Çukurova Üniversitesi İİBF Dergisi

Cilt:25. Sayı:1. Haziran 2021
ss.19-45

# *Potential for the Portfolio Diversification in Emerging Markets: A Survey of Empirical Evidence*

Nermina POBRIĆ[1]

**ABSTRACT**

Finding diversification opportunities in emerging markets presents continuous challenge for international investors. This is the case because diversification opportunities in emerging markets change as a result of change in the expected level, dynamics and direction of cross-country, cross-area and cross-assets correlations, as well as the expected (dis)appearance of volatility transmission across countries and areas. In order to provide the most up-to-date evidence on potential for the portfolio diversification in emerging markets, the author will use recent literature. According to the author's findings, potential for portfolio diversification still exists in all emerging markets areas and the majority of individual emerging markets around the world. Additionally, portfolio diversification in different segments of an emerging financial market can also be beneficial to international investors. Due to the variability of key preconditions for international portfolio diversification, investors should frequently adjust their portfolio positions.

**Keywords:** Portfolio diversification, diversified portfolio, diversification opportunities, diversification benefits, emerging markets.

Tür: Araştırma makalesi | Gönderim tarihi: 15.01.2021 | Kabul tarihi: 01.05.2021

[1]Associate professor, University of East Sarajevo, Faculty of Economics, Brcko, Bosnia and Herzegovina, nermina.pobric.efb@gmail.com (ORCID: 0000-0003-3651-3783)

## Introduction

The importance of investing in emerging markets aimed at achieving an optimal mean-variance performance of the portfolio was initially mentioned in the late 1960s to 1970s. It has become the topic especially discussed since the 1990s, when capital investments started to flow steadily to emerging markets due to the liberalization of these markets, capital market integration, an increase in the degree of the openness of domestic financial markets to foreign investors and institutions, rapid development of information technologies, and a decrease in information asymmetries. As financial markets have increasingly integrated with each other across the world, they have tended to co-move more strongly, their behaviour has been more synchronised, the risk of adverse economic shock is more easily transmitted, and in consequence the benefits of international portfolio diversification have also reduced. However, some differential features of emerging markets, such as the existence of certain risks associated with weaker institutional and regulatory framework as compared to the developed markets, higher average asset returns, higher volatilities, and lower correlations with the developed markets, make it almost impossible for diversification benefits to disappear entirely.

The risk-return performance of internationally diversified portfolios varies within and across different global country blocks and different segments of international financial markets. The global blocks for which the diversification opportunities and diversification benefits have often been investigated so far are the major developed countries, SEE countries, BRIC(S) markets, MENA markets, Islamic markets and Asian frontier markets. In this paper, the potential for the portfolio diversification in emerging markets will be investigated in the way that implies the empirical evidence related to portfolio effects of diversifying international portfolio through investment in different blocks of emerging countries to be taken into account.

Diversification benefits for international investors can shape up differently if international portfolios also contain different types of assets, e.g. equity, debt, currency etc. As Miyajima, Mohanty and Chan (2015, p.127) stated: “Foreign investors’ appetite was particularly strong for emerging market (EM) local currency denominated bonds”. Such occurrence is explained by a greater interest of institutional investors in the portfolio diversification based on the investment in the assets which are expected to offer higher risk-adjusted returns, the improvements of domestic institutions, market infrastructure, macroeconomic fundamentals and monetary policy, global factors, or the inherent volatility of exchange rates in emerging markets. The attractiveness of emerging market local currency denominated bonds has caused a steady increase in the foreign ownership of those bonds since the early 2000s. Investment in other segments of emerging financial markets has not lagged behind.

Finding diversification opportunities in emerging markets that is aimed at creating an efficient portfolio, presents a continuous challenge for international investors. This is the case because diversification opportunities in emerging markets change, as the economic, legal and political landscape across the world changes. To provide the most

up-to-date evidence on potential for the portfolio diversification in emerging markets, we will use recent, that is, up to ten years old literature. We will research the issue by analysing the evidence presented in about 40 empirical studies. The results will be valid under the assumption that they respect the postulates of Markowitz's Modern portfolio theory in making a decision about portfolio diversification. The obtained results are expected to be of use to policy makers and researchers. They could indicate the necessity for national macroeconomic and financial policies in emerging market countries to be continuously adjusted in order to maximise the interest of foreign investors in portfolio investment in a particular country. Researchers could scientifically support policy makers' decision making. Specifically, they could scientifically evaluate the expected effects of changes in economic conditions on potential for portfolio diversification at any given time. Additionally, from time to time, they could update the evidence on potential for the portfolio diversification in earlier investigated combinations of countries and country blocks. Similarly, the researchers could try to discover potential for the portfolio diversification in a new combination of countries or country blocks.

