the duration of the responses of Services of weekly portfolio to the one-unit volatility shocks in all sectors are almost ten times of the daily portfolio. The responses deviate as far as 1% and die in about nine lags.

Having compared the daily and weekly portfolios, we are interested in seeing how the GIRF of the peaceful and volatile sub periods differ from the weekly portfolio for the entire period. As discussed earlier, our results show that the impulse responses in the sub periods follow a similar pattern to the weekly portfolio for the full period. However, there the magnitude of the responses is different from the full period responses. Based on figure 6 and figure 8, we can see that the impulse responses of the sub periods are larger and more turbulent than the responses weekly or daily portfolio for entire period. We can also see from the GIRF tables that the impulse responses during the sub periods are greater than the impulse responses during full period. For example, first let us consider the impulse responses to own volatility shock. Table 19 first row shows that during volatile period, the response of Construction to its own one SD shock is 1.8% (for the first period). On the other hand, from the first row in table 10 (daily portfolio) it can be seen that the response of Construction to its own shocks are approximately 0.62%. Similarly, the responses of Transportation sector to its own shock in the first lag are 0.24% for full period and .50% for the peaceful period. Secondly, the magnitude of responses of the sectors to shocks in other sectors is also greater in sub periods than the full period. The response of Finance sector to one SD shock in Services sector in the first lag is .09% for the entire period. In contrast, the impulse responses of Finance to shocks in Services during peaceful period are 0.25% (table 16) and during volatile period is 0.315% (table 19).

Now we discuss and analyze the sectors and their influences on each other in the different data sets based on the GIRF and VD results.

-       The GIRF for daily and weekly results show that the responses of the Construction sector are about 6.2% to its own shocks in the first lag (table 10 and table 13). Also, Construction responds highly to the shocks of Wholesale (division 5) and Retail (division 6).

E.g. In the first lag, the responses of construction are about 0.35% to the shocks of Wholesale and Retail sectors respectively. However the responses of Construction to its own shocks and to shocks originating in other sectors increase during the sub-periods. During peaceful sub-period along with Retail and Wholesale sector, Transportation (division 4) and Manufacturing (division 3) sectors also have high impact on the Construction sector. The responses of Construction to theses sectors are about 0.53% in the first lag. In the volatile sub-period, the same sectors impact Construction. However, the magnitude of responses of Construction to Wholesale and Retail sectors increases to about 0.98% and 0.88% respectively. According to all the VD charts for Construction, most of the variance is explained by itself. None of the other sectors contribute more than 1% to its variance. The sector itself accounts for about 97% of its variance for the entire period and this increase to 98.2% during the sub periods (table 7 and table 9).

- The prominent impulse responses of Manufacturing sector (division 3) are to shocks from Finance sector (division 7) about 0.47% in daily and weekly portfolio for full period. This result is consistent during the sub-periods too; only the magnitude of influence of finance sector increases during the sub-periods. Unlike the Construction sector, Manufacturing sector responds to the same sectors in weekly portfolio for full period and the sub-periods. Interestingly, Manufacturing attributes for only 76% of its variance for the full period and for peaceful period. Construction contributes about 22% to its variance. In peaceful sub-period the contribution of Construction increases to about 28%. But it contributes about 93% during volatile period.

- Transportation sector (division 4) responds almost equally to shocks in all other sectors during the entire period. However during peaceful and volatile sub-periods, Construction, Manufacturing and Retail Trade are the sectors which influence Transportation more prominently than others. From the variance decomposition tables (table 14 and 17), we can see

that Transportation contributes only about 65% to its own variance. Construction and Manufacturing contributes about 22% and 10% to its variance. However in volatile sub-period, about 81% of the variance of the Transportation sector can be attributed to itself.

-       Wholesale trade (division 5) responds highly to one-unit shocks of Construction, Manufacturing and Transportation in all the four data sets. For the daily and weekly portfolios for full period, the magnitude of the responses is between 0.36% to 0.4% (table 10 and 13). In volatile sub-period, the responses range from 6.9% to shocks from Manufacturing sector and 1.15% to shocks from Construction sector. Wholesale trade contributes about 65% to its variance. Most of the rest is contributed by Construction (about 22%) and Manufacturing (about 5%).

-       Retail Trade (division 6) is highly influenced by Construction, Transportation and Wholesale trade in daily and weekly portfolio for full period. Apart from the above sectors, in peaceful sub-period Manufacturing sector impacts Retail (0.48%) and in volatile sub-period Finance sector impacts Retail sector (0.58%). Construction, Manufacturing and Wholesale accounts for a large shares of Retail Trades' variance. Retail Trade contributes about 60% to its variance. In peaceful sub period, this decreases to about 51% only. Construction contributes about 30% to Retail Trade's variance during peaceful time.

-       Finance sector (division 7) responds highly to shocks from Manufacturing (division 3), Transportation (division 4) and Wholesale Trade (division 5). Manufacturing has the highest impact on Finance during full period of about 0.5%. During the sub periods too, shocks in Manufacturing sector has the highest influence on Finance sector; the impulse responses of Finance to Manufacturing sector are approximately 0.7% and 1.4% during peaceful and volatile

periods respectively. It is also important to note that Construction (9.2%) and Manufacturing (30%) sectors are the highest contributors to the volatility of Finance sector (see the variance decomposition tables: table 7 and table 9).

- The impulse responses from Services (division 8) show interesting results. For daily and weekly portfolios for full period, Services responds to Construction, Retail and Finance sector. In volatile sub-period, Services is sensitive to shocks in Manufacturing Sector too. For the daily portfolio, Services responds mildly to shocks originating in all other sectors in the first lag. The impulse responses are moderate and they die down quickly. On the other hand, the weekly portfolio results show much higher turbulence in the responses of Services sector and the responses extend over 9 lags. The strength of the responses is even higher during the volatile sub period. For example, the first impulse of Services to shock in Construction sector is 0.33% for the entire period (table 13), 0.48% for peaceful sub period (table 16) and 1.6% for volatile period (table 19).

- It is important to note that in all the data sets the generalized one unit volatility shock from Services sector (division 8) has the lowest influences on all the other.

5.4 Summary

In the following we summarize the findings of the generalized impulse response patterns.

1) The largest responses by any sector occur in response to its own volatility shocks. This is also true for the sub periods, but during the sub-periods the responses to volatility shocks in other sectors are comparatively larger.

2) The responses of the divisions to their own shocks fall below other response to other shocks after the initial lags. The responses to self shocks die down considerable after the first two lags.

3) The impulse responses with respect to shocks from all the divisions are mostly positive in the initial period. After the second week, the impulse responses are negative for about a week before bouncing back to positive responses.

4) The responses are substantial for about six weeks and they take about eight weeks (two months) to die down completely.

5) Amongst exogenous variable, the market return is always significant for the sector returns.

6. CONCLUSION

Though the phenomenon of interdependence has been extensively studied in the past, not much research has been done at the industry level to examine a comprehensive set of sectors within a domestics market of a country. In this paper we find the interdependences of the major US industry sectors of the US domestic market. We analyze the dynamic interdependence of seven major sectors of the US equity market for the period of July 1962 to December 2008. We employ the methodologies of VAR, GIRF and VD to investigate the nature of interdependence of US industrial sectors and to determine the direction, magnitude and durability of the impulse responses to the innovations in a sector as a response to the shocks in other sectors. We use the generalized techniques for calculation of the impulse responses. The generalized techniques have the advantage of being insensitive to the ordering of the divisions considered and therefore they produce more reliable results. In order to examine the interdependences, we use two portfolios of different frequencies – a daily returns portfolio and a weekly returns portfolio. Furthermore, we extend the study to two sub-periods – volatile and peaceful sub-periods. We examine the changes in the dynamics of the US sector interdependence relations during these two sub-periods.

Some of the results we observed are as follows. Though the pattern of the impulse responses is similar in the full period and both sub-periods, we do find differences in the magnitude, direction and durability of the impulse responses of the sectors. The largest responses by any sector occur in response to its own volatility shocks. The impulse responses are mostly positive but in the second and third lags they are negative. The responses are substantial for about six weeks and they take about eight weeks (two months) to die down completely. The magnitude of shocks in the daily returns portfolio is the smallest. During the sub-periods, the responses of the sectors to shocks are much larger in strength compared to the responses in the

full period. Specifically, the responses of the sectors during the volatile period are highest amongst all other periods. The sectors Construction, Manufacturing and Finance are the most influential sectors. Services sector is least impacted by others.

We know that the system of residuals of the shocks or innovations is not homogenous and their distribution is heteroskedastic. In previous research efforts (E.g. Chuang, Lu and Tswei (2007)), studies have included the generalized autoregressive conditional heteroskedasticity (GARCH) methodology to examine volatilities in long period of time. For future work, a useful addition to this study will be to address this problem and amend the VAR by adding multivariate GARCH model to capture conditional heteroskedasticity in the volatilities.

APPENDIX

C++ Program to change frequencies:

```cpp
#include "genlib.h"
#include "random.h"
#include "simpio.h"
#include <iostream>
#include <fstream>
#include <iomanip>


int main ()
{
        ifstream myfile1;
        ofstream myfile2;
        double rate,prod = 1;
        int day,month,year;
        bool weekend;

        myfile1.open("US_Int_Rate.txt");
            if(myfile1.fail())
            {
                    cout << "Error: File could not be opened" << endl;
                    return 0;
            }

        myfile2.open ("US_Int_Rate(1962-2008)_result.txt");
        myfile2 << "Date,Weekend,Rate,Prod " << endl;

        while (! myfile1.eof() )
            {
            // reading from the file
                    myfile1 >> month ;
                    myfile1 >> day ;
                    myfile1 >> year ;
                    myfile1 >> weekend ;
                    myfile1 >> rate ;

                    prod = prod*rate;

            // writing into a file
                    if (weekend)
                    {
                            prod = prod-1;
                            myfile2 << month << "/" << day << "/" << year << ","
    << weekend << "," << prod << endl;
                            prod = 1.00;
                    }
            }

        myfile1.close();
        myfile2.close();
        return 0;
}
```

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LIST OF TABLES

Table 1 : Listing of variables used in VAR

VARIABLES	FREQUENCY	START DATE	END DATE
Endogenous Variables			
Construction	Daily	Jul-62	Dec-08
Manufacturing	Daily	Jul-62	Dec-08
Transportation	Daily	Jul-62	Dec-08
Wholesale Trade	Daily	Jul-62	Dec-08
Retail Trade	Daily	Jul-62	Dec-08
Finance	Daily	Jul-62	Dec-08
Services	Daily	Jul-62	Dec-08
Exogenous Variables			
US Market returns	Daily	Jul-62	Dec-08
US interest rate	Daily	Jul-59	Jul-09
US annual GDP percentage change	Annual	1947	2008
US inflation rate	Annual	1914	2008
US unemployment rate	Annual	1948	2008

Table 2 : Value weighted Portfolio returns
Summary statistics: daily data July 1962- December 2008

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Mean	0.00075	0.00083	0.00064	0.00075	0.00071	0.00089	0.00097
Median	0.00124	0.00142	0.00100	0.00123	0.00106	0.00145	0.00128
Maximum	0.10396	0.10207	0.13639	0.08093	0.10877	0.10890	0.10835
Minimum	-0.12288	-0.11587	-0.10513	-0.10915	-0.08625	-0.11430	-0.12097
Std. Dev.	0.00794	0.00945	0.00782	0.00823	0.00646	0.01035	0.01082
Skewness	-0.92509	-0.63643	-0.46810	-0.85353	-0.41203	-0.52811	-0.21981
Kurtosis	20.8382***	14.8237***	26.1823***	17.7092***	26.8909***	13.8570***	9.9916***
Jarque-Bera	155331.4	68299.78	259974.3	105899.8	275988.4	57466.85	23701.35
Probability	0	0	0	0	0	0	0

Notes: * Denotes significance level of 1%.

      ** Denotes significance level of 5%.

      *** Denotes significance level of 10%

Table 3:   Equal weighted Portfolio returns
**   Summary statistics: daily data July 1962- December 2008**

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Mean	0.00073	0.00077	0.00063	0.00080	0.00072	0.00107	0.00139
Median	0.00083	0.00095	0.00054	0.00088	0.00076	0.00134	0.00118
Maximum	0.12603	0.12666	0.13972	0.10772	0.12046	0.13703	0.61860
Minimum	-0.17888	-0.18922	-0.14603	-0.16090	-0.14593	-0.18413	-0.38974
Std. Dev.	0.00930	0.01211	0.00869	0.01116	0.01124	0.01381	0.02647
Skewness	-0.47567	-0.03945	-0.04202	-0.03974	0.10078	-0.02167	2.69864
Kurtosis	24.9146***	15.3706***	24.5113***	12.4795***	16.1592***	12.4803***	81.3635***
Jarque-Bera	234683.3	74643.72	225702	43832.7	84480.78	43837.9	3009399
Probability	0	0	0	0	0	0	0

Notes: * Denotes significance level of 1%.

        ** Denotes significance level of 5%.

        *** Denotes significance level of 10%

Table 4 :   Market returns for equal weighted and value weighted portfolios
**   Summary Statistics : daily data July 1962 - Dec 2008**

	Equal Weighted	Value Weighted
Mean	0.000769	0.000411
Median	0.00137	0.000679
Maximum	0.107384	0.115183
Minimum	-0.103897	-0.171349
Std. Dev.	0.007882	0.009485
Skewness	-0.77235	-0.623637
Kurtosis	19.63578***	22.33162***
Jarque-Bera	136148.2	183036.6
Probability	0	0

Notes: * Denotes significance level of 1%.

        ** Denotes significance level of 5%.

        *** Denotes significance level of 10%

Table 5 : Correlations matrix of daily industry portfolio divisions

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Value Weighted							
Construction	1.00000	0.78169	0.78060	0.79050	0.80746	0.71587	0.41031
Manufacturing	0.78169	1.00000	0.82123	0.77702	0.78618	0.88056	0.41346
Transportation	0.78060	0.82123	1.00000	0.73744	0.79568	0.77151	0.37794
Wholesale	0.79050	0.77702	0.73744	1.00000	0.78283	0.73823	0.40052
Retail	0.80746	0.78618	0.79568	0.78283	1.00000	0.74454	0.43243
Finance	0.71587	0.88056	0.77151	0.73823	0.74454	1.00000	0.42419
Services	0.41031	0.41346	0.37794	0.40052	0.43243	0.42419	1.00000
Equal Weighted							
Construction	1.00000	0.93991	0.90827	0.92591	0.88421	0.88708	0.67833
Manufacturing	0.93991	1.00000	0.91569	0.92329	0.86565	0.93468	0.69704
Transportation	0.90827	0.91569	1.00000	0.88523	0.85554	0.87103	0.60379
Wholesale	0.92591	0.92329	0.88523	1.00000	0.88299	0.88171	0.65243
Retail	0.88421	0.86565	0.85554	0.88299	1.00000	0.81468	0.61349
Finance	0.88708	0.93468	0.87103	0.88171	0.81468	1.00000	0.69169
Services	0.67833	0.69704	0.60379	0.65243	0.61349	0.69169	1.00000

Table 6: Value weighted Portfolio returns
Summary statistics: Weekly data

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Full sample period (Jul 1962- Dec 2008)							
Mean	0.00073	0.00077	0.00063	0.00080	0.00072	0.00107	0.00139
Median	0.00083	0.00095	0.00054	0.00088	0.00076	0.00134	0.00118
Maximum	0.12603	0.12666	0.13972	0.10772	0.12046	0.13703	0.61860
Minimum	-0.17888	-0.18922	-0.14603	-0.16090	-0.14593	-0.18413	-0.38974
Std. Dev.	0.00930	0.01211	0.00869	0.01116	0.01124	0.01381	0.02647
Skewness	-0.47567	-0.03945	-0.04202	-0.03974	0.10078	-0.02167	2.69864
Kurtosis	24.9146***	15.37055***	24.51125***	12.4795***	16.1592***	12.48029***	81.36345***
Jarque-Bera	234683.30	74643.72	225702.00	43832.70	84480.78	43837.90	3009399.00
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Volatile Period							
Mean	0.00396	0.00408	0.00387	0.00378	0.00404	0.00544	0.00623
Median	0.00473	0.00516	0.00375	0.00446	0.00459	0.00683	0.00577
Maximum	0.05882	0.10678	0.05742	0.08455	0.08993	0.12548	0.19409
Minimum	-0.08069	-0.06441	-0.07498	-0.10587	-0.08542	-0.08747	-0.12097
Std. Dev.	0.01500	0.01809	0.01317	0.01937	0.01665	0.02158	0.03095
Skewness	-0.31067	0.03024	-0.32708	-0.28461	0.06870	0.05902	0.59742
Kurtosis	5.190733***	4.731512***	5.425613***	5.432701***	5.832125***	4.856512***	6.281755***
Jarque-Bera	169.17310	97.93341	205.91370	203.64640	262.29880	112.90110	397.94570
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Peaceful Period							
Mean	0.00396	0.00408	0.00387	0.00378	0.00404	0.00544	0.00623
Median	0.00473	0.00516	0.00375	0.00446	0.00459	0.00683	0.00577
Maximum	0.05882	0.10678	0.05742	0.08455	0.08993	0.12548	0.19409
Minimum	-0.08069	-0.06441	-0.07498	-0.10587	-0.08542	-0.08747	-0.12097
Std. Dev.	0.01500	0.01809	0.01317	0.01937	0.01665	0.02158	0.03095
Skewness	-0.31067	0.03024	-0.32708	-0.28461	0.06870	0.05902	0.59742
Kurtosis	5.190733***	4.731512***	5.425613***	5.432701***	5.832125***	4.856512***	6.281755***
Jarque-Bera	169.17310	97.93341	205.91370	203.64640	262.29880	112.90110	397.94570

| Probability | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Table 7:   **Equal weighted Portfolio returns**
                Summary statistics: Weekly data July 1962- December 2008

