Referee Report on

# "Asymmetry and Spillover Effects in the North American Equity Markets"

for *Economics*

## 1) Summary of the paper

This paper contributes to the volatility spillover literature in international stock markets. More specifically, the paper focuses on the spillover effects of the US stock market to the stock market of Canada and Mexico. Contrary to the existing literature (see e.g. Bekaert and Harvey (1997), Ng (2000), and Baele (2003), this paper investigates whether the spillover effects display asymmetric behavior. It further differentiates between mean and volatility spillovers from the US to the other two markets. To do so, they estimate a (augmented) AR(1)-APARCH(1,1) for the three stock markets for daily returns, ranging from January 1992 until December 2003. The main result, which contributes to the existing literature, is that volatility spillover effects from the US to the Canadian and Mexican stock markets are asymmetric. More specific, negative shocks from the US market have a higher impact on the Canadian and Mexican equity markets than positive shocks.

## 2) Main comments

The paper addresses some relevant research questions. First, do shocks in the US stock market have a different impact on the stock markets of the nearby countries. Second, do we have to make a difference between positive and negative shocks (returns), i.e. is the transmission of the shocks (returns) asymmetric. The first research question investigates whether more mature markets (Canada) react differently than more emerging markets (Mexico) to return and volatility shocks in the US market. The second research question is highly relevant, as there is already amply evidence that correlations between stock markets are asymmetric, higher in times of high market volatility. Hence one can expect negative shocks, which are more frequent in times of high market volatility, to have a bigger impact that positive shocks, justifying higher correlations. It could also relate to contagion. High negative shocks in the US stock market could have a higher impact on the other markets, due to contagion.

In spite of the relevance of this research, I do have however some remarks, especially related to the rather restricted contribution of this paper to the existing literature.

a) The paper clearly shows evidence of asymmetry in the volatility spillover effects. To do so, they extend existing models in the literature as to allow for this asymmetry, and further use a more flexible GARCH model. Although the model contains some (minor) methodological innovations, it does not succeed to explain why there is asymmetric behavior. Why do negative shocks have a higher impact than positive shocks? Can it be explained by business cycle variation, or is it contagion? The paper does suggest that the higher negative impact for Mexico (relative to Canada) can be explained by the liberalization process, making emerging stock markets more vulnerable to global market shocks, but no formal analysis is done to prove that. So basically, the model is not capable of extracting the driving economic forces behind the results.
b) Second, the spillover parameters are enforced to be constant. There is a recent paper by Baele and Inghelbrecht (2007) which clearly shows that exposures to global market shocks are time-varying, mainly driven by cyclical movements and the trade integration process. It could be that once allowing for these structural and economic driving forces, the asymmetric spillover effects disappear. In case of this study, you could expect integration en cyclical movements to have an effect on the transmission of shocks from the US to Canada and Mexico. This may be an interesting topic to explore.
c) The paper shows in figure 3 the implied correlations between the unexpected returns. Given the existing literature, we could expect that the correlation are higher in times of higher global (US) market volatility. The paper, however, does not investigate this link, although I could reveal interesting information.
d) The model used in the paper has some nice features, for instance allowing for three sorts of asymmetric effects. Moreover, the authors praise the APARCH specification for its functional flexibility. This may be somehow overstated. First, the lag structure of the specification is enforced to be AR(1)-APARCH(1,1). No formal tests are done to come to this specification. The only flexibility of the model is through the power term, which is not enforced (as is the case in the traditional GARCH models), but is estimated. I am, however, not convinced that this flexibility really makes a difference. Moreover, significance tests show that each estimated model is in line with one of the traditional models.
e) Some data issues. I believe you should work with return indices, i.e. including dividends. Moreover, as a robustness check, you should do the analysis for indices expressed in a common currency (US dollar). Form the point of view of the investor (for instance US investor), working in a common currency is in place.

Despite my comments, I believe this paper has potential. I leave it to the editor to decide whether the contribution is this paper is sufficient to justify a publication in Economics.