The paper is divided into four sections. In the first section, we will consider the level, dynamics and direction of market co-movements as preconditions for the portfolio diversification in emerging markets in times of stability. In the second section, our attention will be directed at precondition for the portfolio diversification in emerging markets in times of crisis. Opportunities for the portfolio diversification in different areas and across different segments of a financial market will be observed in the third and the fourth sections, respectively. Finally, we will draw a conclusion.

## 1. Preconditions for the portfolio diversification in emerging markets in times of stability: The level, dynamics and direction of market co-movements

International portfolio diversification is an investment strategy which implies a cross-border, i.e. countries- or areas-dispersed investment in financial assets aimed at reducing portfolio risk. "The idea is that markets which offer high potential in diversification will reduce risk if they are added to a portfolio and exhibit high weights when optimizing the portfolio structure. In addition, if one over proportionally invests in an economy with good diversification abilities, its performance is reduced to a lower extent in comparison to an investor who over proportionally invests in a market with low potential in diversification." (Kellner and Rösch, 2019, p.102074) Besides the limitation of overall portfolio volatility, the internationally diversified portfolio provides investors with an improved risk-adjusted return.

International portfolio diversification is not limited to portfolio diversification in developed markets only, but also in emerging markets. As the world markets have integrated and the correlations among developed markets have increased, international investors have viewed emerging markets as a place where they could exploit the benefits of international portfolio diversification, in the belief that the correlations

between developed markets and emerging markets will be lower than those among developed markets. Investing in emerging markets has been a major trend among investors since the 1990s. "When emerging markets were first touted as interesting investments for global investors in the early 90s, their diversification benefits were emphasized. The emerging market index had a correlation with the world index of about 0.40, leading to considerable diversification benefits. However, this correlation has increased over time (also, see Fernandes, 2005). […] More recently the correlation stands at 0.90." (Bekaert and Harvey, 2017, p.11) Today, international investors do not doubt whether to invest in emerging markets or not, but they are constantly searching for an appropriate answer to the question how much to invest in emerging markets. A portion of their portfolio investment allocated to emerging markets should be at least as high as an emerging market capitalization-based weight. Ideally, it should reflect the economic contribution of emerging market countries to the development of the world economy.

Market integration, globalization, the removal of the restrictions related to the movement of financial assets across national borders, market liberalisation, and technological advancement have provided investors with an opportunity to exploit the benefits of international portfolio diversification more easily, but have simultaneously made the process of finding diversification opportunities more complicated for investors because of an increase and the dynamic nature of cross-country, cross-area and cross-assets correlations. The potential benefits of international portfolio diversification are limited or even absent under the condition of the stronger co-movements of individual markets and the groups of markets. Weak co-movements of individual markets and the groups of markets suggest greater diversification advantages for investors. Therefore, the investors, portfolio managers and researchers are particularly interested in the evolution, dynamics (term- and time-variability) and direction of co-movements among developed, emerging and frontier markets. The segment of this evaluation important for the international portfolio management is the one which provides support for assessing the benefits of the diversification implemented by adding individual emerging and frontier markets to the developed markets portfolios. Numerous researchers investigated and wrote about the level, direction and variability of the correlations of investment option returns between different countries and different areas, for example Graham, Kiviaho and Nikkinen (2012), Christoffersen, Errunza, Jacobs and Jin (2014), Christoffersen, Errunza, Jacobs and Langlois (2012), Arouri, Nguyen and Pukthuanthong (2012), Guidi and Ugur (2014), Al Nasser and Hajilee (2016), Mensah and Alagidede (2017), Abbes and Trichilli (2015), Mensi, Shahzad, Hammoudeh, Zeitun, and Rehma (2017), Piljak (2013), Rehman and Shah (2016), Gupta and Guidi (2012), Aluko, Fapetu and Azeez (2018), Najeeb, Bacha and Masih (2015), and Bhuiyan, Rahman, Saiti and Ghani (2019).