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Mean	0.000746	0.000825	0.000643	0.000748	0.00071	0.000891	0.000972
Median	0.00124	0.001424	0.000995	0.001229	0.001057	0.001445	0.00128
Maximum	0.103962	0.102071	0.136387	0.080928	0.108772	0.108898	0.108354
Minimum	-0.122884	-0.115869	-0.105132	-0.109154	-0.086252	-0.114297	-0.12097
Std. Dev.	0.007938	0.009454	0.007819	0.00823	0.006462	0.010346	0.01082
Skewness	-0.925093	-0.636425	-0.468097	-0.853529	-0.412029	-0.528114	-0.21981
Kurtosis	20.83821***	14.82368***	26.1823***	17.70915***	26.89089***	13.85696***	9.991572***
Jarque-Bera	155331.4	68299.78	259974.3	105899.8	275988.4	57466.85	23701.35
Probability	0	0	0	0	0	0	0

Table 8: Value weighted Portfolio returns
Correlation Matrix of weekly industry portfolio returns

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Full sample period (Jul 1962- Dec 2008)							
Construction	1.00000	0.75660	0.73796	0.77071	0.79373	0.70151	0.50081
Manufacturing	0.75660	1.00000	0.78360	0.78965	0.75931	0.88072	0.48820
Transportation	0.73796	0.78360	1.00000	0.70427	0.78123	0.74313	0.43074
Wholesale	0.77071	0.78965	0.70427	1.00000	0.77501	0.75523	0.47579
Retail	0.79373	0.75931	0.78123	0.77501	1.00000	0.73697	0.52659
Finance	0.70151	0.88072	0.74313	0.75523	0.73697	1.00000	0.51355
Services	0.50081	0.48820	0.43074	0.47579	0.52659	0.51355	1.00000
Volatile Period							
Construction	1.00000	0.71635	0.71990	0.79887	0.78927	0.69222	0.48027
Manufacturing	0.71635	1.00000	0.80634	0.77552	0.73736	0.91155	0.43162
Transportation	0.71990	0.80634	1.00000	0.72460	0.77271	0.78661	0.41025
Wholesale	0.79887	0.77552	0.72460	1.00000	0.80297	0.76245	0.44867
Retail	0.78927	0.73736	0.77271	0.80297	1.00000	0.73467	0.51282
Finance	0.69222	0.91155	0.78661	0.76245	0.73467	1.00000	0.47032
Services	0.48027	0.43162	0.41025	0.44867	0.51282	0.47032	1.00000
Peaceful Period							
Construction	1.00000	0.79972	0.75626	0.77287	0.80002	0.75198	0.52818
Manufacturing	0.79972	1.00000	0.70552	0.80511	0.78499	0.85692	0.58844
Transportation	0.75626	0.70552	1.00000	0.68812	0.79106	0.66068	0.44669
Wholesale	0.77287	0.80511	0.68812	1.00000	0.75213	0.75898	0.51377
Retail	0.80002	0.78499	0.79106	0.75213	1.00000	0.74013	0.51199
Finance	0.75198	0.85692	0.66068	0.75898	0.74013	1.00000	0.58998
Services	0.52818	0.58844	0.44669	0.51377	0.51199	0.58998	1.00000

Table 9 :   VAR Table for daily portfolio data for Full Period
(July 1962 to December 2008)

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Construction(-1)	0.10954***	-0.07834***	-0.04701***	-0.04480***	0.00301	-0.08599***	0.09565*
	[7.94283]	[-5.27860]	[-4.17448]	[-2.67444]	[0.19534]	[-4.83474]	[1.68984]
Construction(-2)	-0.07359***	0.03830**	-0.00236	-0.03329**	-0.02866**	0.03139*	-0.03586
	[-5.28460]	[2.55577]	[-0.20784]	[-1.96810]	[-1.84370]	[1.74814]	[-0.62744]
Construction(-3)	0.01984	0.02760*	0.02438**	-0.01978	-0.01014	-0.00091	-0.00476
	[1.42418]	[1.84142]	[2.14337]	[-1.16884]	[-0.65177]	[-0.05035]	[-0.08325]
Construction(-4)	0.00511	0.00351	-0.02026*	-0.00167	0.01657	-0.02508	-0.00269
	[0.36618]	[0.23398]	[-1.77929]	[-0.09848]	[1.06426]	[-1.39469]	[-0.04691]
Construction(-5)	0.01495	0.00714	0.02129*	0.01883	0.01414	-0.02857	-0.02745
	[1.07493]	[0.47671]	[1.87480]	[1.11484]	[0.91073]	[-1.59261]	[-0.48081]
Construction(-6)	-0.04846***	-0.02138	-0.02710**	-0.02609	0.01089	-0.01842	-0.05371
	[-3.52681]	[-1.44619]	[-2.41529]	[-1.56281]	[0.70974]	[-1.03941]	[-0.95237]
Manufacturing(-1)	-0.06313***	0.00780	-0.08453***	-0.04670**	-0.12249***	-0.02666	-0.09648**
	[-4.71632]	[0.54130]	[-7.73572]	[-2.87249]	[-8.19720]	[-1.54428]	[-1.75621]
Manufacturing(-2)	-0.00664	-0.04761***	-0.01720	-0.01924	-0.04991***	-0.05398***	-0.07581
	[-0.49389]	[-3.29152]	[-1.56674]	[-1.17801]	[-3.32554]	[-3.11399]	[-1.37406]
Manufacturing(-3)	-0.03852***	-0.04193***	-0.05324***	-0.05482***	-0.06812***	-0.01186	-0.10325**
	[-2.86260]	[-2.89555]	[-4.84659]	[-3.35394]	[-4.53440]	[-0.68360]	[-1.86964]
Manufacturing(-4)	0.00441	-0.02878**	-0.02025	-0.04681***	-0.00575	-0.02044	-0.10103*

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	[0.32809]	[-1.98949]	[-1.84494]	[-2.86730]	[-0.38328]	[-1.17939]	[-1.83141]
Manufacturing(-5)	-0.04379***	-0.01666	-0.02852***	-0.04358***	-0.05657***	-0.03895**	-0.00259
	[-3.26212]	[-1.15352]	[-2.60261]	[-2.67270]	[-3.77499]	[-2.25025]	[-0.04694]
Manufacturing(-6)	0.05789***	0.00406	0.02796***	0.02597	0.02084	-0.03220**	-0.06401
	[4.37459]	[0.28481]	[2.58833]	[1.61566]	[1.41061]	[-1.88689]	[-1.17861]
Transportation(-1)	-0.08681***	-0.02981*	0.12668***	-0.07369***	-0.04238	-0.06009***	-0.34509***
	[-5.81748]	[-1.85603]	[10.3975]	[-4.06506]	[-2.54363]	[-3.12218]	[-5.63426]
Transportation(-2)	-0.02152	-0.01528	-0.02869**	0.01136	-0.02031	-0.01019	0.13630**
	[-1.42151]	[-0.93761]	[-2.32050]	[0.61744]	[-1.20171]	[-0.52184]	[2.19332]
Transportation(-3)	-0.01809	-0.04987***	0.00477	-0.02382	0.00093	-0.05126***	-0.07968
	[-1.19498]	[-3.06156]	[0.38562]	[-1.29549]	[0.05490]	[-2.62583]	[-1.28252]
Transportation(-4)	-0.03862**	-0.02825*	-0.00206	-0.02495	-0.06696***	0.00323	-0.05957
	[-2.54949]	[-1.73307]	[-0.16615]	[-1.35555]	[-3.95871]	[0.16537]	[-0.95799]
Transportation(-5)	0.02829*	0.01315	0.00746	-0.03067*	0.01334	0.00955	-0.05222
	[1.86864]	[0.80703]	[0.60359]	[-1.66804]	[0.78935]	[0.48917]	[-0.84050]
Transportation(-6)	0.00337	0.00292	-0.01253	0.02880	-0.02780*	0.04462**	-0.11154*
	[0.22542]	[0.18187]	[-1.02702]	[1.58706]	[-1.66712]	[2.31626]	[-1.81938]
Wholesale(-1)	-0.02312**	0.01790	-0.02706***	0.12122***	-0.01743	0.02786**	-0.06422
	[-2.15566]	[1.55137]	[-3.09070]	[9.30561]	[-1.45557]	[2.01460]	[-1.45901]
Wholesale(-2)	0.01709	0.00850	-0.00631	-0.00443	0.01330	-0.00599	-0.01107
	[1.57454]	[0.72727]	[-0.71212]	[-0.33576]	[1.09737]	[-0.42813]	[-0.24841]
Wholesale(-3)	-0.01715	0.00981	-0.00747	0.02112	0.01162	-0.00836	-0.09928**
	[-1.58210]	[0.84098]	[-0.84383]	[1.60443]	[0.96029]	[-0.59810]	[-2.23189]
Wholesale(-4)	-0.00348	0.03203***	-0.00077	0.00281	-0.01406	0.04066***	0.02505

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	[-0.32030]	[2.74127]	[-0.08702]	[0.21291]	[-1.16028]	[2.90404]	[0.56227]
Wholesale(-5)	0.00346	-0.00250	-0.00099	0.01999	-0.00580	0.02600**	-0.00775
	[0.31805]	[-0.21357]	[-0.11158]	[1.51454]	[-0.47772]	[1.85495]	[-0.17383]
Wholesale(-6)	-0.01201	-0.00646	-0.02956***	-0.03697***	-0.04499***	0.00164	-0.08751**
	[-1.11840]	[-0.55878]	[-3.36984]	[-2.83337]	[-3.75158]	[0.11849]	[-1.98476]
Retail(-1)	0.02164**	-0.02270	0.02040**	0.00746	0.15025***	-0.02363	0.21863***
	[1.91565]	[-1.86730]	[2.21240]	[0.54341]	[11.9157]	[-1.62235]	[4.71628]
Retail(-2)	-0.00157	-0.01769	0.02301**	-0.01799	0.00706	0.00541	-0.03340
	[-0.13846]	[-1.45026]	[2.48583]	[-1.30612]	[0.55751]	[0.36975]	[-0.71785]
Retail(-3)	0.01259	0.00662	0.00535	0.01308	0.03268***	0.02215	0.12661***
	[1.11050]	[0.54281]	[0.57827]	[0.94980]	[2.58188]	[1.51461]	[2.72095]
Retail(-4)	-0.00799	-0.00100	0.01931	0.01238	-0.01362	0.00095	0.00068
	[-0.70651]	[-0.08197]	[2.09140]	[0.90095]	[-1.07904]	[0.06542]	[0.01463]
Retail(-5)	-0.00135	-0.01665	0.00397	-0.01575	0.01704	0.01568	-0.01130
	[-0.11925]	[-1.36732]	[0.42972]	[-1.14624]	[1.34893]	[1.07502]	[-0.24331]
Retail(-6)	0.00197	-0.00191	0.02227**	0.02689**	0.03251***	0.00725	0.13427***
	[0.17641]	[-0.15864]	[2.44259]	[1.98157]	[2.60733]	[0.50332]	[2.92888]
Finance(-1)	-0.06735***	-0.10548***	-0.04815***	-0.05170***	-0.04915***	-0.00919	0.08404**
	[-6.89587]	[-10.0366]	[-6.03830]	[-4.35824]	[-4.50750]	[-0.72979]	[2.09669]
Finance(-2)	0.01702*	-0.00865	-0.01103	0.01496	0.01062	-0.02300**	0.04652
	[1.73886]	[-0.82152]	[-1.38070]	[1.25854]	[0.97197]	[-1.82214]	[1.15817]
Finance(-3)	-0.01280	-0.02576**	-0.01051	0.00537	-0.01731	-0.01727	0.06803*
	[-1.30709]	[-2.44545]	[-1.31479]	[0.45112]	[-1.58396]	[-1.36784]	[1.69310]
Finance(-4)	-0.01001	-0.01446	-0.00175	0.00812	0.01589	-0.02529**	0.09459***

	[-1.02291]	[-1.37359]	[-0.21954]	[0.68347]	[1.45439]	[-2.00403]	[2.35520]
Finance(-5)	-0.01017	-0.02775***	-0.01838**	-0.00491	-0.01701	-0.02264*	-0.00552
	[-1.04090]	[-2.63826]	[-2.30323]	[-0.41316]	[-1.55870]	[-1.79563]	[-0.13755]
Finance(-6)	-0.03528***	-0.01260	-0.01150	-0.02797**	-0.03201***	-0.02625**	0.08192**
	[-3.64772]	[-1.21087]	[-1.45656]	[-2.38087]	[-2.96468]	[-2.10474]	[2.06399]
Services(-1)	-0.00398	-0.00842***	-0.00202	-0.00777**	-0.00544**	-0.00982***	-0.00609
	[-1.60657]	[-3.15704]	[-0.99565]	[-2.57933]	[-1.96421]	[-3.07208]	[-0.59830]
Services(-2)	-0.00099	-0.00162	-0.00504**	-0.00152	-0.00654**	-0.00433	-0.04828***
	[-0.39833]	[-0.60417]	[-2.47703]	[-0.50205]	[-2.35306]	[-1.34973]	[-4.72431]
Services(-3)	0.00068	-0.00163	-0.00298	-0.00186	-0.00274	-0.01035***	0.01192
	[0.27523]	[-0.60794]	[-1.46698]	[-0.61671]	[-0.98852]	[-3.22780]	[1.16814]
Services(-4)	-0.00142	-0.00425	-0.00497**	-0.00235	-0.00246	0.00493	-0.01393
	[-0.57280]	[-1.59350]	[-2.45258]	[-0.77823]	[-0.88950]	[1.54047]	[-1.36826]
Services(-5)	-0.00299	-0.00021	-0.00389**	0.00012	0.00106	0.00062	-0.01050
	[-1.19793]	[-0.07840]	[-1.90767]	[0.04096]	[0.37926]	[0.19220]	[-1.02379]
Services(-6)	-0.00179	0.00015	-0.00324	-0.00417	-0.00196	-0.00195	0.00136
	[-0.72347]	[0.05690]	[-1.60184]	[-1.38530]	[-0.70727]	[-0.61143]	[0.13390]
C	0.00035	0.00050	-0.00022	-0.00047	0.00022	0.00106***	-0.00026
	[1.23103]	[1.62781]	[-0.96406]	[-1.36438]	[0.68100]	[2.89054]	[-0.22210]
US GDP	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	[1.38900]	[1.13146]	[1.44830]	[1.56682]	[1.33412]	[1.47812]	[0.11777]
US Interest Rate	0.00017***	0.00020***	0.00020***	0.00021***	0.00021***	0.00023***	0.00038**
	[4.60366]	[4.95015]	[6.49900]	[4.66773]	[5.13030]	[4.79824]	[2.48863]
Market Return	0.93759***	1.33202***	0.88596***	1.08853***	1.19149***	1.51761***	1.62278***

	[108.716]	[143.528]	[125.826]	[103.909]	[123.748]	[136.449]	[45.8459]
US Inflation Rate	-0.00009***	-0.00013***	-0.00012***	-0.00014***	-0.00009***	-0.00011***	-0.00007
	[-2.89915]	[-4.10102]	[-4.72424]	[-3.72314]	[-2.81812]	[-2.76087]	[-0.59550]
US Unemployment rate	-0.00014***	-0.00018***	-0.00007*	-0.00002	-0.00019***	-0.00031***	-0.00023
	[-3.00605]	[-3.64901]	[-1.76700]	[-0.36647]	[-3.57775]	[-5.20933]	[-1.20683]

Notes: The top entry in each row show the coefficient of VAR estimation and the second entry show the value of the t-statistic.

* Denotes significance level of 1%.

** Denotes significance level of 5%.

*** Denotes significance level of 10%

Table 9 :   Impulse Response Function for daily Portfolio data
Full Period (July 1962 to December 2008)

Response of Construction

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00618	0.00286	0.00295	0.00351	0.00336	0.00178	0.00079
2	0.00009	-0.00069	-0.00051	-0.00028	-0.00009	-0.00079	-0.00015
3	-0.00027	-0.00010	-0.00022	-0.00009	-0.00013	0.00004	-0.00002
4	-0.00013	-0.00025	-0.00019	-0.00017	-0.00008	-0.00018	0.00001
5	-0.00005	-0.00006	-0.00017	-0.00009	-0.00010	-0.00008	-0.00001
6	0.00002	-0.00015	0.00002	-0.00004	-0.00004	-0.00013	-0.00008
7	-0.00019	0.00011	0.00001	-0.00014	-0.00007	-0.00008	-0.00005
8	-0.00002	0.00007	0.00002	0.00001	-0.00001	0.00004	0.00003
9	0.00004	0.00001	0.00003	0.00002	0.00001	0.00001	0.00001
10	0.00002	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001

Response of Manufacturing

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00308	0.00665	0.00324	0.00304	0.00267	0.00417	0.00071
2	-0.00081	-0.00080	-0.00068	-0.00057	-0.00066	-0.00102	-0.00039
3	0.00008	-0.00017	-0.00006	0.00002	-0.00009	-0.00012	-0.00002
4	0.00001	-0.00032	-0.00028	-0.00005	-0.00007	-0.00032	-0.00002
5	0.00004	-0.00010	-0.00011	0.00014	-0.00001	-0.00010	-0.00006
6	-0.00007	-0.00017	-0.00006	-0.00011	-0.00015	-0.00021	-0.00003
7	-0.00014	0.00000	-0.00004	-0.00012	-0.00010	-0.00003	0.00002
8	0.00004	0.00008	0.00004	0.00004	0.00001	0.00009	0.00003
9	0.00001	0.00003	0.00002	0.00001	0.00000	0.00002	0.00001
10	0.00001	0.00002	0.00001	0.00001	0.00000	0.00001	0.00000

Response of Transportation

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00241	0.00246	0.00505	0.00199	0.00225	0.00176	0.00029
2	-0.00040	-0.00067	0.00007	-0.00044	-0.00017	-0.00063	-0.00016
3	-0.00006	-0.00018	-0.00006	-0.00012	0.00005	-0.00014	-0.00011
4	-0.00001	-0.00031	-0.00008	-0.00013	-0.00001	-0.00025	-0.00010
5	-0.00008	-0.00012	-0.00002	-0.00007	0.00004	-0.00006	-0.00011
7	-0.00014	0.00002	-0.00006	-0.00021	0.00002	-0.00005	-0.00009
8	0.00000	0.00004	0.00001	-0.00002	0.00003	0.00004	0.00001
9	0.00003	0.00001	0.00002	0.00001	0.00002	0.00001	0.00001
10	0.00001	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000

