ELECTRICITY FUTURES AND STOCK MARKET RESPONSE TO ELECTRICITY SECTOR MATERIAL DISCLOSURES

Ivan Diaz-Rainey, University of Otago, New Zealand, + 64 3 479 8117, ivan.diaz-rainey@otago.ac.nz
Xing Han, University of Otago, New Zealand, + 64 3 479 8117, xing.han@otago.ac.nz
Greg Sise, Energy Link Ltd., Dunedin, New Zealand, + 64 3 477 3572, greg.sise@energylink.co.nz

Overview

A material disclosure with sector-wide ramifications by an energy utility has the potential to impact its own stock price, that of its competitors, but also the price of spot electricity and electricity futures. We explore such announcements in the New Zealand context given concerns that 'insiders' may be trading ahead of announcements and affecting market confidence.

Thus, this paper explores information disclosure in the New Zealand electricity industry using data from electricity futures and equity markets. It contributes to the emerging literature on the financial regulation of energy electricity markets (Diaz-Rainey et al. 2011; Ledgerwood & Carpenter, 2012; Nijman, 2012; Rahimi & Sheffrin 2003). This literature has focussed mainly on market monitoring with no empirical research on the issue of fair disclosures in electricity markets apparent. The most closely related works discernible are, Demirer & Kutan (2010) who use event study approach in the oil spot and futures market context, while Keller (2010) explores the equity market response of announcements about competitor market entry in the German electricity industry. Moreover, the novelty of our approach is to understand the impact of information disclosure across both futures and equity markets. Furthermore, when examining electricity futures market we incorporate in our analysis electricity futures prices, volume and open interest.

Methods

Using a unique dataset of 66 public announcement over the period 2012 to 2016 and an event study methodology, we test for abnormal returns in the lead up to events that are categorised as having either negative or positive sector-wide impacts.

Stock Returns: To analyse the market impact of these news events on the energy firms, we adopt an event-study type regression model, as all firms (within the portfolio) are exposed to the news announcements simultaneously. To purge the "rational" stock reaction unrelated to our news events, we use the Fama-French three factors as the control variables (Fama & French 1992).

$$R_{p,t} - RF_t = \alpha + \beta_1 POS + \beta_2 NEG + \beta_3 POS\{-5,-2\} + \beta_4 POS\{-1,+5\} + \beta_5 NEG\{-5,-2\} + \beta_6 NEG\{-1,+5\} + \gamma_1 RMRF_t + \gamma_2 SMB_t + \gamma_3 HML_t + \varepsilon_t \quad (1)$$

where the dependent variable is the daily excess return (over the risk-free rate) of the stock portfolio of energy firms. POS and NEG are the event day dummy for positive and negative events, respectively. $POS\{-5,-2\}$ and $NEG\{-5,-2\}$ are the prior-event dummies, which ranges from day -5 to day -2 before the positive and negative market event, respectively. As it stands, the slope coefficients on $POS\{-5,-2\}$ and $NEG\{-5,-2\}$ capture the informational leakage before the news announcements. $POS\{-1,+5\}$ and $NEG\{-1,+5\}$ are the event dummies which capture a relatively longer event window ranges from day -1 to day +5 for positive and negative market events, respectively. The control variables are $RMRF_t$ is the excess return of the market portfolio over the risk-free rate; SMB_t (Small-minus-Big) is the excess return of the small-sized firms over the large-sized firms; HML_t (High-minus-Low) is the excess return of the high book-to-market ratio firms over the low book-to-market ratio firms.

Electrcity Futures Response to the Market Events: To analyse the market impact of these news events on the energy futures contracts, we adopt a similar event-study type regression model as for the stock markets.

$$FR_t = \alpha + \beta_1 POS + \beta_2 NEG + \beta_3 POS\{-5,-2\} + \beta_4 POS\{-1,+5\} + \beta_5 NEG\{-5,-2\} + \beta_6 NEG\{-1,+5\} + \gamma_1 RMRF_t + \gamma_2 SMB_t + \gamma_3 HML_t + \gamma_4 Volume_t + \gamma_5 OpenInterest_t + \varepsilon_t \quad (2)$$

where the dependent variable is the daily log return of the near-term energy futures contracts (in percentages). The event dummies, POS, NEG, $POS\{-5,-2\}$, $NEG\{-5,-2\}$, $POS\{-1,+5\}$, and $NEG\{-1,+5\}$ follows the same definition as in the stock portfolio regression. To control for the volume effect and hedging demand, we add the trading volume ($Volume_t$) and the open interests ($OpenInterest_t$) of the futures contract in the event-type regression. Following Fama and French (1996), we treat SMB_t and HML_t as proxies for unspecified state variables, and use them, together with $RMRF_t$, as additional control variables in our regression to control for the time-varying market-wide risks. We run similar models to equation (2) for the electricity futures where Open interest and Volume are the dependent variable.

Results & Conclusions

For our stock portfolio we find limited evidence of unusual market activities prior to events. We find a marginally significant effect (based on a one tailed test) in one of our two models for the NEG_[-5,-2]. This is consistent with our a priori expectation that a compliance culture and high reputational capital in New Zealand prevents widespread and illegal insider trading around the related events. Caution should be attached to these regressions and their related interpretation since neither POS_DAY nor NEG_DAY have significant effects. This surprising and suggest that out stock portfolio analysis may be limited in power due to the low number of stocks contained.

In the electricity futures market we find an asymmetric response pattern for the positive and negative events during the pre-event window (-5,-2). More specifically, indicating possible information leakage prior to the news announcement, we find significant negative returns for negative events, while there is no significant market response for the positive events. The former is suggestive of the large market participants mitigating losses prior to announcement, through increased hedging. The absence of an effect for positive events is likely due to the long positions (generating capacity) in the physical market of large players. Thus their response is to generate more in the physical market to take advantage of rising prices and, in the futures market, either close out hedge positions or naturally let them expire by 'doing nothing'. Our interpretation of the asymmetry is confirmed in our analysis of changes in open interest with open interest for NEG [-5-2] increasing, while open interest for POS [-5-2] declines.

We conclude by suggesting that the information disclosure regime that operated over the period analysd benefitted large incumbents at the expense of smaller market players.

References

Demirer, R., & Kutan, A. M. 2010. The behavior of crude oil spot and futures prices around OPEC and SPR announcements: An event study perspective. *Energy Economics*, 32(6), 1467-1476.

Diaz-Rainey, I., Siems, M., & Ashton, J. K. 2011. The financial regulation of energy and environmental markets. *Journal of Financial Regulation and Compliance*, 19(4), 355-369.

Fama, E.F., French, K.R., 1992. The cross-section of expected stock returns. *The Journal of Finance* 47, 427-465

Keller, A. 2010. Competition effects of mergers: An event study of the German electricity market. *Energy Policy*, 38(9), 5264-5271.

Ledgerwood, S. D., & Carpenter, P. R., 2012. A framework for the analysis of market manipulation. *Review of Law & Economics*, 8(1), 253-295.

Nijman, L., 2012. The impact of the new wave of financial regulation for European energy markets. *Energy Policy*, 47, 468-477.

Rahimi, A. F., & Sheffrin, A. Y., 2003. Effective market monitoring in deregulated electricity markets. *IEEE Transactions on Power systems*, 18(2), 486-493.