Graham, Kiviaho and Nikkinen (2012) investigated the co-movement of 22 emerging stock markets from Europe (Czech Republic, Hungary, Poland, Russia and Turkey), Asia (China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan and Thailand), the Americas (Brazil, Chile, Colombia, Mexico and Peru), and Middle East/Africa (Egypt, Israel, Morocco and South Africa) with the US stock market over the period

from January 3rd, 2001 to April 28th, 2010. They found a high degree of co-movement in stock prices at relatively lower frequencies (long-term fluctuations), that is, strong long-term co-movement in stock prices over the entire observed period. However, the co-movement was not constant over time. Namely, the pattern of co-movement changed after 2006 when stronger co-movement occurred for relatively higher frequencies, with the exception of co-movement for fluctuations with the duration less than a year at the highest frequencies (i.e. extremely short-term co-movements). Additionally, the co-movement differed by country. The strongest co-movement was found between the USA and Brazil, Mexico, India and Korea, and the weakest one was found between the USA and Egypt and Morocco.

The dynamics in correlations for developed and emerging markets is the issue which was also addressed by Christoffersen, Errunza, Jacobs and Jin (2014) and Christoffersen, Errunza, Jacobs and Langlois (2012). In their research, the first group of authors observed 16 developed markets (Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, Netherlands, Singapore, Switzerland, the United Kingdom and the United States) and 16 emerging markets (Brazil, Chile, China, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, South Africa, Taiwan, Thailand and Turkey) over the period from 1973 to 2012. The second group of authors employed the data set which consisted of the same 16 developed markets and the same 16 emerging markets plus Argentina, Colombia, and Jordan. Their observed period lasted up to 2009. The results obtained by the two groups of authors suggest that the correlations exhibited upward trend for both developed and emerging markets. While the differences in the levels of correlation for developed markets reduced over time, this did not happen to emerging markets. The whole time in the observed period, the correlations between developed markets were higher than the correlations between emerging markets. "Moreover, for developed markets, the average correlation with other developed markets is higher than the average correlation with emerging markets. For emerging markets, the correlation with developed markets is generally somewhat higher than the correlation with the other emerging markets; however, the differences are small." (Christoffersen et al., 2014, p.824) As Christoffersen, Errunza, Jacobs and Jin concluded, the adverse effect of an increase in correlations for the portfolio diversification potential cannot be circumvented by occasionally adjusting portfolio weights. The result related to upward trend of correlations was also held when Christoffersen, Errunza, Jacobs and Langlois divided the used set of countries into four regions: the European Union (EU), developed non-EU countries, Latin America, and Emerging Eurasia. In addition, these authors pointed to the substantial nonlinear, i.e. asymmetric tail dependence for both developed and emerging markets. Lower tail dependence was larger than upper tail dependence. Tail dependence also exhibited upward trend, but at the end of the observed period, its level was relatively low for emerging markets in comparison to developed markets.

Arouri, Nguyen and Pukthuanthong (2012) discovered that the degree of the stock market integration between six major Asian and Latin American emerging markets (Brazil, Chile, Korea, Malaysia, Mexico and the Philippines) and three developed markets (Canada, France and the USA) also varied over the observed period. The

observed period lasted from January 1973 to March 2008 for developed markets and from January 1988 to March 2008 for emerging markets. Most emerging markets became more integrated in the last years of the observed period. The local and global factors related to national and international market structures contributed to the time-variability of the degree of financial integration then. Additionally, the relative importance of the local risk premium for emerging markets in the total risk premium was generally great, because there were risks undiversifiable internationally due to market segmentation, but this importance decreased in the last years of the observed period, too.

According to the findings presented in the study of Guidi and Ugur (2014, p.134), "five SEE markets (Bulgaria, Croatia, Romania, Slovenia, and Turkey) and two developed counterparts (Germany and the UK) were weakly co-integrated over the period" 2000–2013, while the observed SEE markets were not co-integrated with the US market. Furthermore, the authors revealed that the co-integration between the SEE and developed markets was time-variable, particularly from the onset of the financial crisis in September 2007 until May 2010.

The existence of the short-run integration between stock returns in the emerging markets of Brazil, China, Mexico, Russia and Turkey, which were analysed as a group, and the developed markets of the USA, the UK and Germany in the period from January 2001 to December 2014 was revealed by Al Nasser and Hajilee (2016). Brazilian and Mexican stock markets had a significant short-run relationship with all the three developed markets. Chinese and Russian stock markets exhibited a significant short-run relationship with German and the UK stock markets, while, Turkish stock market was affected by German and the US stock markets in short term. The authors also found that stock returns in all emerging markets were integrated long-term only with German stock market returns.

