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Dynamic of financial asset prices: An Econometric analysis done in energy sector

Mr.D.Kulothungan[1], Mr.C.V.Anandakrishnan[2]
Research scholar[1]
Sri Krishna Intuitions, Coimbatore-641 008

Final year B.Com[2]
Sri Krishna Intuitions, Coimbatore-641 008

Abstract: We study the long-run and short-run dynamics of stock prices and exchange rates in energy sector. The exogenous shocks and its impact on these markets are studied with Johansen (1991) co integration test and unit root tests. We apply the unit root test to find out the unity among the market price and shares traded in energy sector from 2004 to 2013. The result suggests that stock and foreign exchange markets are positively related to volume of the shares and share traded on the period .The average deviation between the volume and shares traded is 11.84 percentages .Finally, through the application of recursive estimation the result shows that the financial crisis had a temporary effect on the long-run co movement of these markets.

Keywords: Stock markets, Foreign exchange markets, Capital market integration, financial crisis, Energy sector.

JEL classification: F21,F31, F36.

Introduction

Financial press has long asserted that stock prices and exchange rates are closely intertwined. In recent times, the depreciation of the dollar against the euro and other major currencies has been argued to put pressure on the investor sentiment and the US stock markets. Similarly, the previous decade associated with high productivity gains and a stock market boom in the US was accompanied by an exchange rate appreciation. Surprisingly, these connections have rarely been highlighted in workhorse models of exchange rate determination. This paper develops a framework in which the same forces that drive exchange rates, also influence countries' stock markets, and argues that a great deal can be learned about foreign exchange markets by examining stock markets, and vice versa. Identifying interrelations between these markets would also shed light on some widely debated spillovers, such as, for example, international financial contagion.

The paper is structured as follows. Section 2 provides the literature review and main debates surrounding the dynamics between stock markets and economic markets, together with impacts from energy and oil price movements. In section 3 we describe the data used in the analysis and discuss econometric concepts and methodology surrounding multivariate co integration analysis and the out-of sample testing framework. The estimation results are presented in section 4, and in section 5 we draw some important policy conclusions with respect to monetary policy and policies designed for stock markets to withstand oil price movements

Objectives of the study

- To study about the energy sector of selected companies in India.
- To analyze the share price and trade volumes of selected companies in energy sector.
- To assess the liquidity and short-term solvency position of the selected companies in energy sector.
- To assess the growth potentiality of the energy sector.

Literature review

Research conducted by Sadorsky (1999) concluded that oil price changes influence the economic activity. More specifically they found that an increase in the oil price is followed by declining stock returns, this is especially true for after the mid 1980s. Papapetrou (2001) and Park and Ratti (2008) came with the same conclusion for Greece and some European countries. Moreover, Guo and Kliesen (2005) concluded that oil price uncertainty has a negative impact on economic activity especially when they included oil price changes. Cong, Wei, Jiao, and Fan (2008) did not find any statistical significant results at 5 percentlevel,however they noted that some "important" shocks to oil prices do have a negative impact on the stock market. On the other hand, work by

Huang et al. (1996) came to a different conclusion. Results revealed that the oil future price does not play any role in determining the stock returns.

In addition, the paper of Heriques and Sadorsky (2011) related oil price volatility with investment. Early work by Bernanke (1983) found that during a high volatility of oil price, firms find that waiting for new information is the best investment behavior. Even though waiting can result in losses for the firm (since they lose opportunities), it is still often in the best interest for the firm to wait since it could sometimes help firms make the right investment decision. Inspired by Bernanke (1983), Heriques and Sadorsky employed panel data sets and found a U shape relationship between oil price and investment

Econometric techniques

1. Unit root test

A series is said to be stationary if the mean and auto covariance of the series do not depend on time. Any series that is not stationary is said to have unit root. A company which do not face liquidity and bankruptcy risks have stable price change, which could be captured by drift(Value of A) and trend(Value B) of the first order auto regression [AR(1)]