Response of Wholesale

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00427	0.00343	0.00296	0.00751	0.00364	0.00257	0.00086
2	-0.00020	-0.00046	-0.00043	0.00033	-0.00009	-0.00051	-0.00022
3	-0.00022	-0.00010	-0.00009	-0.00008	-0.00019	0.00004	-0.00006
4	-0.00022	-0.00028	-0.00020	-0.00005	-0.00011	-0.00011	-0.00005

5	-0.00011	-0.00022	-0.00016	-0.00004	-0.00004	-0.00006	-0.00005
6	-0.00004	-0.00025	-0.00021	-0.00002	-0.00013	-0.00014	-0.00001
7	-0.00010	0.00005	0.00007	-0.00017	0.00005	-0.00007	-0.00009
8	0.00000	0.00005	0.00006	-0.00001	0.00003	0.00004	0.00002
9	0.00001	0.00002	0.00002	0.00001	0.00002	0.00003	0.00002
10	0.00002	0.00000	0.00001	0.00001	0.00002	0.00000	0.00001

Response of Retail

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00376	0.00277	0.00308	0.00334	0.00690	0.00186	0.00096
2	-0.00010	-0.00082	-0.00034	-0.00023	0.00044	-0.00075	-0.00015
3	-0.00015	-0.00032	-0.00019	-0.00009	0.00000	-0.00012	-0.00015
4	-0.00014	-0.00039	-0.00014	-0.00006	0.00005	-0.00027	-0.00008
5	-0.00011	-0.00011	-0.00026	-0.00015	-0.00014	0.00002	-0.00004
6	-0.00005	-0.00027	-0.00009	-0.00014	-0.00002	-0.00021	0.00001
7	-0.00002	-0.00007	-0.00010	-0.00025	0.00009	-0.00018	-0.00002
8	0.00004	0.00005	0.00001	-0.00002	0.00006	0.00003	0.00002
9	0.00003	0.00002	0.00002	0.00002	0.00003	0.00002	0.00002
10	0.00002	0.00002	0.00001	0.00000	0.00002	0.00001	0.00001

Response of Finance

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00229	0.00499	0.00278	0.00273	0.00215	0.00797	0.00095
2	-0.00078	-0.00061	-0.00067	-0.00043	-0.00061	-0.00045	-0.00036
3	-0.00003	-0.00029	-0.00014	-0.00009	-0.00009	-0.00025	-0.00012
4	-0.00010	-0.00021	-0.00025	-0.00016	-0.00004	-0.00023	-0.00024
5	-0.00003	-0.00005	-0.00001	0.00017	0.00002	-0.00011	0.00014
6	-0.00011	-0.00022	-0.00004	0.00005	0.00002	-0.00021	0.00003
7	-0.00010	-0.00017	0.00008	-0.00006	-0.00001	-0.00018	-0.00005
8	0.00006	0.00005	0.00008	0.00005	0.00005	0.00007	0.00003
9	0.00000	0.00002	0.00002	0.00001	0.00002	0.00003	0.00000
10	0.00001	0.00000	0.00000	0.00000	-0.00001	0.00001	0.00000

Response of Services

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00325	0.00271	0.00144	0.00292	0.00352	0.00301	0.02537
2	0.00018	-0.00043	-0.00106	-0.00018	0.00072	0.00005	-0.00001
3	-0.00020	-0.00026	0.00016	-0.00022	-0.00020	0.00007	-0.00124
4	-0.00036	-0.00052	-0.00038	-0.00060	0.00017	0.00002	0.00031
5	-0.00014	-0.00024	-0.00031	-0.00001	-0.00001	0.00034	-0.00026
6	-0.00038	-0.00025	-0.00046	-0.00030	-0.00040	-0.00018	-0.00033
7	-0.00048	-0.00027	-0.00047	-0.00056	0.00024	0.00020	0.00012
8	0.00010	0.00010	0.00005	0.00006	0.00012	0.00010	0.00007
9	0.00004	0.00003	0.00005	0.00005	0.00004	-0.00001	0.00002
10	0.00002	0.00000	0.00002	0.00004	0.00006	0.00000	0.00002

Notes: The entry in each row is the responses of the given sector to shocks in the sector in each column.

Table 11 :   **Variance Decomposition for daily data**
                Full Period (July 1962 to December 2008)

Variance Decomposition of Construction:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00618	100.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	0.00627	97.35248	1.71735	0.35893	0.06023	0.03097	0.45484	0.02520
3	0.00628	97.25994	1.71437	0.39567	0.07679	0.03226	0.49585	0.02513
4	0.00628	97.11530	1.82438	0.41077	0.08360	0.04139	0.49600	0.02856
5	0.00628	97.03872	1.82768	0.47061	0.09062	0.04563	0.49821	0.02854
6	0.00629	96.92002	1.90966	0.48633	0.09139	0.04919	0.50288	0.04053
7	0.00630	96.69707	2.02287	0.48808	0.11653	0.04912	0.58495	0.04139
8	0.00630	96.67531	2.04199	0.48796	0.11652	0.04998	0.58505	0.04318
9	0.00630	96.67451	2.04195	0.48828	0.11653	0.05033	0.58505	0.04335

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
10	0.00630	96.67426	2.04193	0.48828	0.11653	0.05049	0.58504	0.04347

Variance Decomposition of Manufacturing:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00665	21.41228	78.58772	0.00000	0.00000	0.00000	0.00000	0.00000
2	0.00676	22.18250	76.63645	0.07142	0.00052	0.04262	0.96962	0.09688
3	0.00676	22.15829	76.62163	0.07412	0.00420	0.07650	0.96847	0.09680
4	0.00678	22.06471	76.57825	0.16631	0.00895	0.07686	1.00847	0.09646
5	0.00678	22.02939	76.48493	0.19208	0.09684	0.07844	1.01253	0.10579
6	0.00679	22.01399	76.43770	0.19376	0.10035	0.09972	1.04880	0.10568
7	0.00679	22.04076	76.39085	0.19382	0.11261	0.10234	1.05005	0.10956
8	0.00679	22.03882	76.38363	0.19379	0.11264	0.10422	1.05643	0.11046
9	0.00679	22.03868	76.38304	0.19380	0.11272	0.10465	1.05658	0.11054
10	0.00679	22.03874	76.38271	0.19382	0.11272	0.10487	1.05660	0.11054

Variance Decomposition of Transportation:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00505	22.78570	9.04484	68.16946	0.00000	0.00000	0.00000	0.00000
2	0.00513	22.65623	9.87216	66.97001	0.10481	0.04367	0.34350	0.00962
3	0.00514	22.61144	9.95002	66.79226	0.11915	0.13650	0.34679	0.04384
4	0.00515	22.49537	10.34091	66.45091	0.13276	0.15601	0.35961	0.06442
5	0.00516	22.48156	10.36045	66.35458	0.13264	0.20437	0.35967	0.10672
6	0.00516	22.42886	10.47328	66.21508	0.13764	0.21272	0.38818	0.14426
7	0.00517	22.42208	10.46917	65.98349	0.27646	0.28467	0.39958	0.16456
8	0.00517	22.41784	10.47466	65.97095	0.28276	0.28854	0.40068	0.16458
9	0.00517	22.41967	10.47432	65.96878	0.28312	0.28878	0.40067	0.16465
10	0.00517	22.42009	10.47420	65.96773	0.28342	0.28891	0.40100	0.16465

Variance Decomposition of Wholesale:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services

1	0.00751	32.28386	4.80244	0.47491	62.43879	0.00000	0.00000	0.00000
2	0.00757	31.84135	5.03300	0.57919	62.28694	0.00119	0.19265	0.06569
3	0.00757	31.88148	5.02638	0.57863	62.21066	0.01842	0.21720	0.06724
4	0.00758	31.89516	5.09018	0.58066	62.11946	0.02037	0.22614	0.06804
5	0.00759	31.87454	5.14568	0.58672	62.05239	0.02692	0.24319	0.07057
6	0.00759	31.81922	5.25722	0.61803	61.95409	0.03721	0.24366	0.07058
7	0.00760	31.77985	5.26827	0.63372	61.90271	0.06567	0.26821	0.08157
8	0.00760	31.77590	5.27259	0.63882	61.89638	0.06617	0.26827	0.08187
9	0.00760	31.77560	5.27287	0.63892	61.89525	0.06625	0.26882	0.08230
10	0.00760	31.77607	5.27300	0.63903	61.89435	0.06635	0.26882	0.08239

Variance Decomposition of Retail:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00690	29.60535	2.82151	2.72300	2.57143	62.27870	0.00000	0.00000
2	0.00701	28.70339	4.26097	2.64023	2.49320	61.66597	0.19873	0.03750
3	0.00702	28.65184	4.40975	2.63500	2.49684	61.50810	0.22144	0.07704
4	0.00704	28.56219	4.66305	2.62793	2.51511	61.32114	0.22560	0.08497
5	0.00705	28.53032	4.66300	2.72948	2.51986	61.20500	0.26486	0.08749
6	0.00705	28.48051	4.81416	2.72482	2.52421	61.09944	0.26788	0.08897
7	0.00706	28.39424	4.80824	2.72935	2.66605	61.00285	0.31034	0.08892
8	0.00707	28.39131	4.80953	2.73057	2.67389	60.99496	0.31045	0.08929
9	0.00707	28.39246	4.80946	2.73049	2.67381	60.99349	0.31048	0.08982
10	0.00707	28.39254	4.80961	2.73045	2.67416	60.99277	0.31048	0.08999

Variance Decomposition of Finance:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00797	8.26448	30.95657	0.28830	0.46050	0.00002	60.03013	0.00000
2	0.00803	9.10145	30.66785	0.38988	0.47823	0.03352	59.23566	0.09342
3	0.00803	9.08651	30.76441	0.39085	0.47742	0.03404	59.14109	0.10567
4	0.00804	9.07986	30.74727	0.44019	0.48166	0.04960	59.01990	0.18152
5	0.00805	9.06729	30.70290	0.44035	0.57751	0.04957	58.95006	0.21234
6	0.00806	9.07061	30.70329	0.45287	0.63284	0.06253	58.86193	0.21593

7	0.00806	9.07332	30.69049	0.51717	0.63235	0.06548	58.80454	0.21666
8	0.00806	9.07771	30.68603	0.52226	0.63243	0.06547	58.79875	0.21736
9	0.00806	9.07757	30.68581	0.52271	0.63242	0.06579	58.79835	0.21736
10	0.00806	9.07755	30.68565	0.52271	0.63242	0.06594	58.79837	0.21737

Variance Decomposition of Services:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.02537	1.64184	0.28559	0.06194	0.16579	0.53185	0.42570	96.88729
2	0.02544	1.63824	0.33612	0.27765	0.16645	0.74406	0.46347	96.37401
3	0.02548	1.63992	0.34043	0.29820	0.16795	0.74455	0.47416	96.33479
4	0.02550	1.65690	0.36369	0.29925	0.18956	0.80677	0.50920	96.17464
5	0.02551	1.65825	0.36901	0.30667	0.19304	0.80921	0.56883	96.09499
6	0.02552	1.67984	0.36976	0.32109	0.19337	0.81234	0.56852	96.05508
7	0.02554	1.71134	0.36954	0.33143	0.20877	0.90085	0.60902	95.86906
8	0.02554	1.71272	0.37010	0.33146	0.20876	0.90178	0.60942	95.86577
9	0.02554	1.71297	0.37012	0.33165	0.20889	0.90178	0.60969	95.86490
10	0.02554	1.71305	0.37014	0.33168	0.20909	0.90219	0.60969	95.86417

Notes :   Cholesky Ordering - Construction Manufacturing Transportation Wholesale Retail Finance Services

Entries in the ith row show the share of each sector in the forecast error VD of the sector given on the left-hand side.
These shares must add up to 100. Entries in j[th] column show the contribution of the sector listed in the column heading
to the VD of the sector on the left-hand side.

Table 12 : VAR Table for weekly portfolio data
Full Period (July 1962 to December 2008)

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Construction(-1)	0.00499	0.03857	0.03419	-0.02202	0.05235***	-0.03628	-0.15333***
	[0.18966]	[1.46406]	[1.50430]	[-0.66078]	[1.70691]	[-1.08583]	[-1.65786]
Construction(-2)	-0.03948	0.02570	0.03022	-0.02723	-0.04613	-0.00097	-0.32308***
	[-1.49619]	[0.97232]	[1.32561]	[-0.81467]	[-1.49956]	[-0.02903]	[-3.48268]
Construction(-3)	-0.03187	-0.01198	-0.01540	-0.04448	-0.06492***	0.01473	-0.27559***
	[-1.20767]	[-0.45338]	[-0.67539]	[-1.33064]	[-2.10984]	[0.43927]	[-2.97007]
Construction(-4)	-0.00939	0.02488	0.00664	0.00990	0.01842	0.06151***	0.30318***
	[-0.35735]	[0.94594]	[0.29255]	[0.29772]	[0.60171]	[1.84359]	[3.28314]
Manufacturing(-1)	0.01317	-0.08434***	-0.09695***	-0.15282***	-0.12058***	-0.15382***	-0.33407***
	[0.49912]	[-3.19109]	[-4.25167]	[-4.57206]	[-3.91959]	[-4.58901]	[-3.60075]
Manufacturing(-2)	0.00460	-0.03066	-0.04783***	-0.05169	-0.08280***	-0.04513	-0.18832***
	[0.17363]	[-1.15521]	[-2.08857]	[-1.54000]	[-2.67977]	[-1.34054]	[-2.02104]
Manufacturing(-3)	-0.04633*	-0.01948	-0.08050***	-0.07198***	-0.03882	-0.07787***	-0.10292
	[-1.74435]	[-0.73237]	[-3.50712]	[-2.13955]	[-1.25370]	[-2.30796]	[-1.10196]
Manufacturing(-4)	-0.05439***	-0.03943	-0.03620	-0.04620	0.02792	-0.07209***	0.16609*
	[-2.05207]	[-1.48520]	[-1.58071]	[-1.37617]	[0.90371]	[-2.14142]	[1.78236]
Transportation(-1)	-0.09400***	0.01676	0.00640	-0.07255***	-0.10308***	0.05429	-0.28165***
	[-3.44987]	[0.61427]	[0.27181]	[-2.10228]	[-3.24504]	[1.56857]	[-2.93997]
Transportation(-2)	0.07396***	0.01355	0.01364	0.06405*	0.10077***	0.01234	0.18582*
	[2.69862]	[0.49348]	[0.57580]	[1.84518]	[3.15395]	[0.35439]	[1.92850]
Transportation(-3)	-0.01533	0.01506	0.02953	0.03415	0.00042	0.06965***	-0.09271

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	[-0.55935]	[0.54855]	[1.24657]	[0.98365]	[0.01320]	[2.00011]	[-0.96193]
Transportation(-4)	0.03599 [1.31794]	0.01619 [0.59206]	0.04649* [1.97035]	0.02431 [0.70278]	0.04840 [1.52020]	-0.01712 [-0.49345]	0.04955 [0.51610]
Wholesale(-1)	-0.02335 [-1.12410]	-0.02574 [-1.23711]	-0.07173*** [-3.99554]	0.03833 [1.45678]	-0.05272*** [-2.17684]	-0.01111 [-0.42101]	-0.10605 [-1.45188]
Wholesale(-2)	-0.00938 [-0.45032]	0.02023 [0.97003]	-0.01798 [-0.99917]	0.07156*** [2.71298]	0.03913 [1.61171]	0.01132 [0.42786]	0.00560 [0.07647]
Wholesale(-3)	0.00287 [0.13788]	0.00405 [0.19428]	0.03085* [1.71427]	0.03623 [1.37331]	0.04514* [1.85872]	0.03748 [1.41650]	-0.08093 [-1.10506]
Wholesale(-4)	0.04251*** [2.04294]	0.00254 [0.12184]	-0.00165 [-0.09155]	0.03372 [1.27947]	0.00771 [0.31787]	-0.01232 [-0.46608]	0.07280 [0.99515]
Retail(-1)	-0.03205 [-1.46616]	-0.05488*** [-2.50686]	0.02094 [1.10837]	0.00608 [0.21975]	0.05744*** [2.25408]	0.00323 [0.11645]	0.20804*** [2.70693]
Retail(-2)	0.00536 [0.24451]	-0.04027* [-1.83292]	0.01203 [0.63475]	-0.10196*** [-3.66979]	-0.02587 [-1.01165]	-0.05824*** [-2.09030]	0.11638 [1.50903]
Retail(-3)	0.03346 [1.52110]	0.00999 [0.45346]	0.01313 [0.69090]	-0.00214 [-0.07682]	0.03865 [1.50699]	0.00130 [0.04657]	0.33216*** [4.29499]
Retail(-4)	-0.00886 [-0.40243]	-0.06076*** [-2.75646]	-0.02712 [-1.42620]	-0.02759 [-0.98966]	-0.02860 [-1.11476]	-0.05833*** [-2.08647]	-0.20422*** [-2.63920]
Finance(-1)	-0.05484*** [-2.75372]	-0.06365*** [-3.19074]	-0.00544 [-0.31613]	0.00689 [0.27299]	-0.03944* [-1.69860]	-0.01273 [-0.50305]	0.37302*** [5.32684]
Finance(-2)	-0.03534*** [-1.75865]	-0.02268 [-1.12693]	-0.01769 [-1.01885]	0.01430 [0.56186]	-0.01703 [-0.72684]	0.02394 [0.93801]	-0.02499 [-0.35372]
Finance(-3)	0.01972	-0.02333	0.00502	0.02901	-0.01441	-0.01540	0.01434

	[0.98269]	[-1.16077]	[0.28964]	[1.14106]	[-0.61576]	[-0.60400]	[0.20323]
Finance(-4)	-0.02978	-0.00164	-0.02184	-0.01669	-0.09187***	0.02965	-0.19797***
	[-1.48973]	[-0.08173]	[-1.26442]	[-0.65904]	[-3.94155]	[1.16737]	[-2.81637]
Services(-1)	0.00292	-0.00632	-0.01227***	-0.00573	-0.00316	-0.01488*	-0.03347
	[0.48907]	[-1.05682]	[-2.37879]	[-0.75792]	[-0.45471]	[-1.96305]	[-1.59498]
Services(-2)	-0.00916	-0.00468	-0.01275**	-0.01598**	-0.02364***	-0.01038	0.09000***
	[-1.55336]	[-0.79195]	[-2.50346]	[-2.14050]	[-3.43925]	[-1.38594]	[4.34200]
Services(-3)	0.00234	0.00978*	-0.00676	0.00675	-0.01167**	-0.00421	0.12790***
	[0.39886]	[1.66078]	[-1.33001]	[0.90599]	[-1.70294]	[-0.56344]	[6.18859]
Services(-4)	-0.00664	0.00238	0.00761	-0.00432	-0.01376***	-0.00428	-0.11505***
	[-1.13020]	[0.40485]	[1.49977]	[-0.58065]	[-2.00864]	[-0.57388]	[-5.57031]
C	0.00206	0.00229	-0.00078	-0.00165	0.00258	0.00555***	0.00029
	[1.46016]	[1.62021]	[-0.64242]	[-0.92262]	[1.56721]	[3.09453]	[0.05854]
US GDP	0.00000*	0.00000***	0.00000***	0.00000**	0.00000	0.00000	0.00000
	[1.89726]	[2.02356]	[3.15276]	[1.85719]	[1.27838]	[1.22661]	[0.92919]
US Interest Rate	0.00052***	0.00054***	0.00052***	0.00063***	0.00059***	0.00070***	0.00087*
	[3.73585]	[3.87530]	[4.27052]	[3.57298]	[3.62559]	[3.94441]	[1.76524]
Market Return	0.73574***	1.12003***	0.74466***	0.94105***	1.01691***	1.30391***	1.47725***
	[52.6587]	[80.0352]	[61.6783]	[53.1748]	[62.4287]	[73.4696]	[30.0714]
US Inflation Rate	-0.00021	-0.00041***	-0.00031***	-0.00044***	-0.00015	-0.00029*	0.00020
	[-1.54271]	[-3.08100]	[-2.71107]	[-2.56747]	[-0.94435]	[-1.69787]	[0.42202]
US Unemployment rate	-0.00051**	-0.00061***	-0.00011	0.00008	-0.00076***	-0.00124***	-0.00085
	[-2.23370]	[-2.68578]	[-0.53504]	[0.28582]	[-2.86524]	[-4.30754]	[-1.07058]

Notes: Rows represent sources of shocks. Columns show the sectors affected.

