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An investigation of return and volatility linkages among equity markets: A study of selected European and emerging countries☆

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ABSTRACT

This paper investigates the linkages among equity returns (based on exchange traded funds, ETF) and transmission of volatilities in the following countries: Germany, Austria, Poland, Russia and Turkey. Multivariate Autoregressive Moving Averages (MARMA) and the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) methodologies are utilized. The findings include the existence of significant co-movement of returns among countries in the sample. Also, Turkish and Russian markets were found to be more volatile than Austria, Germany and Poland. However, volatilities in Russia and Turkey do not persist very long. Finally, there is strong evidence of volatility spillovers. All of the countries in the sample, with the exception of Turkey, experience volatility spillovers from other markets. The presence of spillovers among return series and persistence of volatilities are useful to investors interested in diversifying their portfolios and to traders/fund managers who are interested in maximizing returns.

1. Introduction

This paper investigates the linkages among country equity returns (based on representative broad market ETFs) and transmission of volatilities. The study covers the period from November 9, 2010 to January 30, 2015. The sample consists of five countries: Austria, Germany, Poland, Russia and Turkey. The list includes three of the fastest growing emerging countries of the last decade—Poland, Russia and Turkey. The selection was made mainly on the basis of close economic relationships between Germany and the rest of the sample countries. The study continues our previous research on the same topic but extends it both in terms of the countries studied and the time period included.

The selection of Russia and Turkey is in line with the European Neighborhood Policy (ENP) which has been established to create a ring of friendly, stable and prosperous countries around the European Union (EU) in order to guarantee stability along

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Table 1
Harmonized long-term interest rates for convergence assessment purposes (Feb 2014–Feb 2015) (% per annum; secondary market yields of government bonds with maturities of close to 10 years).

Country	Feb. 14	Mar. 14	Apr. 14	May 14	June 14	July 14	Aug. 14	Sep. 14	Oct. 14	Nov. 14	Dec. 14	Jan. 15	Feb. 15
Germany	1.56	1.51	1.46	1.33	1.26	1.11	0.95	0.92	0.79	0.72	0.59	0.39	0.30
Austria	1.95	1.87	1.77	1.62	1.65	1.47	1.28	1.22	1.10	0.98	0.81	0.54	0.44
Poland	4.47	4.25	4.10	3.80	3.54	3.34	3.36	3.10	2.72	2.54	2.55	2.21	2.20
Turkey	10.18	10.60	9.80	9.05	8.79	8.75	9.17	9.17	8.96	8.30	n/a	7.75	7.5
Russia	n/a	8.17	8.18	8.14	8.12	8.22	8.57	8.73	8.88	8.63	10.22	10.37	n/a

Sources: ECB and European Commission (2015, https://www.ecb.europa.eu/stats/money/long) and Stats.oecd.org, OECD Statistics (2015).

the outer borders of the EU. This goal is consistent with the broader aims of the European Security Strategy which would promote close political cooperation and economic integration. The impact of the ENP on the integration between neighboring countries and the EU in various areas such as trade flows, factor mobility, human capital and technological activities are currently being studied. The present paper references this literature by including the financial flows and financial integration dimension to the ENP.

The main idea behind the study is simple: If, as recent research indicates, correlation among equity markets has increased (that the markets move together) then, an unexpected event in one market may affect not only returns, but also volatilities in other markets. The increasing pace of integration of global financial markets has provided motivation for many studies to investigate the mechanism(s) through which equity market movements are transmitted around the world. These studies make it clear that while real economic conditions and equity market performances are linked, the performance of equity markets also vary based on international factors. The implication is that market performances are not perfectly correlated across countries. In fact, in the short run, equity performance may have less to do with expected fundamentals of individual countries than financial inflows (outflows). For example, rounds of quantitative easing (QE) by the Federal Reserve (FED) in the US in 2008 and the European Central bank (ECB) in the European Union (EU) in 2014 have resulted in near zero short term and very low long term interest rates. The lower rates encouraged capital to look for higher returns elsewhere. Many emerging countries like Brazil, Indonesia, India, Turkey and Russia became the recipients of capital flows from the US and Western Europe. The incoming financial flows, it was pointed out, have been mostly responsible for many emerging equity markets' spectacular performance after the 2008 up until the second half of 2013 (Performance.morningstar.com, 2014). Starting with 2014 however, we witnessed a reversal of financial flows primarily because the FED's announcement that the long term bond purchases would be eased and then stopped sometime in 2015. Since this news was interpreted by the bond market that the long term rates would increase investors from the US and Europe started to bring their funds back home, causing many emerging markets' currencies to lose value. Turkey and Russia, among other emerging markets experienced sizable currency depreciations in late 2013 and 2014. The reaction of the equity markets was similar in that, many of the indices declined both in terms of local currencies as well as in dollar terms. By March of 2014, the equity markets were down (Brazil 11%, China 6%, Russia 16%, Turkey 7%, and Mexico 10%) (Yardeni and Quintana, 2014). The global financial cycle which started with FED policies of low interest rates resulted initially in capital flows into risky assets (high volatility) may have already run its course due to changes in monetary policy by the FED and hence expected higher interest rates. Recently, the European Central Bank (ECB) started its bond buying program, driving down interest rates to the negative territory in much of the EU countries. For example, current yields on two and five-year German government bonds are −0.25 and −0.12, respectively (Bloomberg (2015)www.bloomberg.com). These rates are down from 1.2 to 1.3 one year earlier. Table 1() indicates the trajectory of the rates in the last 1-year period in the sample countries.

It should be noted that neither Turkey nor Russia are members of the EU. Thus, their interest rates follow a different trajectory. While Turkish rates came down from 10.18% to 7.5 in February of 2015 they are still quite high compared to the EU rates. This is due to (a) higher inflation rates in Turkey and (b) the need to finance a large current account deficit of more than 6% of GDP. Russian rates, on the other hand, have increased due to western embargo following the Ukrainian conflict and annexation of Crimea together with substantially lower oil prices.

In addition to extremely low rates in Europe, we have also witnessed depreciation of the Euro from a high of $1.40 per Euro to a low of $1.05 in a period of several months. The depreciation of the Euro (and appreciation of the US dollar) was largely the result of lower yields in Europe and escape from Euro to dollar denominated assets. The ECB is holding interest rates while the FED is looking to raise them. The start of the 2016 is likely to see the first important divergence in monetary policy since the 2008 financial crisis with the FED pushing through a rate increase while the ECB is expected to cut its deposit rate. Since these moves have been widely expected, US dollar has appreciated (and the Euro depreciated) throughout 2015. It appears that financial flows (credit expansion and contraction), stock prices and volatility may move in lockstep across the globe. Nevertheless, it is still important to study co-movements between equity markets over a financial cycle since correlations do not remain constant over the cycle, presenting diversification opportunities.

The central intent of this paper is to explore both price and volatility linkages among five selected financial markets by utilizing broad equity market index based ETFs. The choice of the data period in this study (November 9, 2010 to January 30, 2015) is especially appropriate since it covers a turbulent times with many fiscal and monetary policy decisions in the European Union (and in the US) in aftermath of 2008 financial crisis with its global effects. Since the ETFs used in this study are all equity ETFs representing broad equity market indices the paper uses "equity returns" and "ETF returns" interchangeably.