Hence for such companies,

$Y_t=a+bT+cY_{t-1}+u$

Coefficient 'c' will have value of significantly less than one and hence will be stationary. In case the company is facing high risk, the above equation will have value of coefficient 'c' which is equal to one. Such companies will have unit root in their AR (1) equation. The reason for this behaviour is that in case the risk is high, Y_{t-1} will influence $Y_t$to great extent than when the risk for the company is low. Hence, the series tends to diverge. In that case the risk for the company is low; the share price tends to behave in random manner which is not the case if the risk is high. In order to test this hypothesis, we applied 'Augmented Dickey-Fuller' (ADF) test (Dickey&Fuller, 1979).

2.Co-integration test

While the company facing liquidity risk is co-integrated with index, companies facing volatility risk are not. The price of the companies facing liquidity risk trend to converge in case of companies facing unsystematic risk.

The study applies both Engle-Granger test (Engle & Granger,1987) and Johansen test (Johansen,1991) to determine whether the share price of the companies under study are co-integrated with trade volumes. Since nine companies with very high risk were deliberated chosen, there was high possibility that share prices of the nine companies would be having unit root test with their share price and trade volumes. Hence the authors try to find the stationary of the first difference to see if they have unit root or not. Co-integration could be applied only if the series showed unit root but the difference between them showed stationary trend.

Findings

1.Unit root test

All the nine companies Balmer& co, cairn, Castrol, Deepak, Linde, Petronet, Punj Llyod, Selan Explor and Tide water have unit root. As per table 1.1,all the nine companies have ADF test statistic less than critical value at 5 % rejection level. Since a series which does not show stationary tends has increasing mean, volatility, and covariance over a period of time, this increase in variance is what we call high risk. The empirical evidence shows that any company whose price is changing significantly in either direction (liquidity risk) or in single direction trends to have unit root with their share price and trade volumes.

Table 1.1

Scripts	Augmented Dickey-Fuller Test			
	In Levels			
	T-Statistic	Critical Value		
		1%	**5%**	**10%**
Balmer Lawrie & Co. Ltd	-1.819079	-3.434505	-2.863262	-2.567735
Cairn India Ltd	-1.141682	-3.434505	-2.863262	-2.567735

Castrol India Ltd	-2.168593	-3.434505	-2.863262	-2.567735
Deepak Fertilizers and Petrochemicals	-1.655063	-3.434505	-2.863262	-2.567735
Linde India Ltd	-0.968626	-3.434505	-2.863262	-2.567735
Petronet LNG Limited	-0.862547	-3.434505	-2.863262	-2.567735
Punj Lloyd Ltd	-0.942331	-3.434505	-2.863262	-2.567735
Selan Exploration Technology Ltd	-1.034131	-3.434505	-2.863262	-2.567735
Tide Water Oil Company India Ltd	-1.068993	-3.434505	-2.863264	-2.567735

Sources: *Eviews*

2. Co-integration test

The result of co-integration test between volume of the share and no of shares traded is presented in table 3. The lag is eight and is based on Akaike Information Criterion. Results show that both trace test and maximum Eigen value test indicate no co-integration in 5% level. This implies that the VAR model can be conducted for all variables including Balmer& co share volumes and no of shares traded, and both variables are not correlated in the long run**.**

Table 2.1: Co-integration test volume and traded shares using Johansen test (Balmer&co)

Unrestricted Co integration Rank Test (Trace)				
Hypothesis	Eigen value	Trace	0.05 Critical Value	Probability Value **
None	0.080198	127.1287	15.49471	0.0001
At most 1	0.001438	2.151944	3.841466	0.1424
Unrestricted Co integration Rank Test (Maximum Eigen value)				
Hypothesis	Eigen value	λ - Max	0.05 Critical Value	Probability Value**
None	0.080198	124.9768	14.26460	0.0001
At most 1	0.001438	2.151944	3.841466	0.1424

(*) denotes rejection of the hypothesis at the 0.05 level ***Source: Eviews*** (**) MacKinnon-Haug-Michelis (1999) p-values

There is co-integration between the number of shares traded and price. Since the Max-Eigen value and trade value are greater than its critical value, null hypothesis is rejected and alternative hypothesis is accepted. Hence the volume of trade can be predicted with the help of price.