The time-varying and weak dependence between emerging African stock markets (Egypt, Nigeria and Kenya), with the exception of the stock market in South Africa, and the developed markets of the United States and United Kingdom, in the period from January 2000 to April 2014, were found by Mensah and Alagidede (2017). "South Africa's upside and downside dependence with advanced markets was clearly distinguishable from the remaining African stock markets." (Mensah and Alagidede, 2017, p.2) It was relatively strong compared to the dependence of other African markets. In addition, the authors found the evidence of the asymmetric dependence between the observed markets. Such result indicates that stock return co-moved differently in bullish and bearish markets. The authors also found that the extreme downward stock market events in developed markets had a limited impact on African stock markets over the observed period. Therefore, there were no significant downside spillover effects for emerging African stock markets.

Abbes and Trichilli (2015) examined the level and dynamic of integration among 27 developed (Austria, Canada, France, Germany, Hong Kong, Italy, Japan, New Zealand, Singapore, Spain, Switzerland, the United Kingdom and the USA) and emerging

(Bahrain, Brazil, China, Chile, Egypt, India, Indonesia, Jordan, Korea, Kuwait, Malaysia, Mexico, Morocco and Oman) Islamic stock markets from four geographical areas (that is, European, American, Asian and MENA countries), in the period from June 2002 to December 2012. The research was conducted from different aspects: within and between different economic groupings, by taking into account the impact of geographical factor, and under the conditions characteristic of financial crises. Islamic stock markets from similar economic grouping were found to be highly long-run integrated, while those from different economic grouping were found to be partially long-run integrated. No evidence of short-run integration was discovered "between the Austrian Islamic market and all other European Islamic markets. Moreover, French Islamic markets seem to be segmented from Italian and Switzerland Islamic markets. For emerging markets, a high level of integration is noted among the MENA and the Asian Islamic markets" (Abbes and Trichilli, 2015, p.102). European-Asian emerging markets and European-Latin American and MENA-Latin American Islamic markets were the economic groupings for which the lowest level of short-run integration was observed. The US Islamic market was discovered to be "segmented from Bahrain, Kuwait, Morocco, Malaysia, Korea, China and Brazil Islamic stock markets. Also, Japan appears to be segmented from all MENA Islamic indices except for Oman." (Abbes and Trichilli, 2015, p.102) The level of the integration among Islamic stock markets varied over time, and particularly under the conditions characteristic of financial crises. In time of crises spanning July 2007 to December 2012, it decreased significantly among developed and emerging Islamic markets. Islamic markets are also attractive for the international investors from conventional markets due to low mutual correlation, particularly during the financial turmoil. A decrease in the correlation of Islamic markets to the other markets during the financial turmoil is commonly explained by less leverage effect. The less leverage effect arises as a result of posing an upper limit of debt financing for the entities subject to Shariah law, in accordance with the principles of Islam.

Besides the previously mentioned studies, the study of Mensi, Shahzad, Hammoudeh, Zeitun, and Rehma (2017) confirmed the time-variability of the co-movement between developed stock markets and emerging as well as frontier stock markets. Namely, four emerging BRIC (Brazil, Russia, India and China) and three frontier Asian stock markets (Bangladesh, Pakistan and Sri Lanka) co-moved with three major developed stock markets (the USA, the UK and Japan) in the period from January 1$^{st}$, 2000 to June 30$^{th}$, 2016, whereby the co-movement changed across frequencies and over time. The link strengthened in the wake of the global financial crisis and the Eurozone sovereign debt crisis.

A considerable time-variability of the co-movement between ten emerging (Brazil, China, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, South Africa and Turkey) and four frontier government bond markets (Argentina, Bulgaria, Colombia and Ecuador) and the US government bond market in the period from October 2000 to December 2011 was revealed by Piljak (2013). "Brazil, Russia, Turkey, and Ecuador sustained longer time intervals of negative correlation with the US market, while on the other hand China, Mexico, Poland, and South Africa had predominantly positive

correlations with very short episodes of negative correlation." (Piljak, 2013, p.41) The factors which explained the time-varying government bond return co-movement were discovered by the author to be macroeconomic factors and global bond market uncertainty. Domestic macroeconomic factors affected more strongly than global factors. Among the domestic macroeconomic factors, the most influential ones were domestic monetary policy and domestic inflationary environment.

