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# Pricing of the currency risk in the Canadian equity market



Mohammad Al-Shboul<sup>a,1</sup>, Sajid Anwar<sup>b,c,\*</sup>

<sup>a</sup> Department of Accounting, Banking and Financial Sciences, College of Business Administration and Economics, Al-Hussein Bin Talal University, P O Box (20), Ma'an 71111, Jordan

<sup>b</sup> School of Business, University of the Sunshine Coast, Maroochydore DC, QLD 4558, Australia

<sup>c</sup> IGSB, University of South Australia, Adelaide, SA 5001, Australia

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### ABSTRACT

Based on a three-factor international capital asset pricing model, we examine whether the world market, the local market and the currency risks are priced in the Canadian equity market. The analysis presented in this paper is based on data collected from 2003 to 2010. As the dataset also includes the period of global financial crisis, we examine the issue of risk pricing in the full sample as well as in before and after global financial crisis periods. Unlike most existing studies, the empirical results presented in this paper are based on (i) the quasi maximum likelihood estimation (QMLE) based multivariate GARCH-in-Mean specification and (ii) the generalized method of moments (GMM) techniques. Our empirical analysis based on weekly data on 58 largest Canadian firms indicates that the currency as well as the local and the world market risks are priced in the Canadian equity market. This result holds for all exchange currency rates proxies and in all sample periods. We find that the price of the world market, the local market and the currency risks is time-varying and the Canadian equity market is partially segmented.

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## 1. Introduction

Finance theory suggests that changes in exchange rates affect the value of assets thereby creating currency risk exposure (Adler and Dumas, 1984; Jorion, 1990). In addition, within the context of an

\* Corresponding author at: School of Business, University of the Sunshine Coast, Maroochydore DC, QLD 4558, Australia. Tel.: +61 7 5430 1222.

E-mail addresses: [m.shboul@ahu.edu.jo](mailto:m.shboul@ahu.edu.jo) (M. Al-Shboul), [SANwar@usc.edu.au](mailto:SANwar@usc.edu.au) (S. Anwar).

<sup>1</sup> Tel.: +962 3 2179000x8343.

international capital asset pricing model (ICAPM), it is argued that in the absence of purchasing power parity (PPP), optimal portfolios differ across countries and the return that investors expect on their investment includes a premium for both market and exchange rate risks (De Santis and Gérard, 1998). More recent studies on exchange rate risk pricing (for example Phylaktis and Ravazzolo, 2004; Tai, 2008; Saleem and Vaihekoski, 2008, 2010; Antell and Vaihekoski, 2007, 2012) suggest that currency risk pricing is time-variant. Most studies that consider the possibility of time-varying exchange rate risk pricing utilize a modified version of De Santis and Gérard's framework. De Santis and Gérard argue that unconditional models of exchange rate risk pricing are unable to detect the time-varying currency risk. The multivariate GARCH process suggested by De Santis and Gérard is the most common method used to quantify the pricing of currency risk and to test whether risk pricing is time-varying. This method makes use of the variance of each risk factor over time, which is regressed against stock returns conditional on a number of instrumental variables. For example, Saleem and Vaihekoski (2010) allowed for the conditional local influence. They analyzed the size of the risk premia due to time-varying sources of risks and analyzed the potential drivers of risk premium. Antell and Vaihekoski (2012), while extending their earlier work published in 2007, modified De Santis and Gérard's framework. In doing so they relied on Ding and Engle's (2001) covariance stationary specification to test a conditional ICAPM for both Finland and Sweden (in periods of floating and fixed currency rates).

The main aim of this paper is to provide a comprehensive analysis of whether or not the exchange rate risk is priced in the Canadian equity market. Canada is a member of G7 (group of seven major industrialized economies) and the North American Free Trade Area (NAFTA). Even before joining NAFTA, Canada was heavily involved in bilateral trade with the US.<sup>2</sup> Among the G7 economies, Canada is regarded as the most open (Kia, 2013). Under the floating exchange rate system, the value of Canadian firms is more likely to be affected by fluctuations in foreign currency exchange rates. Through its impact on the expected return on securities, exchange rate fluctuations can be a source of systematic risk on stocks (see Bodnar et al., 1996). The global financial crisis that started in 2008 also affected the Canadian economy. There was a significant decrease in the gross domestic product (GDP), which adversely affected the Canadian imports. Canada also experienced a decline in demand for its exports. However, this crisis had only a short-term effect on Canada's net exports. From 2009, both exports and imports increased gradually and returned to their pre-crisis level soon after (Li and Li, 2013).<sup>3</sup> The collapse of Lehman Brothers in September 2008 generated a wave of shocks that affected financial markets across the globe. The failure of this large investment bank exacerbated the liquidity and inter-bank lending problems that resulted in a significant decline in stock market indices in most developed as well as developing economies. The foreign exchange markets were also rattled by the higher level of uncertainty caused by the global financial crisis. Due to its strong trading relations with the US, Canadian dollar is almost always significantly affected by fluctuations in the US economy (Melvin and Taylor, 2009). From November 7, 2007 to March 9, 2009, the Canadian dollar depreciated against the currencies of its major trading partners by approximately 28% (Caporale et al., 2013).

In summary, the global financial crisis influenced the Canadian economy and therefore the value of the Canadian dollar. Fluctuations in the value of the Canadian dollar can, among other things, affect the expected future cash flows of firms as well as their cost of capital. As a result, changes in the value of the Canadian dollar can affect the values of Canadian firms. Whether or not the exchange rate risk is priced in the Canadian equity market is likely to be of interest to Canadian investors. Depending on their individual characteristics and risk tolerance, fluctuations in the value of the Canadian dollar are likely to have an asymmetric impact on firms and investors. In addition, the trading strategies employed by Canadian investors are unlikely to be identical to those utilized by their counterparts

<sup>2</sup> Approximately 40% of the goods produced in Canada are sold abroad and about 80% of those goods are exported to the US (Samson, 2013).

<sup>3</sup> Although the global financial crisis was a fixed income crisis, it also affected the foreign exchange market returns. Foreign currency investors tend to rely on the so-called "carry" trade profits. These investors expect to earn profits from arbitrage. Under the interest rate parity condition, this involves, borrowing in a country with low interest rate (Clarida et al., 2009). However, in periods of adverse and unusual market conditions, it may not be possible to earn sufficient profit from interest rate differentials. As the level of uncertainty increases, currency investors tend to unwind, which contributes to a currency crisis (Melvin and Taylor, 2009).

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