Table 2.2: Co-integration test volume and traded shares using Johansen test (Cairn)

Unrestricted Co integration Rank Test (Trace)				
Hypothesis	Eigen value	Trace	0.05 Critical Value	Probability Value **
None	0.035336	54.28940	15.49471	0.0000
At most 1	0.000339	0.506783	3.841466	0.4765
Unrestricted Co integration Rank Test (Maximum Eigen value)				

Hypothesis	Eigen value	λ - Max	0.05 Critical Value	Probability Value**
None	0.035336	53.78261	14.26460	0.0000
At most 1	0.000339	0.506783	3.841466	0.4765

(*) denotes rejection of the hypothesis at the 0.05 level(**) ***Source: Eviews***
MacKinnon-Haug-Michelis (1999) p-values

There is co-integration between the number of shares traded and price. Since the Max-Eigen value and trade value are greater than its critical value, null hypothesis is rejected and alternative hypothesis is accepted. Hence the volume of trade can be predicted with the help of price.

Table 2.3: Co-integration test volume and traded shares using Johansen test(Castrol)

Unrestricted Co integration Rank Test (Trace)				
Hypothesis	Eigen value	Trace	0.05 Critical Value	Probability Value **
None	0.107193	173.9884	15.49471	0.0001
At most 1	0.002991	4.477567	3.841466	0.0343
Unrestricted Co integration Rank Test (Maximum Eigen value)				
Hypothesis	Eigen value	λ - Max	0.05 Critical Value	Probability Value**
None	0.107193	169.5108	14.26460	0.0001
At most 1	0.002991	4.477567	3.841466	0.0343

(*) denotes rejection of the hypothesis at the 0.05 level ***Source: Eviews***
(**) MacKinnon-Haug-Michelis (1999) p-values

There is co-integration between the number of shares traded and price. Since the Max-Eigen value and trade value are greater than its critical value, null hypothesis is rejected and alternative hypothesis is accepted. Hence the volume of trade can be predicted with the help of price

Table 2.4: Co-integration test volume and traded shares using Johansen test(Deepak)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesis	Eigenvalue	Trace	0.05 Critical Value	Probability Value **
None	0.061774	97.48130	15.49471	0.0000
At most 1	0.001440	2.154176	3.841466	0.1422
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesis	Eigenvalue	λ - Max	0.05 Critical Value	Probability Value**
None	0.061774	95.32712	14.26460	0.0000
At most 1	0.001440	2.154176	3.841466	0.1422

(*) denotes rejection of the hypothesis at the 0.05 level ***Source: Eviews***
(**) MacKinnon-Haug-Michelis (1999) p-values

There is co-integration between the number of shares traded and price. Since the Max-eigenvalue and trade value are greater than its critical value, null hypothesis is rejected and alternative hypothesis is accepted. Hence the volume of trade can be predicted with the help of price

Table 2.5: Co-integration test volume and traded shares using Johansen test(Linde)

Unrestricted Co integration Rank Test (Trace)				
Hypothesis	Eigen value	Trace	0.05 Critical Value	Probability Value **
None	0.085899	134.9974	15.49471	0.0001
At most 1	0.000484	0.724431	3.841466	0.3947
Unrestricted Co integration Rank Test (Maximum Eigen value)				

Hypothesis	Eigenvalue	λ - Max	0.05 Critical Value	Probability Value**
None	0.085899	134.2730	14.26460	0.0001
At most 1	0.000484	0.724431	3.841466	0.3947

(*) denotes rejection of the hypothesis at the 0.05 level ***Source: Eviews***
(**) MacKinnon-Haug-Michelis (1999) p-values
There is co-integration between the number of shares traded and price. Since the Max-Eigen value and trade value are greater than its critical value, null hypothesis is rejected and alternative hypothesis is accepted. Hence the volume of trade can be predicted with the help of price