The top entry in each row show the coefficient of VAR estimation and the second entry in brackets show the value of the t-statistic.
* Denotes significance level of 1%.
** Denotes significance level of 5%.
*** Denotes significance level of 10%

Table 12 :   Impulse Response Function for weekly portfolio data
**   Full Period (July 1962 to December 2008)**

Response of Construction:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00621	0.00290	0.00299	0.00354	0.00340	0.00181	0.00081
2	0.00009	-0.00068	-0.00051	-0.00028	-0.00010	-0.00080	-0.00015
3	-0.00027	-0.00011	-0.00021	-0.00010	-0.00013	0.00002	-0.00003
4	-0.00013	-0.00025	-0.00019	-0.00018	-0.00008	-0.00016	0.00001
5	-0.00004	-0.00007	-0.00016	-0.00012	-0.00013	-0.00012	-0.00004
6	0.00002	0.00007	0.00001	0.00001	0.00000	0.00006	0.00002
7	0.00000	0.00003	0.00001	0.00001	0.00000	0.00002	0.00002
8	0.00000	0.00002	0.00001	0.00000	0.00000	0.00001	0.00001
9	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Response of Manufacturing:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00312	0.00669	0.00329	0.00309	0.00272	0.00421	0.00074
2	-0.00080	-0.00079	-0.00068	-0.00055	-0.00066	-0.00104	-0.00039
3	0.00009	-0.00017	-0.00005	0.00002	-0.00009	-0.00014	-0.00004
4	0.00001	-0.00031	-0.00026	-0.00006	-0.00006	-0.00030	-0.00003
5	0.00005	-0.00008	-0.00013	0.00009	-0.00007	-0.00015	-0.00012

6	0.00003	0.00008	0.00004	0.00004	0.00002	0.00008	0.00003
7	-0.00001	0.00003	0.00001	0.00000	-0.00001	0.00003	0.00002
8	0.00000	0.00001	0.00000	0.00000	-0.00001	0.00002	0.00001
9	0.00000	0.00000	-0.00001	0.00000	0.00000	0.00000	0.00000
10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Response of Transportation:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00245	0.00250	0.00508	0.00203	0.00230	0.00179	0.00031
2	-0.00040	-0.00066	0.00008	-0.00043	-0.00017	-0.00065	-0.00016
3	-0.00006	-0.00018	-0.00005	-0.00013	0.00006	-0.00016	-0.00012
4	-0.00002	-0.00031	-0.00008	-0.00014	-0.00001	-0.00023	-0.00010
5	-0.00006	-0.00012	-0.00002	-0.00010	0.00002	-0.00011	-0.00014
6	0.00000	0.00004	0.00005	-0.00001	0.00004	0.00005	0.00001
7	0.00000	0.00001	0.00001	-0.00001	0.00001	0.00001	0.00001
8	0.00000	0.00001	0.00001	-0.00001	0.00000	0.00000	0.00000
9	0.00000	0.00000	0.00000	-0.00001	0.00000	0.00000	0.00000
10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Response of Wholesale:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00430	0.00348	0.00301	0.00754	0.00368	0.00262	0.00089
2	-0.00018	-0.00045	-0.00042	0.00034	-0.00008	-0.00052	-0.00022
3	-0.00021	-0.00011	-0.00008	-0.00009	-0.00019	0.00000	-0.00008
4	-0.00021	-0.00028	-0.00018	-0.00006	-0.00009	-0.00009	-0.00005
5	-0.00009	-0.00020	-0.00018	-0.00008	-0.00009	-0.00010	-0.00009
6	0.00004	0.00006	0.00002	0.00002	0.00002	0.00007	0.00002
7	0.00000	0.00003	0.00002	0.00001	0.00001	0.00003	0.00001
8	0.00000	0.00002	0.00001	0.00000	0.00001	0.00002	0.00001
9	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001
10	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00001	0.00000

Response of Retail:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00380	0.00283	0.00315	0.00339	0.00695	0.00192	0.00099
2	-0.00009	-0.00080	-0.00032	-0.00021	0.00044	-0.00077	-0.00015
3	-0.00014	-0.00033	-0.00018	-0.00010	0.00002	-0.00015	-0.00017
4	-0.00014	-0.00038	-0.00012	-0.00008	0.00006	-0.00026	-0.00009
5	-0.00010	-0.00011	-0.00025	-0.00021	-0.00016	-0.00004	-0.00009
6	0.00000	0.00007	-0.00001	-0.00003	-0.00001	0.00009	0.00001
7	-0.00001	0.00003	0.00002	0.00000	0.00000	0.00003	0.00002
8	0.00000	0.00002	0.00000	-0.00001	0.00000	0.00002	0.00001
9	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001
10	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00001	0.00000

Response of Finance:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00233	0.00503	0.00283	0.00278	0.00221	0.00801	0.00097
2	-0.00077	-0.00061	-0.00067	-0.00041	-0.00061	-0.00045	-0.00037
3	-0.00003	-0.00029	-0.00012	-0.00009	-0.00009	-0.00028	-0.00014
4	-0.00009	-0.00021	-0.00023	-0.00017	-0.00003	-0.00022	-0.00025
5	-0.00004	-0.00004	-0.00001	0.00013	0.00000	-0.00015	0.00009
6	0.00003	0.00007	0.00006	0.00006	0.00005	0.00006	0.00005
7	0.00000	0.00002	0.00002	0.00000	0.00000	0.00002	0.00000
8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00001
9	0.00000	-0.00001	-0.00001	-0.00001	0.00000	0.00000	-0.00001
10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Response of Services:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00330	0.00281	0.00156	0.00300	0.00361	0.00307	0.02540
2	0.00021	-0.00042	-0.00103	-0.00014	0.00077	0.00004	0.00001

3	-0.00019	-0.00028	0.00018	-0.00021	-0.00018	0.00002	-0.00126
4	-0.00032	-0.00053	-0.00034	-0.00059	0.00020	0.00004	0.00034
5	-0.00011	-0.00019	-0.00033	-0.00009	-0.00008	0.00029	-0.00033
6	0.00002	0.00008	-0.00003	0.00003	-0.00005	0.00008	-0.00001
7	-0.00002	0.00003	0.00003	-0.00001	0.00003	0.00000	0.00003
8	-0.00001	0.00005	0.00001	0.00000	-0.00001	0.00004	0.00001
9	0.00000	0.00001	0.00000	0.00001	0.00000	-0.00001	0.00003
10	0.00000	-0.00001	0.00000	0.00001	0.00000	-0.00001	0.00000

Notes: The entry in each row is the responses of the given sector to shocks in the sector in each column.

Table 13 : Variance Decomposition Table for weekly portfolio data
                Full Period (July 1962 to December 2008)

Variance Decomposition of Construction:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1.00000	0.00621	100.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2.00000	0.00629	97.36834	1.67234	0.36094	0.05721	0.02482	0.49378	0.02258
3.00000	0.00630	97.29842	1.66915	0.38931	0.06858	0.02711	0.52430	0.02313
4.00000	0.00631	97.15648	1.77494	0.40230	0.07817	0.03897	0.52330	0.02585
5.00000	0.00631	97.04245	1.78003	0.45918	0.10133	0.05128	0.53829	0.02745
6.00000	0.00631	97.02416	1.79120	0.46126	0.10320	0.05261	0.53975	0.02781
7.00000	0.00631	97.02067	1.79344	0.46130	0.10330	0.05280	0.53987	0.02863
8.00000	0.00631	97.01937	1.79412	0.46131	0.10333	0.05296	0.53991	0.02900
9.00000	0.00631	97.01922	1.79411	0.46137	0.10333	0.05302	0.53995	0.02900
10.00000	0.00631	97.01911	1.79414	0.46138	0.10335	0.05303	0.53998	0.02900

Variance Decomposition of Manufacturing:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1.00000	0.00669	21.77489	78.22511	0.00000	0.00000	0.00000	0.00000	0.00000

2.00000	0.00680	22.47659	76.27018	0.07333	0.00132	0.04392	1.03808	0.09657
3.00000	0.00680	22.45357	76.25468	0.07467	0.00257	0.07617	1.04021	0.09813
4.00000	0.00682	22.36554	76.22992	0.15383	0.00479	0.07715	1.07078	0.09800
5.00000	0.00682	22.32886	76.11681	0.19427	0.03807	0.09444	1.10243	0.12512
6.00000	0.00682	22.32718	76.11324	0.19425	0.03827	0.09486	1.10639	0.12582
7.00000	0.00682	22.32637	76.11229	0.19433	0.03827	0.09504	1.10669	0.12702
8.00000	0.00682	22.32606	76.11176	0.19437	0.03831	0.09533	1.10690	0.12727
9.00000	0.00682	22.32602	76.11169	0.19443	0.03834	0.09535	1.10690	0.12727
10.00000	0.00682	22.32600	76.11167	0.19444	0.03835	0.09535	1.10692	0.12727

Variance Decomposition of Transportation:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1.00000	0.00508	23.25523	9.13073	67.61404	0.00000	0.00000	0.00000	0.00000
2.00000	0.00516	23.09346	9.91808	66.45572	0.09695	0.03990	0.38791	0.00797
3.00000	0.00517	23.03358	10.00104	66.25407	0.11728	0.14292	0.39917	0.05194
4.00000	0.00518	22.91691	10.38241	65.92083	0.13712	0.16645	0.40406	0.07222
5.00000	0.00519	22.88921	10.40610	65.81623	0.14927	0.19710	0.40859	0.13352
6.00000	0.00519	22.88370	10.40925	65.80764	0.15163	0.20229	0.41198	0.13351
7.00000	0.00519	22.88305	10.40992	65.80607	0.15251	0.20258	0.41210	0.13378
8.00000	0.00519	22.88281	10.41001	65.80563	0.15307	0.20259	0.41210	0.13379
9.00000	0.00519	22.88274	10.40999	65.80543	0.15333	0.20262	0.41211	0.13379
10.00000	0.00519	22.88272	10.41001	65.80538	0.15333	0.20263	0.41212	0.13380

Variance Decomposition of Wholesale:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1.00000	0.00754	32.53711	4.87882	0.49049	62.09358	0.00000	0.00000	0.00000
2.00000	0.00760	32.07786	5.09570	0.59462	61.94627	0.00141	0.21961	0.06453
3.00000	0.00761	32.11820	5.08985	0.59510	61.87650	0.02005	0.23145	0.06885
4.00000	0.00762	32.12845	5.15187	0.59493	61.78210	0.02419	0.24792	0.07055
5.00000	0.00762	32.11074	5.20241	0.61217	61.72058	0.02434	0.25054	0.07922
6.00000	0.00762	32.10973	5.20506	0.61221	61.71430	0.02434	0.25497	0.07940
7.00000	0.00762	32.10885	5.20671	0.61269	61.71277	0.02438	0.25513	0.07948
8.00000	0.00762	32.10846	5.20739	0.61294	61.71195	0.02438	0.25527	0.07961

Period	S.E.						
9.00000	0.00762	32.10843	5.20739	0.61295	61.71191	0.02439	0.25527	0.07967
10.00000	0.00762	32.10841	5.20743	0.61295	61.71187	0.02439	0.25529	0.07968

Variance Decomposition of Retail:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1.00000	0.00695	29.91272	2.93213	2.79694	2.58870	61.76951	0.00000	0.00000
2.00000	0.00706	29.00381	4.32580	2.71118	2.51304	61.17677	0.23308	0.03632
3.00000	0.00707	28.94300	4.48750	2.70316	2.51246	61.02806	0.24014	0.08569
4.00000	0.00709	28.85621	4.72632	2.70171	2.51919	60.85926	0.24169	0.09563
5.00000	0.00709	28.81699	4.72623	2.79653	2.56406	60.73928	0.25039	0.10653
6.00000	0.00709	28.80859	4.73801	2.79876	2.56909	60.72197	0.25695	0.10663
7.00000	0.00710	28.80750	4.74020	2.79886	2.56902	60.71962	0.25735	0.10746
8.00000	0.00710	28.80694	4.74122	2.79884	2.56950	60.71846	0.25747	0.10757
9.00000	0.00710	28.80687	4.74126	2.79885	2.56949	60.71825	0.25760	0.10768
10.00000	0.00710	28.80684	4.74129	2.79885	2.56951	60.71818	0.25766	0.10768

Variance Decomposition of Finance:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1.00000	0.00801	8.49753	31.02594	0.28864	0.46923	0.00034	59.71832	0.00000
2.00000	0.00806	9.30241	30.73983	0.38463	0.49132	0.03572	58.95083	0.09526
3.00000	0.00807	9.28511	30.83519	0.38441	0.49047	0.03653	58.85444	0.11385
4.00000	0.00808	9.27675	30.81907	0.42029	0.49815	0.05807	58.73159	0.19608
5.00000	0.00808	9.26686	30.77903	0.42033	0.55794	0.05840	58.70507	0.21237
6.00000	0.00808	9.26719	30.77979	0.42189	0.56000	0.05847	58.69745	0.21522
7.00000	0.00808	9.26703	30.78045	0.42223	0.56000	0.05856	58.69649	0.21524
8.00000	0.00808	9.26700	30.78037	0.42223	0.56001	0.05863	58.69635	0.21543
9.00000	0.00808	9.26696	30.78042	0.42224	0.56002	0.05865	58.69614	0.21557
10.00000	0.00808	9.26695	30.78044	0.42224	0.56002	0.05865	58.69611	0.21558

Variance Decomposition of Services:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1.00000	0.02540	1.68793	0.31716	0.05036	0.17788	0.55442	0.41512	96.79714

2.00000	0.02547	1.68585	0.36818	0.25916	0.17753	0.78196	0.44773	96.27960
3.00000	0.02551	1.68653	0.37439	0.28358	0.17881	0.78175	0.45492	96.24002
4.00000	0.02553	1.69878	0.40199	0.28370	0.20186	0.84671	0.49482	96.07215
5.00000	0.02554	1.69904	0.40542	0.29522	0.20186	0.84660	0.53980	96.01206
6.00000	0.02554	1.69908	0.40630	0.29610	0.20186	0.84747	0.54005	96.00915
7.00000	0.02555	1.69912	0.40659	0.29623	0.20188	0.84761	0.54020	96.00838
8.00000	0.02555	1.69913	0.40715	0.29623	0.20190	0.84761	0.54021	96.00776
9.00000	0.02555	1.69913	0.40717	0.29623	0.20191	0.84761	0.54025	96.00770
10.00000	0.02555	1.69914	0.40718	0.29623	0.20191	0.84761	0.54026	96.00767

Notes : Cholesky Ordering - Construction Manufacturing Transportation Wholesale Retail Finance Services.
Entries in the ith row show the share of each sector in the forecast error VD of the sector given on the left-hand side. These shares must
add up to 100. Entries in j^{th} column show the contribution of the sector listed in the column heading to the VD of the sector on the left-hand side.

