

Referee report for “Asymmetry and Spillover Effects in the North American Equity Markets”

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In this paper, the authors propose an extension of the shock/volatility spillover models of Bekaert and Harvey (1997), Ng (2000) and Baele (2005). This extension accounts for asymmetries in both return and volatility spillovers. In particular, they apply this model in order to analyse shock/volatility spillovers from the US equity markets into Canada and Mexico, for the sample period from January 1992 to December 2003.

In my opinion, the main contributions of the paper are twofold. First, unlike previous studies, they model the conditional volatility of equity returns using the asymmetric power APARCH model proposed by Ding, Granger and Engle (1993). Second, they focus on North American stock markets, this is US, Canada and Mexico. Therefore, the contribution of the paper is potentially significant in the sense that it analyses interrelations between important markets which had not been previously analysed in the literature. In particular, as far as I know, there are no other studies analysing volatility spillovers between US and Mexico.

The analysis carried out is thorough and appropriate in terms of the objectives of the study. The methodological section is accurate and the final conclusion addresses the issues that are raised during the introductory section.

As I already said, one of the main strengths of the study is the use of the APARCH model proposed by Ding, Granger and Engle (1993). This is a general model which nests several asymmetric GARCH specifications as special cases. General specifications such as this particular model enable researchers to select the final model using some restriction tests. This is an easy procedure and avoids ad hoc selection. In fact, in the empirical analysis, it seems that the outcome of the likelihood ratio tests provides a clear rejection of both the Bollerslev and the Taylor/Schwert models against the APARCH (1, 1) model.

Moreover, the empirical section is very accurate and complete and it presents several specification tests that provide robustness checks on results.

To my mind, the paper is almost ready for publication. Some weaknesses/suggestions should, however, be mentioned and considered.

- The authors claim to “extend the standard shock spillover model of Bekaert and Harvey (1997), Baele (2003) and Ng (2000) to account for asymmetries”. This affirmation could be misleading. Those studies also account for asymmetries, though they are asymmetries in volatility spillover effects. As far as I understand it, the current study innovates by including asymmetry modelling in mean returns.
- I do not fully agree with the statement on page 2: “correlations in volatility and returns appear to be causal from the US market while none of the other markets explains US stock market movements”. I would rather include some references or be less strict in the second part of the sentence.
- Similarly, I do not agree with the statement on page 3: “Yet, there is no evidence in the literature documenting that the international transmission of stock returns and volatility also exhibits asymmetric behaviours”. There is empirical evidence on that (see, for instance, Booth, Martikainen and Tse (1997)). The same applies to: “This generality in the modeling of spillover effects has thus far been absent in the literature studying dependencies in national stock markets”, on page 4.
- Would it be possible to model volatility transmission among the three countries considered using a multivariate GARCH specification? This way, one could analyse as well interactions between Canada and Mexico and reverse spillover effects from the Canadian and Mexican markets to the US.
- Regarding the data, Are the indices used comparable? Why not using indices from a common database (Datastream?) so that they are more easily comparable? Would results be different by using indices measured in a common currency?
- On page 17, an explanation to justify the selection of two subperiods would certainly help.
- In the notation used through the paper, is $d = \delta$? A more complete definition/interpretation of δ would also help, both in the methodology and the empirical results sections.
- The results found by some other studies analysing volatility spillovers between US and Canada could have been mentioned in the literature review (see Karolyi (1995), Darbar and Deb (1997), Ramchand and Susmel (1998) and Susmel (2000)).

- Why variance ratios are obtained under the assumption that “volatility spillovers originating from the US equity market have symmetric effects on the volatility of the Canadian and Mexican returns”? See page 13.
- On page 16, Why the fact that “the mean of the returns is higher for Mexico, as is the standard deviation” is “an indication of unconditional variance in returns, compared to Canada and the US.”?
- Finally, some minor and formal remarks:
 Baele (2003) has already been published in the Journal of Financial and Quantitative Analysis, Vol. 40, No. 2, June 2005.
 The complete title for Ding, Granger and Engle (1993) is “A long memory property of stock market returns and a new model”.
 The figures and tables design and format could be improved in order to make it more easily readable (Some examples: title in bold and include notes in all tables).
 Why do you use $Q(12)$ and $Q^2(12)$ in Table 1 and $Q(6)$ and $Q^2(6)$ in the rest of the paper?
 Why do you use a 10% level of significance on page 20 instead of 5% or 1%?
 On page 7, last line, “equation (4)” should be “equation (5)”.
 Revise formulas, as some characters appear as “?”.

As a conclusion, despite these comments, the paper is well written, accurate and addresses important issues.

References

- Booth, G. G.; T. Martikainen and Y. Tse (1997): Price and volatility spillovers in Scandinavian stock markets, *Journal of Banking and Finance*, 21, 811-823.
- Darbar, S. M. and P. Deb (1997): Co-movements in international equity markets, *Journal of Financial Research*, 20, 305-322.
- Ramchand, L. and R. Susmel (1998): Volatility and cross correlation across major stock markets, *Journal of Empirical Finance*, 5, 397-416.
- Susmel, R. (2000): Switching volatility in private international equity markets, *International Journal of Finance and Economics*, 5, 265-283.