Table 2.6: Co-integration test volume and traded shares using Johansen test(Petronet)

Unrestricted Co integration Rank Test (Trace)				
Hypothesis	Eigen value	Trace	0.05 Critical Value	Probability Value **
None	0.057452	89.14229	15.49471	0.0000
At most 1	0.000459	0.685664	3.841466	0.4076
Unrestricted Co integration Rank Test (Maximum Eigen value)				
Hypothesis	Eigen value	λ - Max	0.05 Critical Value	Probability Value**
None	0.057452	88.45663	14.26460	0.0000
At most 1	0.000459	0.685664	3.841466	0.4076

(*) denotes rejection of the hypothesis at the 0.05 level ***Source: Eviews***
(**) MacKinnon-Haug-Michelis (1999) p-values

There is co-integration between the number of shares traded and price. Since the Max-Eigen value and trade value are greater than its critical value, null hypothesis is rejected and alternative hypothesis is accepted. Hence the volume of trade can be predicted with the help of price

Table 2.7: Co-integration test volume and traded shares using Johansen test(Punjllyod)

Unrestricted Co integration Rank Test (Trace)				
Hypothesis	Eigen value	Trace	0.05 Critical Value	Probability Value **
None	0.028535	44.39620	15.49471	0.0000
At most 1	0.000746	1.116128	3.841466	0.2908
Unrestricted Co integration Rank Test (Maximum Eigen value)				
Hypothesis	Eigen value	λ - Max	0.05 Critical Value	Probability Value**
None	0.028535	43.28007	14.26460	0.0000
At most 1	0.000746	1.116128	3.841466	0.2908

(*) denotes rejection of the hypothesis at the 0.05 level ***Source: Eviews***
(**) MacKinnon-Haug-Michelis (1999) p-values

There is co-integration between the number of shares traded and price. Since the Max-Eigen value and trade value are greater than its critical value, null hypothesis is rejected and alternative hypothesis is accepted. Hence the volume of trade can be predicted with the help of price

Table 2.8: Co-integration test volume and traded shares using Johansen test(Selan explor)

Unrestricted Co integration Rank Test (Trace)				
Hypothesis	Eigen value	Trace	0.05 Critical Value	Probability Value **

None	0.101685	161.4405	15.49471	0.0001
At most 1	0.000753	1.125721	3.841466	0.2887
Unrestricted Co integration Rank Test (Maximum Eigen value)				
Hypothesis	Eigen value	λ - Max	0.05 Critical Value	Probability Value**
None	0.101685	160.3148	14.26460	0.0001
At most 1	0.000753	1.125721	3.841466	0.2887

(*) denotes rejection of the hypothesis at the 0.05 level ***Source: Eviews***
(**) MacKinnon-Haug-Michelis (1999) p-values

There is co-integration between the number of shares traded and price. Since the Max-Eigen value and trade value are greater than its critical value, null hypothesis is rejected and alternative hypothesis is accepted. Hence the volume of trade can be predicted with the help of price

Table 2.9: Co-integration test volume and traded shares using Johansen test(Tide water)

Unrestricted Co integration Rank Test (Trace)				
Hypothesis	Eigen value	Trace	0.05 Critical Value	Probability Value **
None	0.106164	168.7208	15.49471	0.0001
At most 1	0.000623	0.932297	3.841466	0.3343
Unrestricted Co integration Rank Test (Maximum Eigen value)				
Hypothesis	Eigen value	λ - Max	0.05 Critical Value	Probability Value**
None	0.106164	167.7886	14.26460	0.0001
At most 1	0.000623	0.932297	3.841466	0.3343

(*) denotes rejection of the hypothesis at the 0.05 level ***Source: Eviews***
(**) MacKinnon-Haug-Michelis (1999) p-values

There is co-integration between the number of shares traded and price. Since the Max-Eigen value and trade value are greater than its critical value, null hypothesis is rejected and alternative hypothesis is accepted. Hence the volume of trade can be predicted with the help of price