The existence of both short- and long-term strong relation between the EFA stock markets (emerging and frontier markets of Asia) (Bangladesh, China, India, Indonesia, Korea, Malaysia, Pakistan, the Philippines, Sri Lanka and Thailand) and the developed markets of the Unites States, Japan and Europe (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom), during the 15-year period, that is, the period which lasted from January 2000 to December 2014, was found by Rehman and Shah (2016). The authors discovered that the relationship was bidirectional both over the long- and short-term period, whereby the influence of developed markets on the EFA markets was more evident than vice versa. The level of integration was higher among the EFA and Japanese markets than among the EFA markets and the US and European markets.

In their research, Gupta and Guidi (2012), Aluko, Fapetu and Azeez (2018), Bhuiyan, Rahman, Saiti and Ghani (2019), and Najeeb, Bacha and Masih (2015) put focus on the co-movements of one emerging market with more developed and/or emerging markets. Hence, Gupta and Guidi (2012) explored if there was a relationship between the Indian stock market and the three developed Asian markets, i.e. the markets in Hong Kong, Japan and Singapore, in the period between 1999 and 2009. Their results suggest the presence of the short-run relationship and the absence of the strong long-run relationship between the observed markets. The long-run relationship was not stable over time. Namely, the correlations between Indian and other markets rose dramatically during the crisis and returned to their initial levels after the crisis. Aluko, Fapetu and Azeez (2018) investigated if there was a relationship between the Nigerian stock market and five developed stock markets, i.e. the markets in the US, the UK, Germany, France and Japan, in the period from January 2000 to December 2015. Over the entire observed period, the Nigerian stock market was not linked to the German and Japanese stock markets, or the Nigerian stock market was significantly linked only to the French, German and Japanese stock markets. The obtained results differed depending on the applied research methodology. When the observed period was divided into three sub-periods in the context of the global financial crisis (pre-crisis period lasted up to December 2007, crisis period spanned December 2007 to June 2009, post-crisis period spanned until the end of the analysed period), the obtained results also differed depending on the applied research methodology. As the authors concluded, "the causality test results reveal that the Nigerian stock market and the developed stock markets (US, UK, Japan, Germany and France) are not linked in the pre-crisis, crisis and post-crisis periods with the exception of only Japanese stock market in the post-crisis period. […] The regression estimates show that the stock markets of Germany and France have significant positive and negative impact on the Nigerian stock market

respectively before the crisis, but none of the developed stock markets significantly influenced the Nigerian stock market during the crisis period. After the crisis, only the German stock market has significant but negative impact on the Nigerian stock market." (Aluko et al., 2018, p.194) Finally, Bhuiyan, Rahman, Saiti and Ghani (2019), and Najeeb, Bacha and Masih (2015) investigated the relationship between the Malaysian and other markets. The first group of authors discovered that in the period from January 2010 to December 2015, the sovereign bond indexes in the markets of Australia, Canada, Germany, Japan, the UK and the USA all had very low correlation with the Malaysian sukuk index, except during the Eurozone crisis, when a few variations in the level of the correlations were observed. The second group of authors proved that the dynamics of the co-movement between Malaysian Islamic equity market and world (developed and emerging) Islamic equity markets differs for different investment horizons. They emphasise the importance for Malaysian Islamic investors to take into account the heterogeneity in investment horizons when they estimate the possibility and make a decision about international portfolio diversification.

## 2. Precondition for the portfolio diversification in emerging markets in times of crisis: The absence of volatility transmission

Investors' quest for efficient ways to internationally diversify their portfolios is more difficult in times of crises. The scope for efficient international portfolio diversification is restricted over the crisis periods due to fast transmission of macroeconomic and political shocks to other markets, fast transmission of financial contagion across global financial markets, sharing common economic and market trends in wide range, and as a consequence, an ever-increasing correlation among markets. To illustrate the restriction of diversification opportunities in times of political crises, Abbas, Khan and Shah (2013, p.67) stated that "any political crises in China are likely to affect returns on most stocks in Hong Kong negatively, but will have little or no influence on stock returns in Finland. Likewise, political turmoil in Russia may have an effect on Finnish stock returns (because of geographic closeness and the strong economic relations between them), with little effect on Hong Kong stock returns." The degree of markets' vulnerability to global and regional crises will affect investors' ability to diversify international and regional portfolios. The higher the vulnerability, the lower the ability for portfolio diversification is.