Table 15:   VAR Table for weekly portfolio data Peaceful Sub-Period

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Construction(-1)	-0.022599	-0.043631	-0.02464	-0.059587	-0.071869	-0.043918	0.102406
	[-0.44001]	[-0.83553]	[-0.52051]	[-0.91594]	[-1.34030]	[-0.71000]	[0.84896]
Construction(-2)	0.057394	0.030265	0.071268	0.031226	-0.032426	0.057071	-0.034799
	[1.11669]	[0.57916]	[1.50445]	[0.47965]	[-0.60428]	[0.92199]	[-0.28828]
Construction(-3)	-0.001101	0.004496	-0.038299	-0.000904	-0.054594	0.040608	-0.054118
	[-0.02140]	[0.08597]	[-0.80794]	[-0.01388]	[-1.01672]	[0.65559]	[-0.44803]
Construction(-4)	0.076579	0.031337	0.003093	0.00949	0.023247	0.026852	0.15497
	[1.48744]	[0.59866]	[0.06518]	[0.14553]	[0.43249]	[0.43307]	[1.28163]
Manufacturing(-1)	-0.037219	-0.052393	-0.138143***	-0.217004***	-0.0808	-0.088405	-0.049246
	[-0.74998]	[-1.03838]	[-3.02017]	[-3.45221]	[-1.55949]	[-1.47915]	[-0.42252]

Manufacturing(-2)	-0.057655	-0.067748	-0.066653	-0.080301	-0.016302	-0.159627***	-0.213984*
	[-1.15562]	[-1.33557]	[-1.44950]	[-1.27069]	[-0.31296]	[-2.65664]	[-1.82620]
Manufacturing(-3)	-0.034065	-0.005585	-0.077579*	-0.081819	-0.01563	-0.117505*	0.110611
	[-0.68150]	[-0.10990]	[-1.68392]	[-1.29228]	[-0.29950]	[-1.95192]	[0.94221]
Manufacturing(-4)	-0.095722	0.014425	0.017602	-0.018299	-0.022381	0.003866	0.223165*
	[-1.91121]*	[0.28328]	[0.38132]	[-0.28844]	[-0.42801]	[0.06409]	[1.89719]
Transportation(-1)	-0.00154	0.009333	0.031243	0.025728	0.064988	-0.006863	-0.072872
	[-0.03041]	[0.18129]	[0.66949]	[0.40116]	[1.22941]	[-0.11255]	[-0.61282]
Transportation(-2)	0.061231	0.069538	-0.030264	0.021447	0.039642	-0.006688	0.056649
	[1.21906]	[1.36165]	[-0.65373]	[0.33710]	[0.75596]	[-0.11055]	[0.48021]
Transportation(-3)	0.051358	0.121517**	0.067529	0.08485	0.043247	0.069595	0.214054*
	[1.01928]	[2.37201]	[1.45410]	[1.32947]	[0.82211]	[1.14687]	[1.80884]
Transportation(-4)	-0.004961	0.04682	0.031458	-0.024504	0.027216	0.027308	0.071267
	[-0.09941]	[0.92287]	[0.68402]	[-0.38770]	[0.52242]	[0.45441]	[0.60813]
Wholesale(-1)	-0.018841	0.032324	-0.043893	0.117023**	-0.016341	0.087688**	-0.08608
	[-0.51462]	[0.86837]	[-1.30078]	[2.52351]	[-0.42751]	[1.98875]	[-1.00112]
Wholesale(-2)	0.046079	0.025481	0.04404	0.110447**	0.030907	-0.006488	-0.053354
	[1.24625]	[0.67783]	[1.29231]	[2.35829]	[0.80066]	[-0.14571]	[-0.61441]
Wholesale(-3)	0.056279	0.042675	0.144384***	0.105852**	0.124756***	0.080345*	-0.092046
	[1.52634]	[1.13834]	[4.24852]	[2.26642]	[3.24075]	[1.80929]	[-1.06290]
Wholesale(-4)	0.008348	0.016179	-0.016314	-0.0335	-0.043996	0.046778	-0.029343
	[0.22503]	[0.42897]	[-0.47716]	[-0.71298]	[-1.13600]	[1.04707]	[-0.33681]
Retail(-1)	-0.050678	-0.106618**	0.089983**	-0.084583	0.037555	-0.066631	0.029185
	[-1.08903]	[-2.25343]	[2.09796]	[-1.43498]	[0.77299]	[-1.18890]	[0.26703]

Retail(-2)	0.006627	-0.013431	0.005812	-0.096186	0.079592	-0.021453	-0.034112
	[0.14131]	[-0.28166]	[0.13445]	[-1.61915]	[1.62550]	[-0.37982]	[-0.30970]
Retail(-3)	-0.025276	-0.029741	0.00423	-0.060295	-0.021529	-0.044664	-0.171446
	[-0.54026]	[-0.62524]	[0.09810]	[-1.01746]	[-0.44077]	[-0.79269]	[-1.56032]
Retail(-4)	-0.04424	-0.063597	-0.025658	0.054558	-0.011938	-0.103581*	-0.210952*
	[-0.95136]	[-1.34510]	[-0.59865]	[0.92625]	[-0.24588]	[-1.84951]	[-1.93153]
Finance(-1)	-0.050746	-0.054865	-0.041088	-0.049563	-0.086079**	-0.069722	0.046552
	[-1.39229]	[-1.48053]	[-1.22309]	[-1.07356]	[-2.26208]	[-1.58836]	[0.54382]
Finance(-2)	-0.092222***	-0.018946	-0.051669	-0.008995	-0.072539*	0.0821*	0.163089*
	[-2.55447]	[-0.51616]	[-1.55279]	[-0.19671]	[-1.92451]	[1.88824]	[1.92344]
Finance(-3)	-0.075933**	-0.111787***	-0.079142**	-0.040629	-0.074703**	-0.024597	-0.034153
	[-2.08954]	[-3.02552]	[-2.36288]	[-0.88266]	[-1.96897]	[-0.56202]	[-0.40016]
Finance(-4)	0.030738	-0.054153	-0.035647	-0.007696	-0.004071	-0.043594	-0.103365
	[0.84520]	[-1.46450]	[-1.06344]	[-0.16706]	[-0.10722]	[-0.99529]	[-1.21015]
Services(-1)	0.010152	-0.00281	0.003471	0.010892	0.009363	-0.017049	-0.062766
	[0.64436]	[-0.17541]	[0.23906]	[0.54580]	[0.56924]	[-0.89854]	[-1.69630]*
Services(-2)	-0.023445	-0.021454	-0.008678	-0.013408	-0.046143***	-0.043059**	-0.018737
	[-1.50004]	[-1.35005]	[-0.60241]	[-0.67725]	[-2.82769]	[-2.28748]	[-0.51043]
Services(-3)	-0.012402	-0.022405	-0.022018	-0.04311**	-0.028396*	-0.050223***	-0.019205
	[-0.79285]	[-1.40878]	[-1.52723]	[-2.17584]	[-1.73878]	[-2.66602]	[-0.52277]
Services(-4)	-0.03135**	-0.038536**	-0.029173**	-0.046265**	-0.037185**	-0.0367**	-0.098011***
	[-2.02400]	[-2.44694]	[-2.04345]	[-2.35807]	[-2.29943]	[-1.96736]	[-2.69420]
c	0.001137	0.0022	-0.001468	3.80E-05	-0.003344	0.001734	0.000683
	[0.44571]	[0.84815]	[-0.62446]	[0.01176]	[-1.25530]	[0.56445]	[0.11392]

US GDP	-2.22E-07	-2.46E-07	-1.29E-07	-3.06E-07	-1.78E-07	-1.91E-07	-8.24E-07**
	[-1.35641]	[-1.47807]	[-0.85359]	[-1.47694]	[-1.03929]	[-0.96672]	[-2.14206]
US Interest Rate	0.001521***	0.00094***	0.001111***	0.001504***	0.001244***	0.001192***	0.000798
	[6.61819]	[4.02286]	[5.24203]	[5.16395]	[5.18206]	[4.30546]	[1.47884]
Market Return	0.870785***	1.18993***	0.713778***	1.137671***	1.010454***	1.429117***	1.538176***
	[28.2938]	[38.0270]	[25.1628]	[29.1834]	[31.4469]	[38.5561]	[21.2800]
US Inflation Rate	-0.001088***	-0.000936***	-0.000351	-0.001304***	-0.000436	-0.000327	0.00193**
	[-3.28710]	[-2.78095]	[-1.15113]	[-3.11096]	[-1.26287]	[-0.82062]	[2.48319]
US Unemployment rate	-0.000613	-0.00055	-0.000213	-0.000413	-0.000113	-0.000939*	-0.001315
	[-1.38833]	[-1.22576]	[-0.52428]	[-0.73974]	[-0.24453]	[-1.76667]	[-1.26904]

Notes: Rows represent sources of shocks. Columns show the sectors affected.

The top entry in each row show the coefficient of VAR estimation and the second entry in brackets show the value of the t-statistic.

* Denotes significance level of 1%.

** Denotes significance level of 5%.

*** Denotes significance level of 10%

Table 16 :   Impulse Response Function Table for weekly portfolio data in Peaceful Sub-Period

Response of Construction:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.01033	0.00549	0.00546	0.00534	0.00584	0.00440	0.00205
2	-0.00111	-0.00121	-0.00084	-0.00105	-0.00116	-0.00119	-0.00012
3	0.00056	-0.00023	0.00072	0.00041	0.00050	-0.00067	-0.00060

4	-0.00022	-0.00052	0.00018	0.00007	-0.00017	-0.00086	-0.00022
5	0.00017	-0.00054	-0.00015	-0.00017	-0.00026	-0.00006	-0.00054
6	0.00012	0.00023	0.00002	0.00027	0.00014	0.00011	0.00034
7	-0.00002	-0.00006	-0.00006	-0.00003	0.00004	0.00001	0.00006
8	0.00000	-0.00001	-0.00005	-0.00003	0.00006	0.00009	0.00005
9	-0.00002	-0.00004	-0.00002	0.00000	-0.00001	0.00004	0.00004
10	-0.00001	0.00000	0.00000	-0.00002	0.00000	0.00000	-0.00007

Response of Manufacturing:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00558	0.01050	0.00395	0.00556	0.00475	0.00610	0.00229
2	-0.00143	-0.00146	-0.00103	-0.00088	-0.00164	-0.00139	-0.00047
3	0.00043	-0.00015	0.00063	0.00032	0.00030	-0.00005	-0.00048
4	0.00001	-0.00034	0.00071	0.00017	0.00002	-0.00103	-0.00042
5	-0.00002	-0.00027	0.00008	-0.00020	-0.00030	-0.00054	-0.00075
6	0.00015	0.00020	0.00004	0.00028	0.00020	0.00009	0.00038
7	0.00002	0.00000	0.00001	0.00011	0.00008	-0.00007	0.00012
8	-0.00001	-0.00002	0.00000	-0.00003	0.00011	0.00001	0.00007
9	-0.00002	-0.00003	0.00001	0.00000	0.00003	0.00001	0.00006
10	-0.00001	0.00000	0.00001	-0.00003	0.00000	-0.00002	-0.00007

Response of Transportation:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00503	0.00358	0.00952	0.00365	0.00540	0.00249	0.00077
2	-0.00082	-0.00162	-0.00018	-0.00112	-0.00008	-0.00128	-0.00034
3	0.00045	-0.00029	0.00013	0.00026	0.00036	-0.00042	-0.00020
4	-0.00005	-0.00038	0.00056	0.00098	0.00037	-0.00079	-0.00054
5	-0.00035	-0.00037	-0.00004	-0.00031	-0.00023	-0.00058	-0.00062
6	0.00006	0.00019	-0.00002	0.00016	0.00008	0.00012	0.00030
7	0.00002	0.00001	-0.00003	0.00013	0.00007	0.00006	0.00003
8	-0.00005	-0.00003	-0.00004	-0.00007	0.00013	0.00003	0.00003
9	-0.00002	0.00000	0.00002	-0.00001	0.00004	0.00001	0.00004

| 10 | -0.00001 | 0.00000 | 0.00001 | -0.00002 | 0.00000 | -0.00001 | -0.00008 |

Response of Wholesale:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00677	0.00692	0.00501	0.01308	0.00593	0.00539	0.00208
2	-0.00163	-0.00242	-0.00101	-0.00053	-0.00163	-0.00176	-0.00032
3	0.00036	-0.00017	0.00017	0.00093	-0.00021	0.00012	-0.00023
4	-0.00019	-0.00063	0.00020	0.00065	-0.00045	-0.00053	-0.00084
5	-0.00024	-0.00049	-0.00039	-0.00043	-0.00003	-0.00014	-0.00090
6	0.00013	0.00023	-0.00005	0.00025	0.00013	0.00025	0.00038
7	0.00000	-0.00003	-0.00008	0.00007	0.00009	0.00006	-0.00005
8	-0.00005	-0.00004	-0.00011	-0.00001	0.00010	0.00010	0.00008
9	-0.00004	-0.00004	-0.00001	-0.00001	0.00000	0.00003	0.00005
10	-0.00001	0.00000	-0.00001	-0.00001	-0.00001	0.00001	-0.00009

Response of Retail:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00610	0.00487	0.00612	0.00489	0.01078	0.00357	0.00124
2	-0.00116	-0.00151	-0.00021	-0.00103	-0.00047	-0.00163	-0.00026
3	0.00009	-0.00017	0.00066	0.00019	0.00089	-0.00061	-0.00114
4	-0.00033	-0.00022	0.00027	0.00076	0.00005	-0.00078	-0.00055
5	-0.00030	-0.00050	-0.00005	-0.00054	-0.00017	-0.00048	-0.00082
6	0.00011	0.00030	0.00007	0.00031	0.00023	0.00013	0.00031
7	-0.00006	-0.00005	-0.00001	0.00000	0.00010	-0.00004	0.00004
8	-0.00003	0.00001	-0.00002	-0.00002	0.00017	0.00004	0.00005
9	-0.00004	-0.00002	0.00002	-0.00001	0.00003	-0.00001	0.00005
10	-0.00002	0.00000	0.00001	-0.00002	0.00002	-0.00002	-0.00009

Response of Finance:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services

1	0.00530	0.00722	0.00326	0.00513	0.00412	0.01244	0.00252
2	-0.00125	-0.00151	-0.00088	-0.00035	-0.00125	-0.00147	-0.00079
3	-0.00008	-0.00097	-0.00024	-0.00035	-0.00034	0.00020	-0.00101
4	0.00010	-0.00062	0.00036	0.00052	-0.00016	-0.00048	-0.00102
5	-0.00026	-0.00039	-0.00033	-0.00001	-0.00077	-0.00046	-0.00073
6	0.00015	0.00016	-0.00015	0.00027	0.00013	0.00028	0.00037
7	0.00003	-0.00003	-0.00014	0.00020	-0.00003	0.00013	0.00024
8	-0.00003	-0.00009	-0.00009	-0.00005	0.00007	0.00011	0.00008
9	-0.00002	-0.00002	-0.00003	0.00001	0.00001	0.00007	0.00006
10	-0.00002	-0.00002	-0.00003	-0.00004	-0.00004	0.00002	-0.00009

Response of Services:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00481	0.00530	0.00196	0.00386	0.00279	0.00491	0.02425
2	-0.00004	-0.00067	-0.00055	-0.00098	-0.00021	-0.00012	-0.00151
3	-0.00100	-0.00149	-0.00043	-0.00119	-0.00093	0.00029	-0.00060
4	-0.00055	0.00008	0.00074	-0.00101	-0.00084	-0.00055	-0.00068
5	0.00074	0.00097	0.00019	-0.00020	-0.00073	-0.00022	-0.00197
6	0.00001	-0.00004	-0.00032	0.00002	-0.00023	0.00024	0.00049
7	0.00032	0.00024	0.00025	0.00035	0.00023	-0.00008	0.00036
8	0.00002	-0.00007	0.00007	-0.00004	0.00005	-0.00019	0.00019
9	0.00001	-0.00013	0.00001	0.00003	0.00000	0.00003	0.00015
10	0.00002	0.00002	0.00004	0.00003	0.00000	-0.00003	-0.00003

Notes: The entry in each row is the responses of the given sector to shocks in the sector in each column.

Table 17 :   Variance Decomposition for weekly portfolio data in Peaceful sub-period

Variance Decomposition of Construction:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.010325	100	0	0	0	0	0	0
2	0.010438	98.95781	0.496353	0.036569	0.081632	0.159974	0.215704	0.051961
3	0.010542	97.29903	0.84224	0.345113	0.172215	0.168416	0.836675	0.33631
4	0.010597	96.34182	1.034738	0.498514	0.289386	0.189126	1.31152	0.334893
5	0.010643	95.53095	1.509775	0.52453	0.287565	0.232248	1.343593	0.571342
6	0.010652	95.3801	1.54317	0.52863	0.322002	0.234384	1.344073	0.647639
7	0.010653	95.35926	1.54602	0.531227	0.321991	0.243864	1.346135	0.651507
8	0.010655	95.33201	1.545704	0.534339	0.322408	0.255535	1.356782	0.653225
9	0.010655	95.32326	1.546942	0.534343	0.323059	0.255755	1.361871	0.654775
10	0.010656	95.31822	1.546916	0.534315	0.323707	0.255747	1.361798	0.659294

Variance Decomposition of Manufacturing:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.010497	28.25315	71.74685	0	0	0	0	0
2	0.01068	29.09437	69.92337	0.040514	0.02272	0.650803	0.26442	0.003803
3	0.010726	29.00274	69.4985	0.29386	0.071196	0.648083	0.266174	0.219449
4	0.010835	28.42316	68.24723	0.9626	0.126451	0.700024	1.268324	0.272212
5	0.010879	28.18999	67.76376	0.973384	0.1425	0.805584	1.457867	0.666913
6	0.01089	28.15449	67.65293	0.974648	0.180691	0.814965	1.459569	0.762702
7	0.010892	28.14347	67.62551	0.974253	0.193708	0.818776	1.468596	0.775688
8	0.010893	28.13601	67.60783	0.974086	0.194179	0.838712	1.468814	0.780367
9	0.010894	28.13432	67.60291	0.974986	0.194408	0.840181	1.469481	0.783714
10	0.010894	28.13269	67.59888	0.975205	0.195272	0.840191	1.469629	0.788128

Variance Decomposition of Transportation:

	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services

Period								
1	0.009516	27.97682	1.263445	70.75973	0	0	0	0
2	0.009708	27.59024	3.283553	68.2417	0.169649	0.537093	0.170739	0.007024
3	0.00976	27.51008	3.659852	67.52588	0.24846	0.60824	0.407354	0.040131
4	0.009937	26.53652	3.703664	65.69293	2.056117	0.609639	1.184803	0.216336
5	0.009969	26.48853	3.727322	65.31512	2.054537	0.60927	1.343516	0.46171
6	0.009976	26.45863	3.756956	65.23899	2.061853	0.610311	1.34195	0.531307
7	0.009977	26.45018	3.755703	65.21956	2.083961	0.61566	1.343288	0.53164
8	0.00998	26.43571	3.753276	65.17751	2.085403	0.667796	1.347432	0.532877
9	0.009981	26.43425	3.753255	65.17419	2.085403	0.669996	1.347536	0.535378
10	0.009981	26.43253	3.753045	65.1698	2.085729	0.670016	1.34754	0.541345