Conclusion

This paper analyses the long-run interaction among stock prices and the real exchange rate in four oil exporting Middle East countries using co integration analysis of whole sample period. This exercise produces evidence of co integration between stock prices and trade volumes in the companies under investigation. In line with Phylaktis and Ravazzolo (2005) we argue that this result may be due to the omission of an important variable, which acts as a conduit through which the market price and volumes are linked. Therefore we incorporate additional variables to the system such as oil prices and market index (using the BSE stock prices as a proxy). Again the analysis that focuses on the full sample point out the evidence of co integration. We therefore, the long-run equilibrium relationship among the stock prices, the real exchange rates and oil prices in India. We find that, oil prices have a long-run positive effect on stock prices.

Our results indicate that, firstly, the oil price is an important variable, which acts as a conduit through which the real exchange rates and domestic stock prices are linked, so that the oil exporting countries as policy makers in OPEC should keep an eye on the effects of changes in oil prices levels on their own economies and stock markets. Secondly, government policy makers may play a role in influencing real exchange rates and stock prices through the use of oil prices, as the countries in our sample are among the biggest oil producers in the world. Thirdly, the relationship between real exchange rates and stock prices may be useful for portfolio managers interested in global asset allocation or investors trying to hedge against foreign exchange risk. Also the co integration among the share price and trade volumes of stock market give the

foreign investors an opportunity to benefit from diversifying their portfolio between the major stock markets like US stock exchange and the emerging markets in the Middle East region.

References:

[1] Abdalla, I.S.A., and Murinde, V. (1997). Exchange rate and stock prices interactions in emerging financial markets: evidence on India, Korea, Pakistan and the Philippines. Applied Financial Economics 7, 25-35.
[2] Aggarwal, R. (1981). Exchange Rates and stock prices: a study of the US capital Ajayi, R., Mougoue, M., 1996. On the dynamic relationship between stock prices and exchange rates. The Journal of Financial Research 19, 193-207
[3] Ajayi, R.A., and Mougoué, M. (1996). On the dynamic relation between stock prices and exchange rates. Journal of Financial Research 19, 193-207.
[4] Bahmani-Oskooee, M., and Sohrabian, A. (1992). Stock prices and the effective exchange rate of the dollar. Applied Economics 24, 459-464.
[5] Bhattacharya, B. & Mukherjee, J. (2003). Causal Relationship Between Stock Market and Exchange Rate. Foreign Exchange Reserves and Value of Trade Balance: A Case Study for India, Paper presented at the Fifth Annual Conference on Money and Finance in the Indian Economy, January 2003.
[6] Cappiello, L., R.F. Engle and K. Sheppard (2003) Asymmetric Dynamics in theCorrelations of Global Equity and Bond Returns, Working Paper No. 204,European Central Bank
[7] Chaudhuri, K., Daniel, B.C., 1998.Long-run equilibrium real exchange rates and oil prices. Economics Letters 58, 231-238
[8] Dornbusch, R. (1975). A portfolio balance model of the open economy. Journal of Monetary Economics 1, 3-20.Feldstein, M. (1980) Inflation and the Stock Market. *American Economic Review* , 70(5): 839-947
[9] Fisher, R. A. (1930). *The General Theory of Natural Selection*. Oxford University Press, Oxford
[10] Fratzscher, M., (1998), 'Why are Currency Crises so Contagious? A Comparison of the Latin American Crisis of 1994-1995 and the Asian Crisis of 1997-1998', *Weltwirtschaftiliches*, 134, 664-91.
[11] Granger, C. W. J, Huang, B. and C.W. Yang, (1998), 'A Bivariate Causality Between Stock Prices and Exchange Rates: Evidence from the Recent Asian Flue', Discussion Paper 98-09, University of California, San Diego, Department of Economics, April 1998.
[12] Granger, C.W.J. (1969). Investigating causal relations by econometric models and cross-spectral methods. Econometrica 37, 424-439.