The scope of efficient international portfolio diversification in times of crises has particularly drawn the attention of researchers since the subprime crisis, the global financial crisis and the European public debt crisis. It was empirically tested by Abbas, Khan and Shah (2013), Neaime (2016), Majdoub and Mansour (2014), Mensi, Hammoudeh and Kang (2017), Das, Kannadhasan and Bhattacharyya (2019), Mensi, Hammoudeh, Reboredo and Nguyen (2014), Miyajima, Mohanty and Chan (2015), and Narayana and Rehman (2017), among others.

Abbas, Khan and Shah (2013) investigated if there was volatility transmission among four Asian stock markets, that is, the markets of China, India, Pakistan and Sri Lanka, and also between these markets and four major developed markets of Japan, Singapore, the United Kingdom and the United States. The presence of the transmission of shocks between the friendly countries from different regions with economic links was empirically proven. The volatility transmission, even between unfriendly (in political terms) countries (such as, India and Pakistan) was also present, but to a lesser degree. As the authors concluded, this has existed and will continue to exist due to and as long as unfriendly countries have been and will be economically related to each other. Volatility transmission mostly took place in the direction from a larger market to a smaller market, and sometimes in the opposite direction.

Contagion vulnerability and financial linkages within the set of ten MENA stock markets (Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Qatar, Saudi Arabia, Tunisia and UAE) and between those ten MENA stock markets as a group and the three main world stock markets (i.e. French, the UK and the US markets), in the period from January 2005 to July 2014, were investigated by Neaime (2016). The author discovered that financial shocks in the UK and US stock markets were transmitted to the MENA region. However, the vulnerability of the MENA region to international financial turmoil lasted only for short periods of time. When the author divided the set of the observed markets into two sub-sets, that is, oil producing countries or the so-called MENA-GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE) and non-oil producing countries (Egypt, Jordan, Morocco and Tunisia), the obtained research results showed that oil producing countries were relatively less vulnerable to regional and global financial crises compared to non-oil producing countries. It was the case that although the MENA-GCC countries were segregated from the rest of the world, and non-oil producing countries were financially integrated with the rest of the world markets. The author considers that regional financial integration, which is still weak, might explain a higher vulnerability of non-oil producing countries to regional and global financial crises, with the exception of financial integration in the short run.

The conditional correlations and volatility spillovers among five Islamic emerging markets (Indonesia, Malaysia, Pakistan, Qatar and Turkey) and the US market, in the period from January 2008 to January 2013 were the issues which Majdoub and Mansour (2014) addressed in their research. The authors found statistically significant, but very low conditional correlations of volatility for all the pairs of countries within the set of the analysed markets over the observed period. According to the authors, "the weak conditional correlations over time suggest that the Islamic emerging and US markets are weakly integrated and the volatility spillovers among them are weak as well. The characteristics of stocks included in the MSCI Islamic equity indexes and the peculiar specificities of the Islamic finance industry play an important role in explaining our results. Indeed, the prohibition of investment in interest-bearing activities and the stringent restrictions on leverage coupled with the 'asset-backed' principle contribute to explaining why the Islamic equity indexes have very low conditional correlations. The investment in Islamic financial markets is less affected by volatility spillovers and shocks transmission." (Majdoub and Mansour, 2014, p.469) Mensi, Hammoudeh and

Kang (2017) also found statistically significant, but variable dynamic conditional correlations in both bull and bear markets, as well as significant and asymmetric volatility effects for four major developed stock markets of Japan, the USA, Asia and Europe (represented by the Nikkei 225 index, S&P 500 index, DJASIA index and Europe Stoxx 600 index) and the emerging BRICS indices in the period from June 4th, 1998 to April 28th, 2016. Therefore, the aforementioned research study provided strong evidence about the presence of the spillover effects between the observed stock markets.