Variance Decomposition of Wholesale:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.013078	26.76509	9.022629	0.813948	63.39833	0	0	0
2	0.013378	27.06414	10.4894	0.780595	61.24007	0.26505	0.124334	0.036416
3	0.013452	26.83698	10.47575	0.772916	61.23442	0.468741	0.12645	0.084752
4	0.01356	26.43029	10.52	0.865243	60.94495	0.68078	0.185581	0.373162
5	0.013605	26.28801	10.54826	0.89401	60.56339	0.753976	0.20312	0.749237
6	0.013614	26.26447	10.55532	0.908819	60.50399	0.755854	0.210215	0.80133
7	0.013616	26.25681	10.55293	0.912444	60.49322	0.768405	0.213125	0.803062
8	0.013619	26.24658	10.54844	0.916742	60.46745	0.789908	0.224967	0.805913
9	0.013619	26.24581	10.54817	0.916823	60.46402	0.790258	0.22741	0.807506
10	0.013619	26.24467	10.54768	0.916793	60.46124	0.790223	0.227513	0.811882

Variance Decomposition of Retail:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.010779	32.00525	3.192472	8.713519	1.023046	55.06572	0	0
2	0.010951	32.13025	4.027513	8.766507	1.029325	53.4226	0.583641	0.040161
3	0.011089	31.33941	3.981166	9.021223	1.032117	52.69051	0.976991	0.958584
4	0.011207	30.76714	3.900038	9.057659	2.024556	51.58644	1.575787	1.088387

5	0.011249	30.6106	3.99865	9.01629	2.107009	51.20673	1.591909	1.468817
6	0.01126	30.56598	4.051787	9.000563	2.139596	51.12948	1.59318	1.519422
7	0.011261	30.55896	4.050794	8.998265	2.140546	51.13677	1.593087	1.521576
8	0.011264	30.54378	4.049345	8.993657	2.13983	51.15669	1.593807	1.522894
9	0.011265	30.54249	4.048996	8.995004	2.139805	51.15384	1.593825	1.526039
10	0.011265	30.54023	4.048867	8.99477	2.140169	51.15014	1.59404	1.531789

Variance Decomposition of Finance:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.012435	18.14233	17.5127	0.014712	0.712281	0.01983	63.59815	0
2	0.012599	18.6505	17.68392	0.025601	1.05435	0.202867	62.28216	0.100603
3	0.012713	18.32062	18.11312	0.029702	1.036486	0.205413	61.63305	0.661609
4	0.012819	18.02447	18.20279	0.162867	1.44719	0.296815	60.67517	1.190699
5	0.012872	17.91742	18.10929	0.183043	1.487816	0.618457	60.23648	1.447499
6	0.012884	17.89731	18.08124	0.23169	1.518404	0.625509	60.1456	1.500243
7	0.012891	17.87864	18.06369	0.250499	1.56124	0.625016	60.093	1.527912
8	0.012894	17.86977	18.05873	0.253827	1.560409	0.641658	60.08374	1.531862
9	0.012895	17.86814	18.05686	0.254062	1.560757	0.642573	60.08386	1.533745
10	0.012895	17.86702	18.05556	0.254184	1.561273	0.642829	60.08027	1.538862

Variance Decomposition of Services:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.024249	3.926126	1.782882	0.216571	0.068918	0.017292	0.560094	93.42812
2	0.02433	3.900301	1.868266	0.262266	0.192139	0.028739	0.57679	93.1715
3	0.024436	4.032468	2.067626	0.272413	0.224887	0.04021	0.974483	92.38791
4	0.024539	4.048402	2.082806	0.49529	0.465713	0.245808	1.002068	91.65991
5	0.02474	4.073358	2.12373	0.505179	0.604998	0.589516	1.120919	90.9823
6	0.02475	4.070094	2.122464	0.528658	0.605647	0.593285	1.135364	90.94449
7	0.024758	4.08408	2.122224	0.529616	0.611646	0.592973	1.152345	90.90712
8	0.02476	4.083465	2.123465	0.530493	0.611702	0.593238	1.15795	90.89969
9	0.024761	4.083021	2.12728	0.530508	0.612846	0.593188	1.15952	90.89364
10	0.024761	4.083038	2.127294	0.530642	0.612886	0.593386	1.159925	90.89283

Table 18 :   VAR Table for weekly portfolio data in Volatile sub-period

	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
Construction(-1)	0.014838	0.080781***	0.065534	0.059288	0.090435	-0.004254	-0.241539
	[0.30860]	[1.69195]	[1.64291]	[1.05609]	[1.53560]	[-0.07301]	[-1.16855]
Construction(-2)	-0.091347*	0.073296	0.028251	0.003322	-0.081482	0.001679	-0.541032***
	[-1.89486]	[1.53121]	[0.70641]	[0.05902]	[-1.38001]	[0.02874]	[-2.61073]
Construction(-3)	-0.07379	0.027199	0.016836	-0.057422	-0.106552*	0.082692	-0.472256**
	[-1.52889]	[0.56755]	[0.42048]	[-1.01903]	[-1.80250]	[1.41391]	[-2.27620]
Construction(-4)	-0.038284	0.080862*	0.032714	0.070167	0.009077	0.132334**	0.400587*
	[-0.79529]	[1.69169]	[0.81918]	[1.24844]	[0.15395]	[2.26858]	[1.93577]
Manufacturing(-1)	0.069763	-0.098132**	-0.092251**	-0.119131**	-0.098605	-0.202485***	-0.562338**
	[1.39489]	[-1.97607]	[-2.22347]	[-2.04019]	[-1.60972]	[-3.34109]	[-2.61558]
Manufacturing(-2)	0.015573	-0.058605	-0.062491	-0.055537	-0.095518	-0.064842	-0.078479
	[0.30763]	[-1.16590]	[-1.48804]	[-0.93965]	[-1.54054]	[-1.05703]	[-0.36063]
Manufacturing(-3)	-0.033837	-0.011639	-0.097343**	-0.096983	-0.041975	-0.055493	-0.148047
	[-0.66978]	[-0.23202]	[-2.32266]	[-1.64424]	[-0.67837]	[-0.90648]	[-0.68170]
Manufacturing(-4)	-0.02021	-0.02066	-0.008043	0.024302	0.170031***	-0.051847	0.317382
	[-0.40374]	[-0.41566]	[-0.19368]	[0.41582]	[2.77328]	[-0.85474]	[1.47491]

Transportation(-1)	-0.081975*	0.083268*	-0.030834	-0.063002	-0.137681**	0.112892*	-0.507528**
	[-1.67899]	[1.71757]	[-0.76127]	[-1.10523]	[-2.30237]	[1.90814]	[-2.41814]
Transportation(-2)	0.099194**	0.017805	0.046798	0.104801**	0.159636***	0.019544	0.173157
	[2.01604]	[0.36443]	[1.14652]	[1.82435]	[2.64898]	[0.32780]	[0.81867]
Transportation(-3)	-0.074988	-0.038244	-6.07E-05	0.012964	-0.033033	0.037927	-0.328485
	[-1.52645]	[-0.78403]	[-0.00149]	[0.22603]	[-0.54901]	[0.63712]	[-1.55547]
Transportation(-4)	0.027984	-0.047477	-0.0064	0.001025	0.049557	-0.082209	0.178549
	[0.56777]	[-0.97011]	[-0.15653]	[0.01781]	[0.82093]	[-1.37646]	[0.84271]
Wholesale(-1)	-0.047463	-0.053102	-0.100831***	-0.039805	-0.096325	-0.064132	-0.160831
	[-1.11574]	[-1.25717]	[-2.85721]	[-0.80145]	[-1.84877]**	[-1.24413]	[-0.87949]
Wholesale(-2)	-0.012055	-0.03223	-0.053862	0.006822	0.02751	-0.090753*	-0.016827
	[-0.28590]	[-0.76981]	[-1.53981]	[0.13857]	[0.53269]	[-1.77617]	[-0.09283]
Wholesale(-3)	0.003999	0.044181	0.022841	0.056903	0.013842	0.039016	-0.141205
	[0.09556]	[1.06330]	[0.65796]	[1.16468]	[0.27007]	[0.76941]	[-0.78496]
Wholesale(-4)	0.066995	-0.065554	-0.045623	-0.033694	-0.015777	-0.118314**	0.123804
	[1.59758]	[-1.57432]	[-1.31144]	[-0.68819]	[-0.30718]	[-2.32828]	[0.68677]
Retail(-1)	-0.018812	-0.015254	0.034532	0.052446	0.048995	0.061384	0.486267***
	[-0.50052]	[-0.40872]	[1.10750]	[1.19516]	[1.06431]	[1.34777]	[3.00961]
Retail(-2)	0.001517	-0.03592	0.01663	-0.144103***	-0.065497	0.014949	0.272331*
	[0.04015]	[-0.95752]	[0.53061]	[-3.26694]	[-1.41544]	[0.32654]	[1.67683]
Retail(-3)	0.062893*	-0.002289	-0.009616	-0.001017	0.06394	0.007599	0.584658***
	[1.64525]	[-0.06030]	[-0.30323]	[-0.02279]	[1.36564]	[0.16404]	[3.55783]
Retail(-4)	-0.022505	-0.048008	-0.015595	-0.062029	-0.040796	-0.017489	-0.283128*
	[-0.58352]	[-1.25357]	[-0.48740]	[-1.37749]	[-0.86361]	[-0.37421]	[-1.70767]

Finance(-1)	-0.092414**	-0.109541***	0.017957	-0.018604	-0.016685	-0.012109	0.667848***
	[-2.25648]	[-2.69367]	[0.52853]	[-0.38907]	[-0.33263]	[-0.24400]	[3.79338]
Finance(-2)	-0.010283	0.02199	-0.011292	0.056857	0.011881	0.044414	-0.132418
	[-0.24660]	[0.53107]	[-0.32643]	[1.16781]	[0.23262]	[0.87893]	[-0.73869]
Finance(-3)	0.070892*	-0.004185	0.040355	0.092622*	0.03456	-0.025911	0.103933
	[1.70507]	[-0.10138]	[1.16998]	[1.90804]	[0.67866]	[-0.51429]	[0.58150]
Finance(-4)	-0.019231	0.041806	-0.005462	-0.018099	-0.192705***	0.07656	-0.389918**
	[-0.46573]	[1.01964]	[-0.15946]	[-0.37543]	[-3.81034]	[1.53008]	[-2.19666]
Services(-1)	0.004278	-0.013329	-0.01389*	-0.012908	-0.010723	-0.019581*	-0.078123*
	[0.46792]	[-1.46839]	[-1.83155]	[-1.20942]	[-0.95770]	[-1.76761]	[-1.98795]
Services(-2)	-0.013608	-0.008192	-0.013075*	-0.013433	-0.021329**	-0.011503	0.099853***
	[-1.52028]	[-0.92163]	[-1.76077]	[-1.28531]	[-1.94545]	[-1.06052]	[2.59496]
Services(-3)	-0.000219	0.002327	-0.005066	0.009759	-7.99E-05	-0.007277	0.17348***
	[-0.02468]	[0.26430]	[-0.68860]	[0.94252]	[-0.00736]	[-0.67721]	[4.55070]
Services(-4)	-0.01027	0.001608	0.012386*	0.002863	-0.001388	-0.002705	-0.107905***
	[-1.16461]	[0.18370]	[1.69324]	[0.27810]	[-0.12849]	[-0.25314]	[-2.84658]
c	-0.000294	0.007059*	0.003114	0.004242	0.001002	0.006597	-0.005003
	[-0.06824]	[1.65211]	[0.87227]	[0.84450]	[0.19011]	[1.26523]	[-0.27050]
US GDP	3.23E-07	8.59E-08	1.27E-07	8.12E-08	2.61E-07	2.34E-08	1.32E-06
	[1.58681]	[0.42533]	[0.75106]	[0.34191]	[1.04799]	[0.09505]	[1.51087]
US Interest Rate	0.000723**	0.000555	0.000612**	0.000296	0.001158**	0.000615	0.003975**
	[1.82044]	[1.40768]	[1.85864]	[0.63843]	[2.38304]	[1.27940]	[2.32943]
Market Return	0.679627***	1.107053***	0.769235***	0.869152***	0.995455***	1.277727***	1.472566***
	[29.3171]	[48.0940]	[39.9991]	[32.1126]	[35.0595]	[45.4849] '	[14.7767]

US Inflation Rate	-0.000139	-0.000424	-0.000434	-0.000407	-0.000457	-0.000792*	-0.00218
	[-0.39248]	[-1.20389]	[-1.47742]	[-0.98355]	[-1.05255]	[-1.84490]	[-1.43088]
US Unemployment rate	-0.000341	-0.001311	-0.000659	-0.000473	-0.000718	-0.000736	-0.001199
	[-0.40734]	[-1.57623]	[-0.94832]	[-0.48377]	[-0.69952]	[-0.72488]	[-0.33282]

Notes: Rows represent sources of shocks. Columns show the sectors affected.

The top entry in each row show the coefficient of VAR estimation and the second entry in brackets show the value of the t-statistic.

* Denotes significance level of 1%.

** Denotes significance level of 5%.

*** Denotes significance level of 10%

Table 19 :   Impulse Response Function table for weekly portfolio data in Volatile sub-period

Response of Construction:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.01800	0.00402	0.00535	0.00988	0.00886	0.00335	0.00387
2	-0.00087	-0.00074	-0.00163	-0.00151	-0.00127	-0.00179	-0.00011
3	-0.00147	0.00049	0.00102	-0.00067	-0.00073	0.00002	-0.00124
4	-0.00048	0.00006	-0.00072	0.00029	0.00082	0.00090	0.00040
5	-0.00024	-0.00045	0.00000	0.00046	-0.00023	-0.00050	-0.00091
6	0.00008	0.00003	0.00021	0.00026	-0.00017	-0.00001	-0.00026
7	0.00010	0.00001	0.00000	-0.00010	-0.00005	0.00007	0.00021
8	0.00004	0.00010	0.00005	-0.00010	-0.00022	-0.00002	-0.00022
9	-0.00002	0.00001	0.00003	-0.00001	0.00001	0.00005	0.00015
10	0.00002	-0.00002	-0.00004	-0.00001	0.00007	0.00006	0.00007

Response of Manufacturing:

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Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00399	0.01788	0.00535	0.00588	0.00273	0.01161	0.00108
2	-0.00001	-0.00309	0.00016	-0.00165	-0.00072	-0.00351	-0.00139
3	0.00041	-0.00003	-0.00008	-0.00038	-0.00077	0.00012	-0.00031
4	0.00082	0.00028	-0.00017	0.00117	0.00058	0.00004	0.00042
5	-0.00016	-0.00023	-0.00104	-0.00136	-0.00129	0.00016	-0.00019
6	-0.00027	0.00032	0.00036	0.00035	0.00003	0.00016	0.00010
7	-0.00002	-0.00001	-0.00010	0.00014	0.00039	0.00024	0.00019
8	0.00011	-0.00001	-0.00001	-0.00002	-0.00005	-0.00011	-0.00015
9	-0.00003	-0.00007	0.00001	0.00012	0.00005	0.00011	-0.00003
10	0.00004	0.00000	0.00001	-0.00004	0.00001	0.00000	0.00004

Response of Transportation:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00444	0.00447	0.01494	0.00360	0.00485	0.00363	0.00040
2	-0.00027	-0.00192	-0.00080	-0.00179	-0.00031	-0.00124	-0.00101
3	-0.00026	-0.00089	0.00031	-0.00097	-0.00029	-0.00089	-0.00084
4	0.00015	-0.00068	-0.00015	0.00030	0.00008	-0.00002	-0.00022
5	-0.00002	-0.00028	-0.00029	-0.00082	-0.00036	-0.00036	0.00053
6	-0.00029	0.00016	0.00005	0.00005	-0.00002	0.00010	-0.00022
7	-0.00004	-0.00006	0.00011	0.00009	0.00026	-0.00005	0.00014
8	0.00000	-0.00005	-0.00011	-0.00004	0.00010	0.00001	0.00008
9	0.00001	-0.00002	0.00007	0.00010	-0.00001	-0.00004	-0.00014
10	-0.00002	-0.00002	-0.00002	-0.00005	0.00000	-0.00001	0.00007

Response of Wholesale:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.01153	0.00691	0.00507	0.02102	0.01045	0.00646	0.00318
2	0.00013	-0.00260	-0.00121	-0.00088	0.00032	-0.00201	-0.00082
3	-0.00116	0.00031	0.00049	-0.00091	-0.00281	0.00064	-0.00133

4	-0.00026	0.00014	0.00058	0.00104	0.00047	0.00140	0.00083
5	0.00026	-0.00010	-0.00035	-0.00089	-0.00081	-0.00018	-0.00024
6	-0.00002	0.00008	0.00032	0.00013	-0.00017	-0.00015	-0.00015
7	0.00023	-0.00018	-0.00002	0.00010	0.00041	0.00034	0.00044
8	0.00013	0.00001	-0.00013	-0.00019	-0.00005	0.00001	-0.00006
9	-0.00015	-0.00004	0.00002	0.00005	0.00001	0.00007	-0.00003
10	0.00000	-0.00004	0.00002	0.00000	0.00011	0.00003	0.00007

Response of Retail:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.01085	0.00337	0.00716	0.01096	0.02205	0.00397	0.00541
2	-0.00020	-0.00280	-0.00235	-0.00191	-0.00033	-0.00225	-0.00073
3	-0.00185	-0.00057	0.00113	-0.00079	-0.00182	-0.00044	-0.00186
4	-0.00116	-0.00017	-0.00028	0.00013	0.00075	0.00042	0.00009
5	-0.00025	0.00027	0.00017	-0.00098	-0.00098	-0.00228	-0.00102
6	0.00018	0.00015	0.00031	0.00036	-0.00036	-0.00024	-0.00034
7	0.00041	-0.00001	0.00003	0.00018	0.00022	0.00010	0.00049
8	-0.00009	0.00019	-0.00027	-0.00024	-0.00028	0.00002	-0.00001
9	-0.00017	0.00004	0.00009	0.00013	-0.00004	0.00007	0.00010
10	0.00001	-0.00004	-0.00005	0.00004	0.00014	0.00012	0.00016

Response of Finance:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.00406	0.01417	0.00531	0.00670	0.00393	0.02182	0.00315
2	-0.00083	-0.00363	0.00059	-0.00181	0.00022	-0.00261	-0.00162
3	-0.00099	-0.00054	-0.00026	-0.00174	-0.00074	0.00013	-0.00075
4	0.00170	-0.00043	0.00101	0.00138	0.00120	-0.00056	-0.00028
5	0.00040	-0.00065	-0.00133	-0.00182	-0.00094	0.00010	-0.00039
6	-0.00032	0.00038	0.00043	0.00005	-0.00015	-0.00019	-0.00009
7	-0.00019	0.00004	-0.00008	-0.00001	0.00033	0.00018	0.00000
8	0.00005	-0.00002	0.00000	-0.00002	0.00003	-0.00020	-0.00015
9	-0.00008	-0.00008	-0.00001	0.00018	0.00008	0.00007	-0.00012

| 10 | 0.00005 | -0.00001 | 0.00002 | -0.00001 | -0.00001 | -0.00002 | 0.00002 |

Response of Services:

Period	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.01661	0.00467	0.00205	0.01169	0.01899	0.01119	0.07739
2	-0.00402	-0.00367	-0.00583	-0.00201	0.00405	0.00541	-0.00356
3	-0.00541	-0.00361	0.00125	-0.00191	0.00353	-0.00279	0.00692
4	-0.00315	-0.00309	-0.00456	-0.00075	0.00947	0.00283	0.01319
5	0.00410	0.00027	0.00279	0.00217	-0.00176	-0.00441	-0.00994
6	-0.00149	-0.00073	-0.00016	-0.00133	-0.00012	-0.00229	0.00278
7	0.00058	0.00078	0.00029	-0.00011	0.00078	-0.00066	0.00026
8	0.00065	0.00098	0.00044	-0.00006	-0.00169	-0.00161	-0.00282
9	-0.00076	-0.00023	-0.00028	0.00009	0.00021	0.00018	0.00189
10	0.00035	0.00035	-0.00002	0.00037	0.00010	0.00018	-0.00044

Notes: The entry in each row is the responses of the given sector to shocks in the sector in each column.

