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Are idiosyncratic volatility and MAX priced in the Canadian market?☆

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ABSTRACT

The negative relationship between realized idiosyncratic volatility (*RIvol*) and future returns uncovered by Ang et al. (2006) for the U.S. market has been attributed to return reversals. For the Canadian market where return reversals are considerably less important, we find that *RIvol* is positively related to future returns, even after controlling for risk loadings, illiquidity and reversals. Unlike the findings of Bali et al. (2001) for the U.S. market, we find that the relationship between extreme positive returns (*MAX*) and future returns for the Canadian market is positive and that idiosyncratic volatility continues to be consistently positively related to future returns after controlling for *MAX*. We find evidence that suggests that reversals for stocks with extreme daily returns are confined to (typically small) stocks with low institutional holdings.

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1. Introduction

Following the seminal work of Sharpe (1964); Lintner (1965) and Black (1972) on the CAPM, many financial economists and practitioners maintain that only systematic risk is priced under the assumption that investors are rational and returns are mean-variance efficient. Subsequent asset pricing models also generally assume that idiosyncratic risk (*Ivol*) is not priced. Goetzmann and Kumar (2008), among others, find that investors are not nearly as diversified as they should be. This leads to the following question: If investors do not hold diversified portfolios, are they compensated for their exposure to *Ivol*?

Various asset-pricing models for imperfect markets (e.g., Merton, 1987) predict a positive relationship between the incremental risks from holding not fully diversified portfolios and expected returns. In turn, this implies that expected returns are positively

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related to *Ivol*. However, empirical results on the nature of this relationship are mixed and range from a significant negative to no to a significant positive relationship. Furthermore, the empirical evidence on whether or not there is a trend in *Ivol* varies from upwards at least during the 1990's in Campbell et al. (2001) to no time trend but rather episodic phenomena associated partially with retail investors in Brandt et al. (2010).

Many studies explain the results of Ang et al. (2006, 2009) that realized *Ivol* (*RIvol*) and future returns are negatively related as being due to return reversals (Huang et al., 2010; Fu, 2009). These studies argue that the negative relationship disappears after controlling for the prior month's return. Venezia et al. (2011) show that herding by investors Granger-causes *RIvol*, which in turn leads to lower returns in subsequent periods. The over- and under-reaction of investors in some markets is a well-documented phenomenon that has received much interest from practitioners and academics. Academic studies for the U.S. market include those by De Bondt and Thaler (1985, 1987) who find overreaction over periods of a few years, Jegadeesh and Titman (1993, 2001) who find under-reaction over periods of three to twelve months, and Jegadeesh (1990) and Lehmann (1990) who find overreaction over periods of between one week and a month. A large number of investors follow contrarian or momentum strategies in the U.S. (Goetzmann and Massa, 2002) that can lead to risk-adjusted excess returns when investors overreact or underreact to news, respectively (Eggins and Hill, 2010). Grinblatt et al. (1995) find that over three-quarters of their mutual fund sample engage in momentum investing. The pervasiveness of longer-term momentum and shorter-term contrarian trading strategies (based on 6-12 and one month horizons, respectively) is demonstrated by the so-called 'quant meltdown' of August 2007, when a large number of quantitative managers using such strategies experienced significant losses (Khandania and Lob, 2007).

The momentum effect uncovered in the U.S. market (Jegadeesh and Titman, 1993) and in other markets (e.g., Griffin et al., 2003) has been hard to support empirically in the context of an efficient market with rational investors. For combinations of portfolio formation and test periods of one to four quarters, Jegadeesh and Titman (1993) show that the momentum effect is not explained by market risk and the unconditional Fama and French (1996) factors. Furthermore, the importance of the momentum factor increases when the three-factor model is conditioned (Grundy and Martin, 2001). The finding by Jegadeesh and Titman (2001) that positive momentum returns in the U.S. market become negative after the first year following portfolio formation appear to support the predictions of the behavioral models and not those of the efficient-market hypothesis. Griffin et al. (2003) find that momentum profits over 6-month holding periods for a period ending in December 2000 are more pervasive in European and North American markets (including Canada), but less evident in the Asian markets (including Japan). They also find no evidence that macroeconomic risk variables can explain momentum, and that momentum profits reverse over 1- to 5-year horizons, which is counter to the predictions of existing risk-based explanations. However, the evidence is inconclusive about the profitability of momentum strategies for institutional investors (Sias, 2007).

Previous studies propose various explanations for the momentum trading of investors. The behavioral explanations include both over- and under-reaction to information. For example, the momentum trades of smart traders push prices past fundamental values in their effort to exploit uninformed investors in the model of De Long et al. (1990). Daniel et al. (1998) propose a theory based on investor overconfidence and biased self-attribution that explains several anomalous patterns in securities returns that are anomalous when viewed from the perspective of efficient markets with rational investors. Their theory is based on two premises supported by psychological studies; namely, individuals overestimate the precision of their private information signals due to their overconfidence in their ability to evaluate securities, and investor confidence changes in a biased fashion based on decision outcomes. All of this evidence suggests that the importance of the momentum effect can be expected to differ across international markets.

The prior literature documents that the Canadian market exhibits considerably weaker return reversals (over-reactions) than those documented for the U.S. Assoe and Sy (2003) find that the returns of a contrarian strategy consisting of buying (selling) low (high) return stocks based on monthly formation and test portfolios are driven by small stocks and the January effect over the 1964-1998 time period. Using longer non-overlapping portfolio formation and test periods of 1 to 10 years for the 1950-1988 time period, Kryzanowski and Zhang (1992) find that a contrarian strategy does not yield positive and significant returns as was previously found for the U.S. market. We provide some further evidence in this paper that the return behavior of Canadian stocks continues to exhibit considerably less anomalous behavior from the perspective of efficient markets with rational investors than previously reported for some other country markets (e.g., the U.S.).

The industrial composition of the Canadian market differs markedly from that in the U.S. According to the TSX group, the Canadian market is the global leader in both the mining and oil & gas sectors. It has the highest market capitalization of mining stocks in the world with a total market capitalization of 6.9 billion Canadian dollars where the combined capitalization of both the Australian Stock Exchange (ASX) and NYSE for this sector is 5.7 billion Canadian dollars. The Canadian market is the leading global market for the number of mining companies with a total of 1,618 listed mining companies followed by the ASE with 782 listed mining companies.[2] The Canadian market is also the leader in oil & gas listings with 369 such listings which is more than the combined total for both the ASX and NYSE. Furthermore, Boyer and Filion (2007) report that commodity prices are more important than the domestic Canadian exchange rate and interest rates in explaining the overall performance of the Canadian stock market.

Our results are interestingly different for the Canadian versus the U.S. market. First, we are unable to confirm for the Canadian market the negative relationship between *RIvol* and subsequent returns documented by Ang et al. (2009) for the U.S. market. While Canada was included in their international sample, Ang et al. (2009) only included a subsample of 300 Canadian firms available in DataStream. In contrast, our sample is more inclusive since it includes all firms that have ever been listed on the Toronto Stock Exchange (TSX). Using quintiles and deciles based on different measures of *RIvol* (with and without adjustments

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[2] All the numbers are calculated as of December 31, 2013. See: http://www.tmx.com/en/pdf/Mining_Sector_Sheet.pdf; and http://www.tmx.com/en/pdf/OilGas_Sector_Profile.pdf.

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