Das, Kannadhasan and Bhattacharyya (2019) examined how the asset prices in 24 emerging stock markets (Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Pakistan, Peru, the Philippines, Poland, Qatar, Russia, South Africa, Taiwan, Thailand, Turkey and UAE) reacted to various sources of newspaper-based US macroeconomic shocks in the period spanning January 1997 to May 2018. Economic Policy Uncertainty (EPU), Geopolitical Risk (GPR) and Financial Stress Indicator (FS) are three indicators which the authors used in their research as the newspaper-based indexes of macroeconomic shocks. The authors revealed "that: (a) the impact of these shocks is heterogeneous across the markets in terms of causality and intensity. (b) the influence of EPU is mostly profound and significant as compared to other two shock indicators i.e. GPR and FS. (c) the causality-in-mean is more significant and stronger rather than the causality-in-variance." (Das et al., 2019, p.1) Therefore, the influence of US macroeconomic shocks was not found to be uniform across all the observed emerging stock markets, the investors were found to perceive the signs of economic policy uncertainty rather than the signs of war or financial events, and all three indexes of macroeconomic shocks were „found to hold a more consistent impact on mean rather than the variance of returns. This implies that these shocks influence the EMs more in terms of price risk rather than the variance risk." (Das et al., 2019, p.12)

Similarly to the previously mentioned authors, Mensi, Hammoudeh, Reboredo and Nguyen (2014) investigated the influence of the US economic policy uncertainty, but also the stock market uncertainty, changes in the global stock market, and commodity (crude oil and gold) prices on the performance of emerging stock markets. The emerging stock markets included in the research are those of BRICS (Brazil, Russia, India, China and South Africa). The observed period lasted from September 29th, 1997 to September 20th, 2013. According to the obtained results, the BRICS stock markets were positively and significantly dependent on the global stock market. However, this dependence was mostly asymmetric in the tails of return distributions and has not changed since the onset of the global financial crisis. While "Russia, India and South Africa exhibited both upper tail dependence and lower tail independence before and since the onset of the global financial crisis, on the other hand, Brazil and China showed symmetric tail dependence and independence, respectively" (Mensi et al., 2014, p.2). "As to the effects from the commodity markets, the oil prices display a symmetric independence with the BRICS markets (except South Africa), even though the dependence significantly increases since the onset of the recent financial crisis. The gold prices co-move with the stock prices at both the upper and lower tails (except for Russia and China whose central banks bought gold heavily), and the degree of co-

movement decreases since the onset of the financial crisis. Moreover, the stock market uncertainty (VIX) is a relevant factor in a bear market but insignificant in a bull market for the BRICS, with the exception of Brazil and India. Finally, the economic policy uncertainty exerts no impact on the BRICS stock markets in both lower and upper quantiles." (Mensi et al., 2014, pp.15-16)

The research focus of Miyajima, Mohanty and Chan (2015) was on the behaviour and the factors which influenced the yields on the government bonds denominated in local currency in the domestic bond markets of 11 emerging market countries (Brazil, Chile, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Poland, South Africa and Turkey), in the period from January 2000 to May 2014. Domestic factors such as GDP growth, fiscal balance, and the forecasts of domestic short-term interest rate were found to explain a large part of the yields on the government bonds denominated in local currency in the observed emerging markets. As for the impact of global risk aversion shocks on emerging market local currency government bond yields, the authors revealed a relative resistibility of the analysed yields to the shocks. An additional finding of the authors is that "a significant fraction of movements in EM domestic bond yields can be attributed to US Treasury yields and the degree of influence has increased sharply since May 2013 after investor expectations built that the Federal Reserves may taper down the pace of its bond purchases. The implication is that reversal of the exceptionally easy global monetary policies is likely to have strong adverse influence on EM local currency bond markets." (Miyajima et al., 2015, p.136)

The conclusions in the study of Narayana and Rehman (2017) refer to the predictability of EFA markets returns on the basis of the conditions in developed (Japanese and the US) equity markets and the exchange rate and oil price shocks, over three different frequencies (daily, weekly and monthly) and during the global financial crisis and non-global financial crisis periods. The authors used daily, weekly and monthly data on the DJIA, S&P 500, Nikkei 225 and Morgan Stanley Capital International (MSCI) indices as the indicators of conditions in the developed and EFA equity markets. The observed period spanned 2000 to 2013. The results related to the predictability of EFA markets returns on the basis of the conditions in developed equity markets over three different frequencies slightly differed depending on the applied research methodology. Namely, DJIA was found to be a consistent and positive predictor of EFA markets returns, regardless of the applied research methodology. However, by applying the VECM framework, the Nikkei 225 and S&P 500 were found to predict monthly and daily EFA markets returns respectively, whereby the Nikkei 225 showed a delayed predictability. On the other hand, using the long-run regression models of the co-integrated variables, the authors revealed that the Nikkei 225 and S&P 500 predicted daily and weekly EFA markets returns, that is, daily returns, respectively. Furthermore, no MSCI developed index and the daily and monthly MSCI developed index were shown to have a positive and significant effect on the EFA markets returns when the VECM framework and the long-run regression models of the co-integrated variables, respectively, were applied in the research. According to the results related to the predictability of EFA markets returns, on the basis of the exchange rate and oil price shocks, these shocks were not as important predictors of the EFA markets returns as the developed equity markets of