Table 20 :   Variance Decomposition for weekly portfolio data in Volatile sub-period

Variance Decomposition of Construction:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.018003	100	0	0	0	0	0	0
2	0.018181	98.28276	0.094626	0.540797	0.353884	0.037999	0.659841	0.030095
3	0.018335	97.28297	0.303816	1.078483	0.351413	0.069674	0.686705	0.22694
4	0.018439	96.25473	0.308992	1.19885	0.478242	0.511811	1.019236	0.228138
5	0.01849	95.73918	0.35503	1.201632	0.677312	0.562858	1.050022	0.413963
6	0.018499	95.65216	0.354747	1.211732	0.696654	0.606642	1.050597	0.427468
7	0.018502	95.62613	0.354664	1.211734	0.707444	0.607349	1.0531	0.439584

	8	0.018506	95.58803	0.356824	1.211339	0.71666	0.624173	1.054171	0.448804
	9	0.018506	95.58041	0.356878	1.211627	0.716606	0.624188	1.05485	0.455437
	10	0.018507	95.57465	0.356991	1.212141	0.716617	0.626369	1.057346	0.455883

Variance Decomposition of Manufacturing:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.017877	4.987701	95.0123	0	0	0	0	0
2	0.01836	4.72859	93.05255	0.296062	0.458983	0.085028	1.092233	0.286553
3	0.018407	4.752966	92.5829	0.304209	0.605638	0.33416	1.113547	0.306581
4	0.018457	4.924314	92.08463	0.368578	0.832557	0.332731	1.136393	0.320793
5	0.018575	4.869092	90.92377	0.664021	1.457543	0.504794	1.261348	0.319428
6	0.018593	4.880641	90.79397	0.702558	1.525159	0.505229	1.263773	0.328667
7	0.018603	4.875887	90.7029	0.704577	1.534335	0.563868	1.288317	0.330111
8	0.018604	4.878354	90.68551	0.704823	1.536511	0.566154	1.292361	0.336285
9	0.018607	4.877549	90.66556	0.705151	1.546637	0.566108	1.302006	0.33699
10	0.018607	4.877925	90.66333	0.705133	1.548212	0.566122	1.302009	0.337263

Variance Decomposition of Transportation:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.014935	8.832512	5.698227	85.46926	0	0	0	0
2	0.01518	8.58214	7.086101	82.77337	1.003664	0.087302	0.01219	0.455227
3	0.015262	8.520403	7.319223	82.06505	1.284639	0.086563	0.064328	0.659798
4	0.015299	8.489129	7.51455	81.66858	1.369424	0.090524	0.168583	0.699214
5	0.015344	8.439567	7.505296	81.21307	1.71878	0.091756	0.17337	0.858156
6	0.015351	8.466676	7.521314	81.14256	1.731985	0.093318	0.173329	0.870818
7	0.015355	8.462569	7.518476	81.10622	1.739483	0.123569	0.174006	0.87568
8	0.015356	8.460927	7.518077	81.09491	1.739666	0.134286	0.175562	0.876575
9	0.015358	8.459348	7.516788	81.08164	1.745432	0.136683	0.176636	0.88347
10	0.015358	8.459222	7.516587	81.07864	1.746069	0.136974	0.1767	0.885811

Variance Decomposition of Wholesale:

	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services

Period								
1	0.02102	30.08343	4.483414	0.089604	65.34355	0	0	0
2	0.021246	29.45074	5.994739	0.183762	64.00536	0.125018	0.039674	0.200705
3	0.021514	29.00857	5.919288	0.300141	62.47752	1.813811	0.181332	0.299339
4	0.021638	28.69248	5.860827	0.389776	62.17506	1.796897	0.690821	0.394143
5	0.021689	28.57154	5.839073	0.424795	62.19642	1.882296	0.687897	0.397971
6	0.021696	28.55156	5.836767	0.448012	62.15711	1.902908	0.705279	0.39836
7	0.021712	28.5225	5.8408	0.447575	62.07017	1.930118	0.7751	0.41374
8	0.021715	28.51671	5.839007	0.454201	62.07001	1.929499	0.775217	0.415357
9	0.021717	28.51718	5.838211	0.455176	62.06683	1.929543	0.777641	0.415423
10	0.021717	28.51566	5.838216	0.455309	62.06355	1.933182	0.778272	0.415816

Variance Decomposition of Retail:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.022051	24.18983	0.193382	3.298733	6.910361	65.40769	0	0
2	0.022374	23.50345	1.785214	3.812011	7.113534	63.6333	0.027604	0.124883
3	0.022617	23.66725	1.752209	4.404004	6.974345	62.78606	0.027474	0.388662
4	0.022711	23.73186	1.739327	4.367919	7.082025	62.59883	0.094535	0.385499
5	0.02297	23.21073	1.721869	4.275367	7.170833	61.29887	1.907246	0.415083
6	0.022991	23.17472	1.721098	4.279133	7.172529	61.28286	1.946239	0.423415
7	0.022999	23.1903	1.721867	4.277148	7.167829	61.24235	1.947554	0.452953
8	0.023005	23.18055	1.729991	4.293742	7.179391	61.21568	1.947693	0.452957
9	0.023008	23.17994	1.730887	4.296039	7.18882	61.19987	1.947308	0.457137
10	0.02301	23.17635	1.731042	4.295816	7.188333	61.19549	1.953458	0.459505

Variance Decomposition of Finance:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.021816	3.456334	38.89501	0.179773	0.789714	0.138144	56.54102	0
2	0.022272	3.455927	39.84039	0.839767	0.892392	0.27093	54.28033	0.42026
3	0.022365	3.624588	39.53026	0.835674	1.271471	0.272488	53.97107	0.49445
4	0.022487	4.159011	39.24024	0.942381	1.364683	0.271019	53.46113	0.561529

5	0.022691	4.114923	38.64875	1.29001	2.346099	0.285662	52.70937	0.605189
6	0.022711	4.128023	38.62143	1.327224	2.345799	0.290261	52.68169	0.605578
7	0.022719	4.131981	38.59747	1.326865	2.346065	0.33718	52.65403	0.606407
8	0.022721	4.131687	38.59093	1.326635	2.346008	0.337209	52.65733	0.610199
9	0.022724	4.13175	38.58156	1.326432	2.362062	0.337659	52.64664	0.613892
10	0.022724	4.132097	38.58121	1.326451	2.362273	0.337911	52.64607	0.613992

Variance Decomposition of Services:

Period	S.E.	Construction	Manufacturing	Transportation	Wholesale	Retail	Finance	Services
1	0.077393	4.608181	0.016131	0.191036	0.156297	2.862117	1.395053	90.77118
2	0.078985	4.68281	0.145016	0.476967	0.170952	3.823182	3.020627	87.68045
3	0.079942	5.029372	0.236565	0.682691	0.218806	4.364807	2.966789	86.50097
4	0.082293	4.89255	0.311766	0.804035	0.263596	6.952233	3.302612	83.47321
5	0.083359	5.010242	0.310265	0.834124	0.256895	7.144013	3.767334	82.67713
6	0.083484	5.027184	0.31168	0.834089	0.260348	7.133251	3.834458	82.59899
7	0.08351	5.028954	0.317885	0.833603	0.267408	7.138278	3.86562	82.54825
8	0.083632	5.020426	0.327426	0.831197	0.274457	7.193524	3.96791	82.38506
9	0.083664	5.024902	0.327227	0.83059	0.280146	7.191967	3.966965	82.3782
10	0.083668	5.026222	0.32833	0.831112	0.280456	7.191565	3.966736	82.37558

Notes: Cholesky Ordering- Construction Manufacturing Transportation Wholesale Retail Finance Services.
Entries in the ith row show the share of each sector in the forecast error VD of the sector given on the left-hand side.
These shares must add up to 100. Entries in j[th] column show the contribution of the sector listed in the column heading
to the VD of the sector on the left-hand side.

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Figure 2: Generalized Impulse Response Function - Daily Portfolio (Full Period).

Response of DIV2VAL to Generalized One S.D. Innovations

Response of DIV3VAL to Generalized One S.D. Innovations

Response of DIV4VAL to Generalized One S.D. Innovations

Response of DIV5VAL to Generalized One S.D. Innovations

Response of DIV6VAL to Generalized One S.D. Innovations

Response of DIV7VAL to Generalized One S.D. Innovations

Response of DIV8VAL to Generalized One S.D. Innovations

Figure 3: Variance Decomposition - Daily Portfolio (Full Period).

Variance Decomposition of DIV2VAL

Variance Decomposition of DIV3VAL

Variance Decomposition of DIV4VAL

Variance Decomposition of DIV5VAL

Variance Decomposition of DIV6VAL

Variance Decomposition of DIV7VAL

Variance Decomposition of DIV8VAL
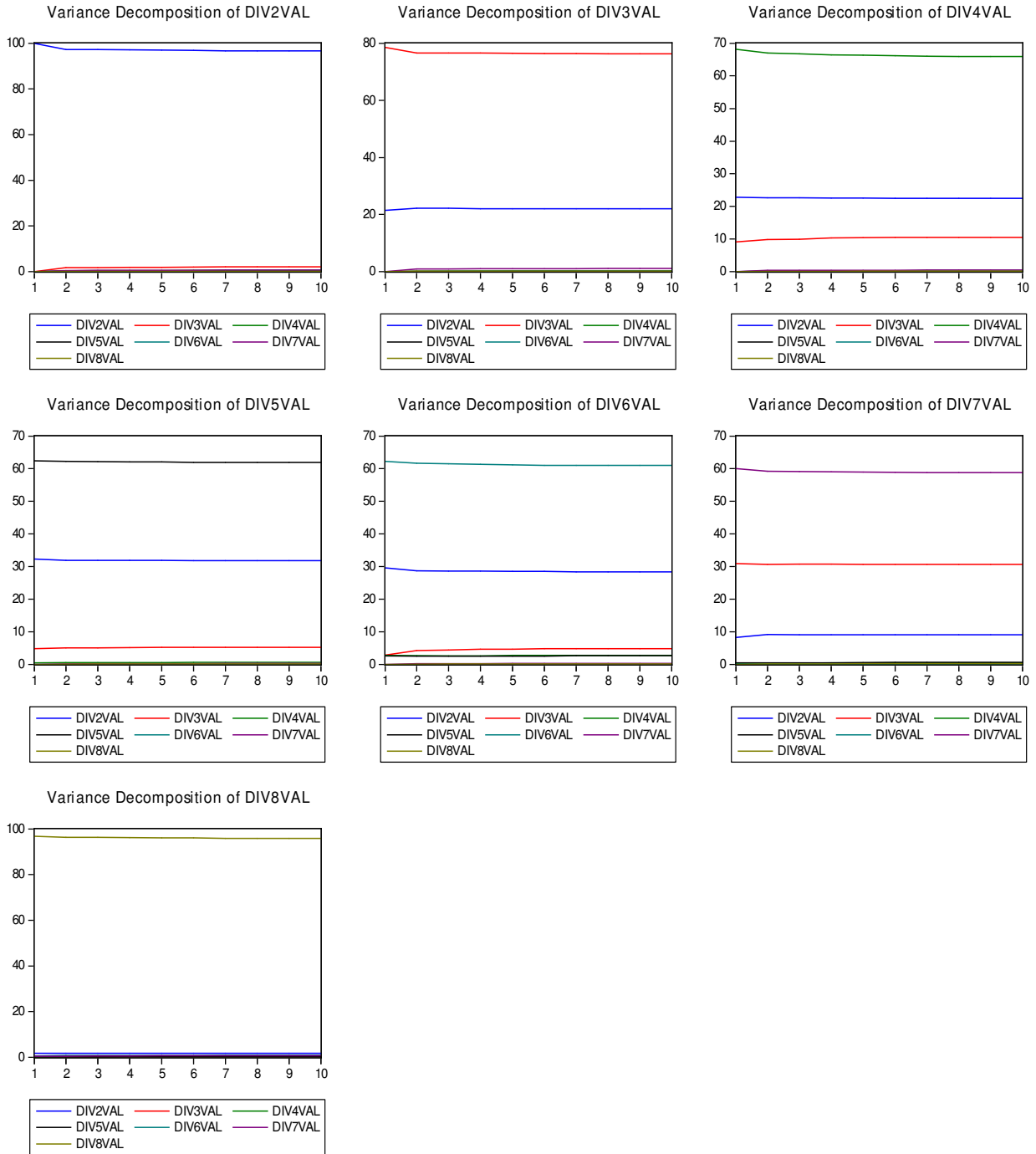
Figure 4 : Generalized Impulse Response Function - Weekly Portfolio (Full Period).

Response of DIV2_VAL to Generalized One S.D. Innovations

Response of DIV3_VAL to Generalized One S.D. Innovations

Response of DIV4_VAL to Generalized One S.D. Innovations

Response of DIV5_VAL to Generalized One S.D. Innovations

Response of DIV6_VAL to Generalized One S.D. Innovations

Response of DIV7_VAL to Generalized One S.D. Innovations

Response of DIV8_VAL to Generalized One S.D. Innovations
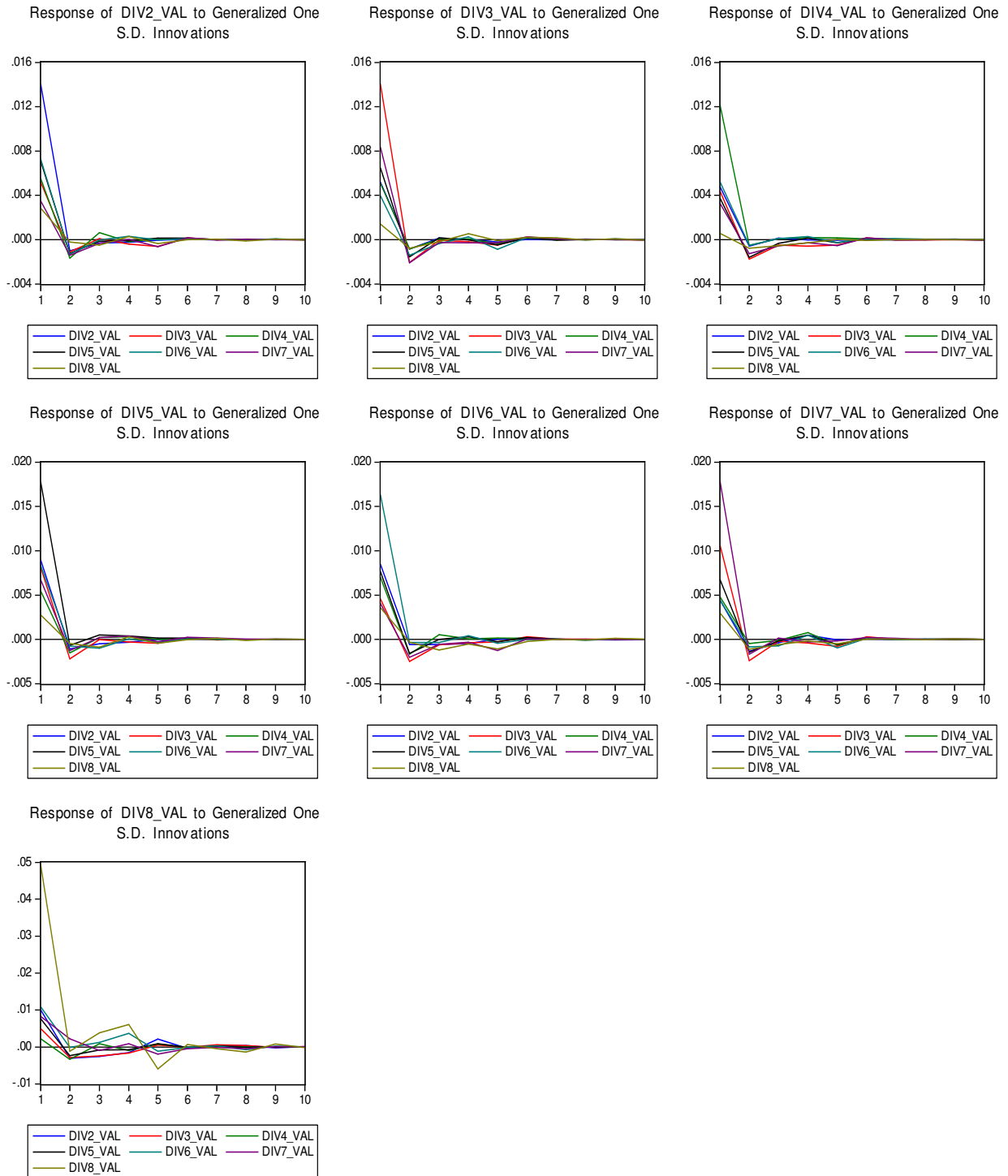
Figure 5 : Variance Decomposition - Weekly Portfolio (Full Period).

