Pacific-Basin Finance Journal 30 (2014) 132–157

Contents lists available at ScienceDirect

Pacific-Basin Finance Journal

journal homepage: www.elsevier.com/locate/pacfin

Currency jumps and crises: Do developed and emerging market currencies jump together?

Kam Fong Chan [a,*], John G. Powell [b], Sirimon Treepongkaruna [c]

[a] University of Queensland Business School, The University of Queensland, Australia
[b] Australian National University, Australia
[c] UWA Business School, The University of Western Australia, Australia

ARTICLE INFO

Article history:
Received 25 February 2014
Accepted 7 August 2014
Available online 14 August 2014

JEL classification:
C01
C58
G01
G11

Keywords:
Bipower variation
Realized jump variation
Currency cojumps
Emerging markets
Macroeconomic announcements

ABSTRACT

Emerging market currencies tend to jump together, thus intensifying short-term risk, whereas developed market currency jumps and cojumps are much less prevalent. Emerging market currency jumps are considerably more severe, especially during crisis periods. Jumps represent a majority of emerging market currency volatility, in stark contrast to the much lower jump contribution previously documented for developed market currencies. Emerging market currency jumps and cojumps do not appear to respond to macroeconomic news announcements, a new result that is in sharp contrast to developed market currency jumps and cojumps.

1. Introduction

Currency market jumps are disconcerting for investors and corporations alike because jumps are not only difficult to hedge but also problematic if not hedged, and they are similarly challenging for policymakers concerned about the level or stability of currencies. Should jumps occur simultaneously in different countries in reaction to a major worldwide event such as the 2007–2009 global financial crisis, then the risk situation worsens since international diversification will not moderate the overall damage. This paper documents the features of currency jumps for a wide range of important developed and emerging market countries to test whether currency jumps are more severe during crises, especially in emerging markets, and explores the

* Corresponding author. Tel.: +614 1370 4817; fax: +617 3346 8166.
E-mail address: k.chan@business.uq.edu.au (K.F. Chan).

http://dx.doi.org/10.1016/j.pacfin.2014.08.001
0927-538X/

international transmission of currency jumps, including whether they can be explained by macroeconomic news announcements. The good news for investors and policy makers is that, as this study shows, a relatively small proportion of the realized volatility of developed market currencies is accounted for by jumps, and developed market currencies do not tend to jump together, thus moderating the overall short-term risk profile. In contrast, jumps often comprise the majority of emerging market currency volatility, with emerging market currencies frequently jumping together in the same direction, especially during financial crises, thus enhancing short-term risk and adding further to the economic challenges facing emerging market economies.

To document currency jumps and their features, the bipower variation measure developed by Barndorff-Nielsen and Shephard (henceforth BNS, 2004, 2006) is applied to a 15-year sample (1996 to 2010) of high-frequency data for 13 prominent developed and emerging market currencies, with nine of the currencies being from the Asia Pacific regions and therefore of especial interest to the current study. The BNS bipower variation measure, further refined by Huang and Tauchen (2005), separates the total return variation over a trading day into its continuous sample path variation and a potential discontinuous jump component. This separation allows realized jump variations to be filtered out and the jump frequency, jump size, and jump volatility to be estimated. A compelling feature of the BNS jump detection technique is that it is completely nonparametric. As such, it stands in contrast to other techniques, including maximum likelihood estimation, efficient method of moments, and Markov Chain Monte Carlo, that tend to generate noisy parameter estimates based on relatively coarser (i.e., daily) returns (see, e.g., Jorion, 1988; Eraker et al., 2003).

The BNS measure and its applications are part of what has been referred to as a paradigm shift from a continuous price path paradigm to one with jump discontinuities, a shift that has been made possible by tick-by-tick data studies of the salient features of financial market returns (e.g., Bollerslev et al., 2008). A plethora of studies utilize the BNS measure to highlight the importance of incorporating jumps in security prices, including studies of stock market prices (Andersen et al., 2007a, 2010a; Tauchen and Zhou, 2010; Evans, 2011; Zhou and Zhu, 2012; Liao, 2013), bond prices and interest rates (Dungey et al., 2009; Wright and Zhou, 2009; Busch et al., 2011; Zhou and Zhu, 2012), and electricity prices (Chan et al., 2008). The BNS measure has also been used to identify economically significant Deutsche Mark (DEM), Euro (EUR), and Japanese Yen (JPY) jump risks (Andersen et al., 2007a; Evans, 2011; Tauchen and Zhou, 2010). As such, the BNS technique provides a 'consensus benchmark' for jump detection in financial markets, including currency markets, and is thus utilized in this study; jump detection has been further refined by Lee and Mykland (2008) so their technique is also employed to enhance jump timing detection and as a sensitivity analysis for the BNS results.

To test whether currency jumps are more severe in emerging markets, especially during crises, the BNS measure is applied to a broad sample of currencies over a lengthy sample period, thus providing an important extension of the literature due to the breadth of the currencies studied as well as the inclusion of emerging market currencies. Prior studies of developed markets such as the S&P 500 index, the U.S. Treasury bond market, and the DEM, EUR, or JPY foreign exchange markets find nontrivial jumps with a daily jump frequency range of 10% to 20% (see, e.g., Andersen et al., 2007a; Wright and Zhou, 2009; Tauchen and Zhou, 2010). In contrast, this study scrutinizes a wide range of important emerging markets (with an especial interest in five emerging market Asia Pacific currencies, namely the Indonesian Rupiah, Malaysian Ringgit, Korean Won, Philippine Peso and Thai Baht) as well as the most important developed market currencies. Inclusion of emerging market currencies is especially important because Bekaert and Harvey (1997) find that emerging stock market returns are more leptokurtic than developed stock market returns. It is therefore likely that emerging currency markets are also more volatile, thus suggesting that the frequency of jumps in emerging currency markets could be considerably higher than the jump frequency documented for developed currency markets, with potentially larger jump magnitudes and variability. This study's extensive sample period, January 1996 to October 2010, also spans four important financial crises, namely the 1997 'Asian flu' crisis, the 1998 Long-Term Capital Management (LTCM) and Russian–Brazilian currency crisis, the 2000–2001 DotCom bubble burst, and the 2007–2009 global financial crisis. The presence of four crises thus provides an ideal period to test for differences in jump frequency during crisis periods, and to examine whether jumps have more pronounced effects in emerging currency markets during crises.

The BNS bipower variation measure adopted in our study identifies statistically significant jumps in all of the currencies examined, with the minimum proportion of days with jumps being 13% for the British Pound (GBP), while four out of five emerging market currencies display jumps on a majority of days. Interestingly, currency jumps do not tend to occur more frequently during crisis periods but they are much more severe,