Variance Decomposition of DIV2_VAL

Variance Decomposition of DIV3_VAL

Variance Decomposition of DIV4_VAL

Variance Decomposition of DIV5_VAL

Variance Decomposition of DIV6_VAL

Variance Decomposition of DIV7_VAL

Variance Decomposition of DIV8_VAL
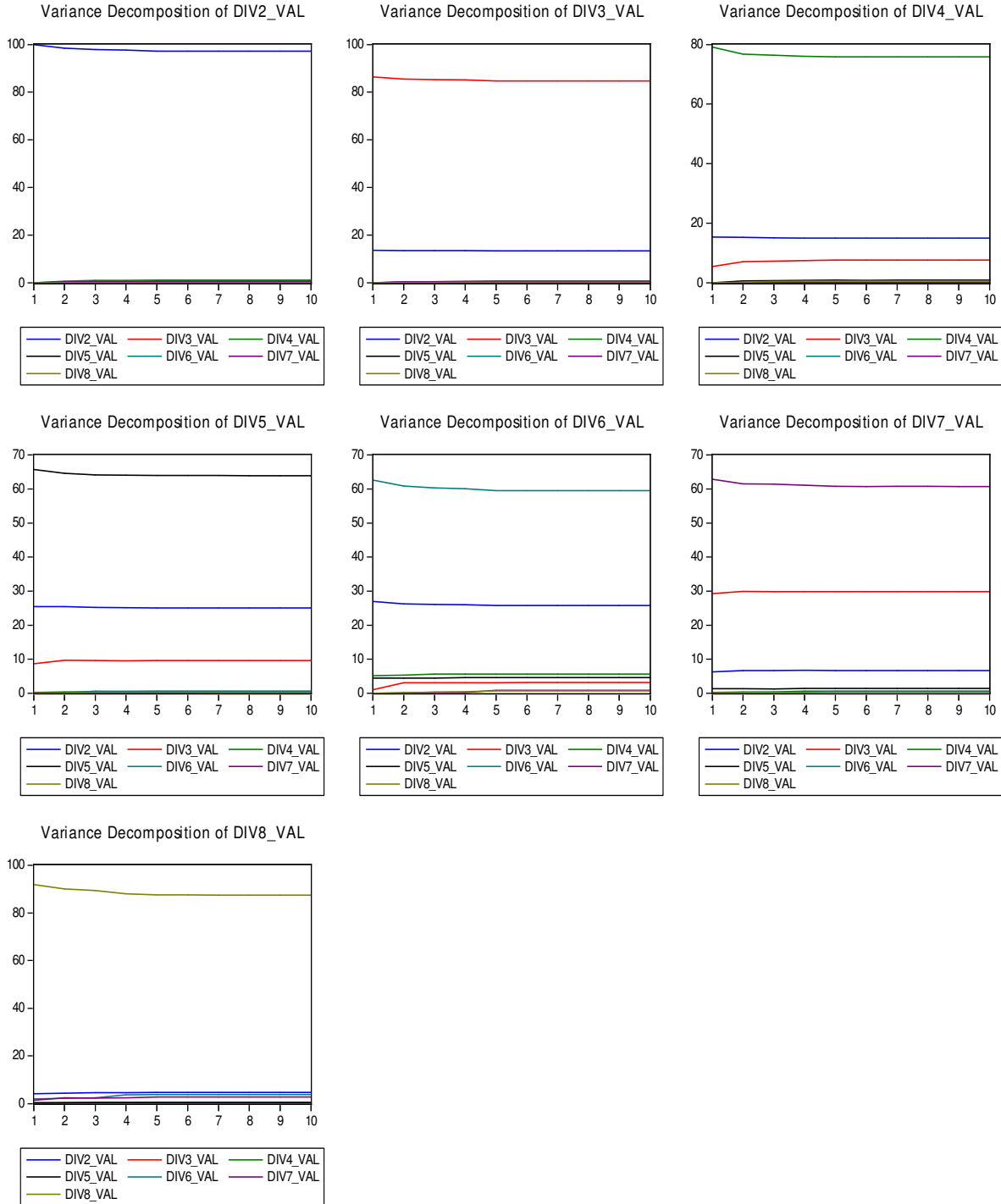
Figure 6 : Generalized Impulse Response Function - Weekly Portfolio (Peaceful Sub-Period).

Response of DIV2_VAL to Generalized One S.D. Innovations

Response of DIV3_VAL to Generalized One S.D. Innovations

Response of DIV4_VAL to Generalized One S.D. Innovations

Response of DIV5_VAL to Generalized One S.D. Innovations

Response of DIV6_VAL to Generalized One S.D. Innovations

Response of DIV7_VAL to Generalized One S.D. Innovations

Response of DIV8_VAL to Generalized One S.D. Innovations
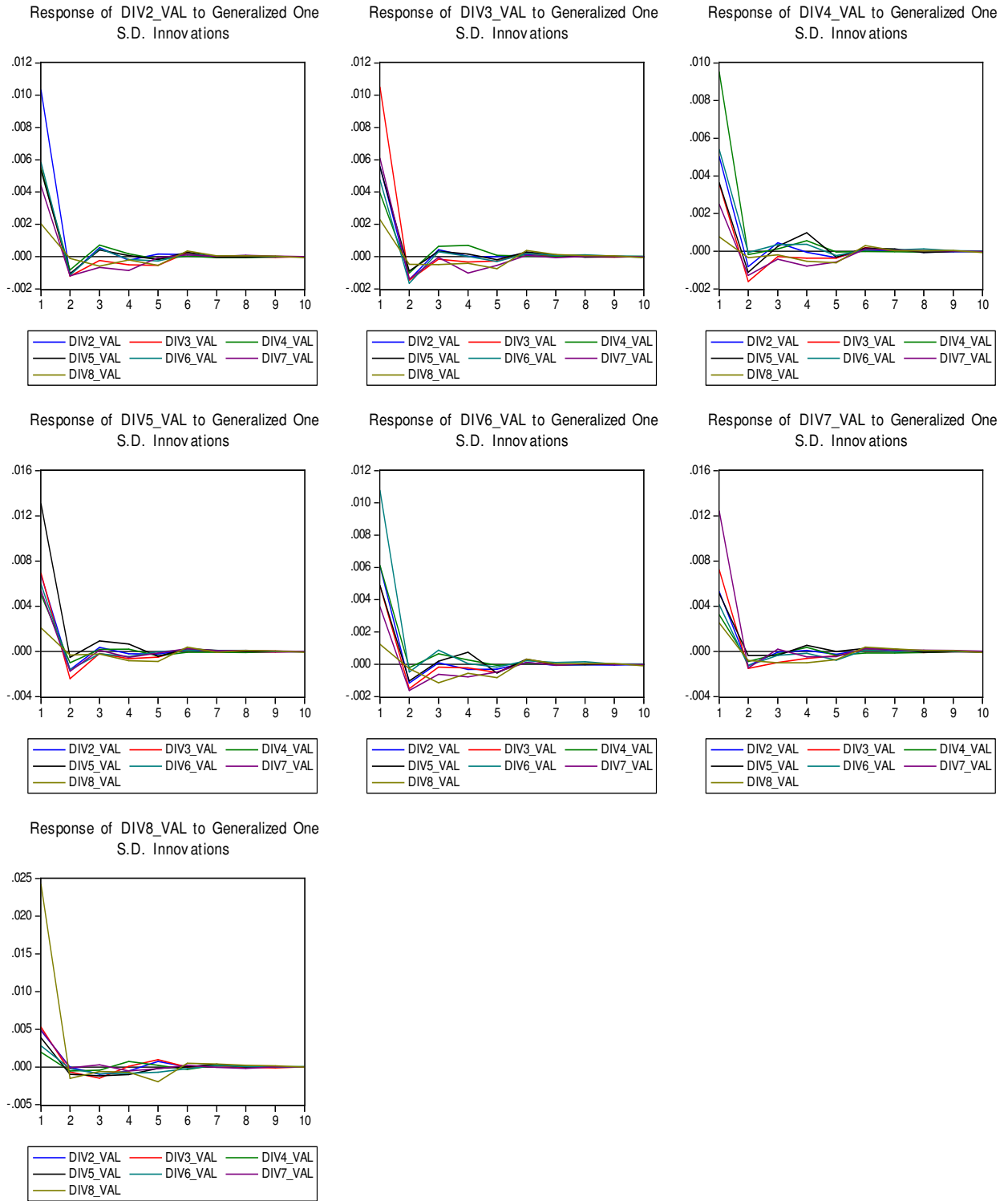
Figure 7 : Variance Decomposition - Weekly Portfolio (Peaceful Sub-Period).

Variance Decomposition of DIV2_VAL

Variance Decomposition of DIV3_VAL

Variance Decomposition of DIV4_VAL

Variance Decomposition of DIV5_VAL

Variance Decomposition of DIV6_VAL

Variance Decomposition of DIV7_VAL

Variance Decomposition of DIV8_VAL
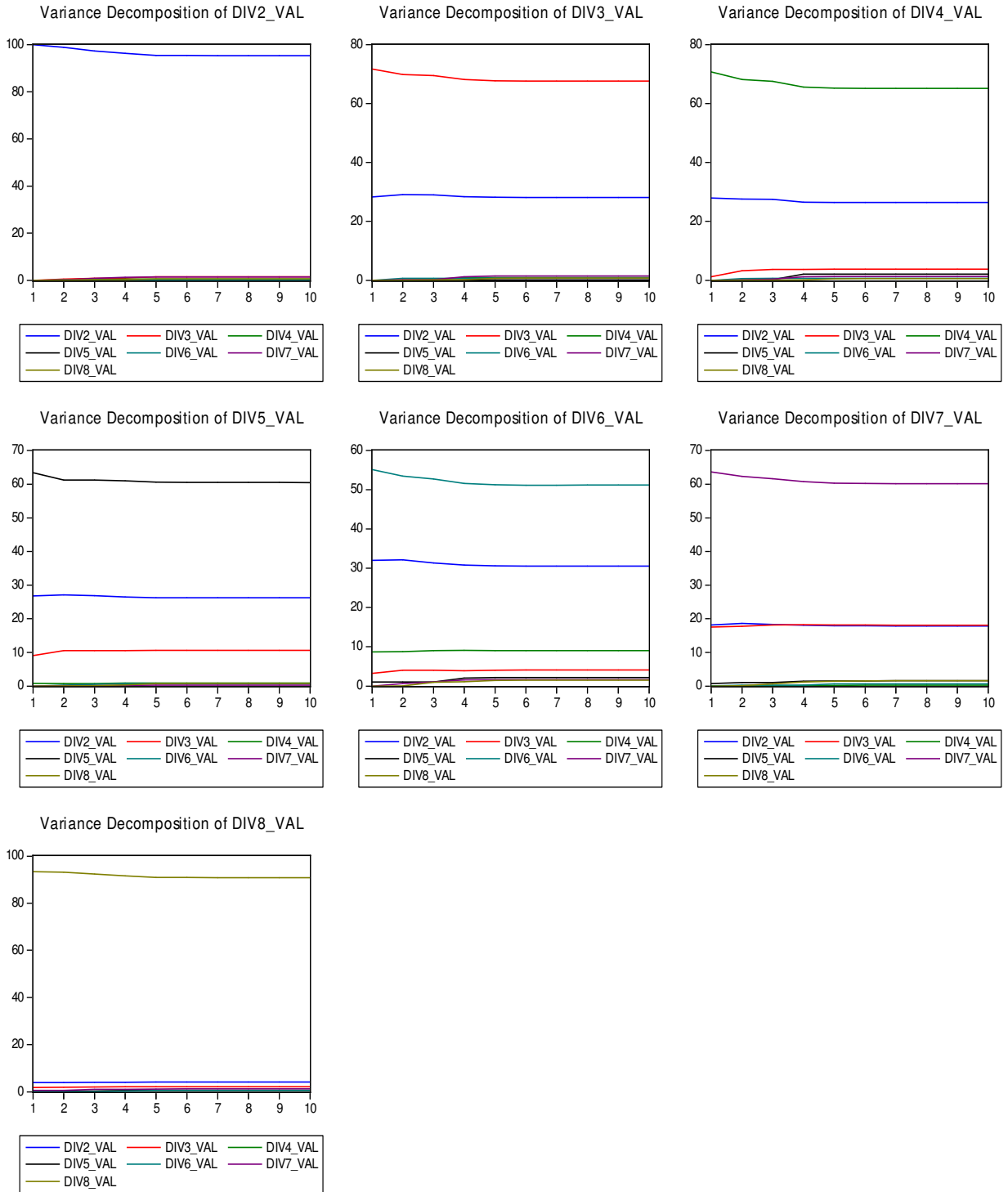
Figure 8 : Generalized Impulse Response Function - Weekly Portfolio (Volatile Sub-Period).

Response of DIV2_VAL to Generalized One S.D. Innovations

Response of DIV3_VAL to Generalized One S.D. Innovations

Response of DIV4_VAL to Generalized One S.D. Innovations

Response of DIV5_VAL to Generalized One S.D. Innovations

Response of DIV6_VAL to Generalized One S.D. Innovations

Response of DIV7_VAL to Generalized One S.D. Innovations

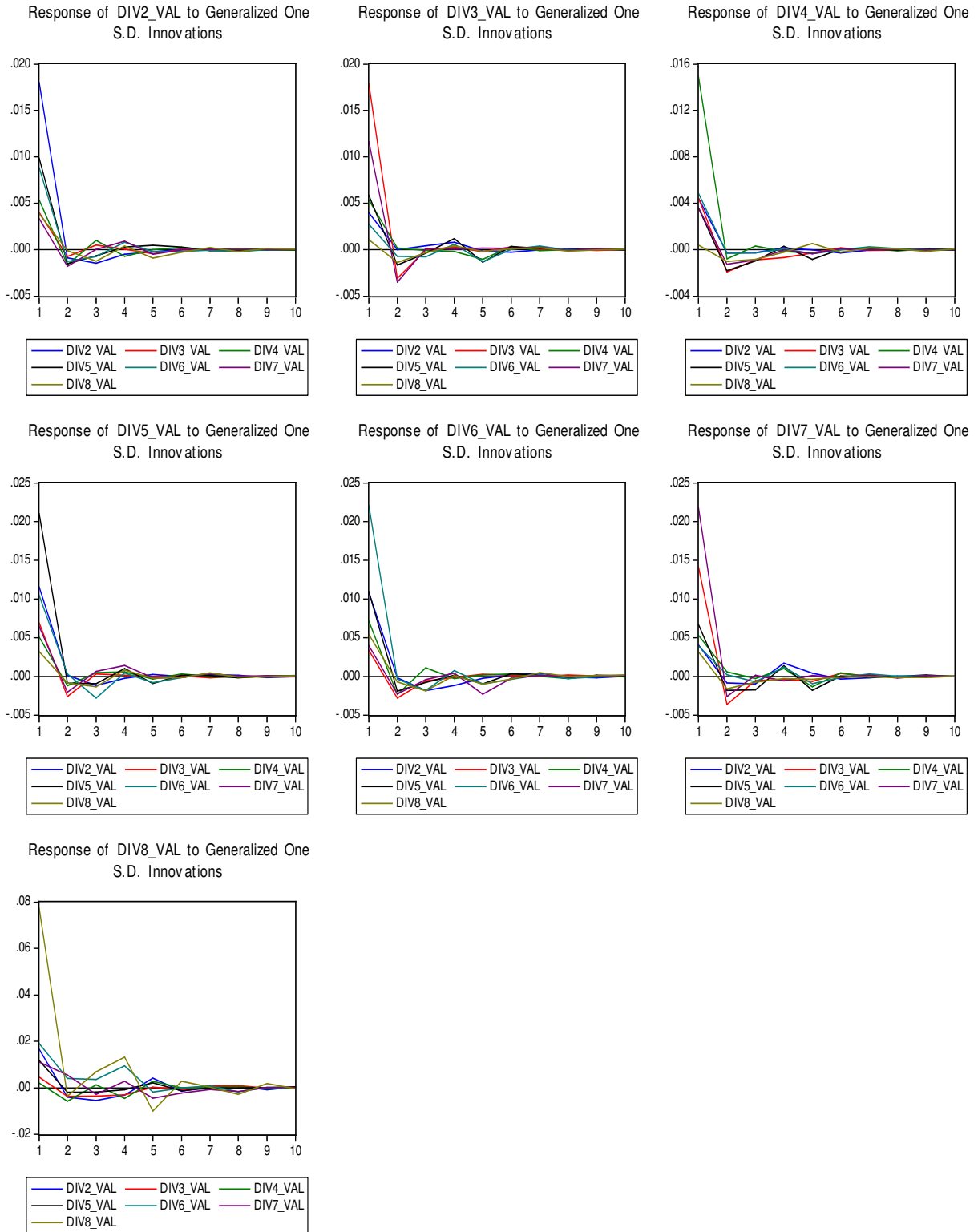Response of DIV8_VAL to Generalized One S.D. Innovations

Figure 9 : Variance Decomposition - Weekly Portfolio (Volatile Sub-Period).