Japan and the US. As for the predictability of EFA markets returns during the global financial crisis and non-global financial crisis periods, the authors proved "that the EFA and developed market nexus is maintained in periods excluding the GFC. During the recoupling phase of the GFC, when the EFA markets were most correlated with the US, while the effect of the S&P 500 is insignificant, those of the Nikkei 225 and DJIA are important, although this is delayed by a week (DJIA) to a month (Nikkei 225). During the non-GFC periods, the influences of the Nikkei 225 and DJIA were visible in a week's time, while those of the S&P 500 are seen within a day and persist at least for a month." (Narayana and Rehman, 2017, p.231)

## 3. Opportunities for the portfolio diversification in different areas: Empirical evidence

Numerous researchers have dealt with potential for the portfolio diversification in different groups of countries and different individual countries all over the world. For example, Hadhri and Ftiti (2019), Graham, Kiviaho and Nikkinen (2012), Christoffersen, Errunza, Jacobs and Jin (2014), and Christoffersen, Errunza, Jacobs and Langlois (2012) addressed this potential in European, Asian, Latin American and MENA countries simultaneously. Using skewness-based analysis and the data relating to the period from December 1994 to December 2017, Hadhri and Ftiti (2019) examined if portfolio investments in 22 emerging stock markets (four European markets (Czech Republic, Hungary, Poland and Russia), eight Asian markets (China, India, Korea, Malaysia, the Philippines, Sri Lanka, Taiwan and Thailand), six Latin American markets (Argentina, Brazil, Chile, Colombia, Mexico and Peru), and four MENA markets (Egypt, Jordan, Morocco and Turkey)) can be profitable for local and international investors and if there are potential opportunities for the portfolio diversification in these markets. A negative relationship between asymmetry measure (the realized skewness expressed via skewness factor - SKF) and returns, as well as the evidence that a negative (positive) skewness was followed by positive (negative) returns was found for all individual and regional markets, except for Hungary, Jordan, Korea, Russia and Sri Lanka. "A positive (negative) correlation between two countries with negative (positive) SKFs suggests investors may be able to improve risk-return efficiency by diversifying portfolios in these countries, while a negative (positive) correlation is a sign of decreased (increased) integration between these two countries, which may have a significant impact on the efficiency of international portfolio diversification. This interpretation is valid for all markets, except for Korea, Sri Lanka, Hungary, Russia, and Jordan. The opposite applies to these markets." (Hadhri and Ftiti, 2019, pp.190-191) Therefore, by following the skewness-based strategies of portfolio investment, more profits can be generated in the observed emerging stock markets in both intra- and inter-regional level. As the authors also found, the skewness-based portfolio investment in the observed emerging stock markets can be more profitable investment alternative compared to portfolio investment in developed markets over time and for different time horizons, especially in crisis periods.

In the studies of Graham, Kiviaho and Nikkinen (2012), Christoffersen, Errunza, Jacobs and Jin (2014), and Christoffersen, Errunza, Jacobs and Langlois (2012), which we already referred to in the first section, the authors also revealed that there are potential opportunities for the portfolio diversification in the markets from four regions listed earlier. The first group of authors proved that in the observed period, in most of 22 observed markets, it was possible for a significant diversification benefits for the US investors to be offered, mostly in short term. Only in Egypt and Morocco, there were diversification benefits for both short-term and long-term US investors. Additionally, in emerging American markets, short-term diversification was less beneficial to the US investors after 2006. What follows from the obtained findings is "that investing selectively in emerging markets may provide significant diversification benefits which, invariably, depend on the investment horizon" (Graham et al., 2012, p.34). The second and third groups of authors agreed that emerging markets still offer considerable benefits from correlation-based diversification, and that, in comparison to developed markets, emerging markets often offer greater diversification benefits to investors from developed markets, especially during large market turmoil. Although the benefits from international portfolio diversification have reduced for both developed and emerging markets over time, adding investment in emerging markets to a developed markets-only portfolio may still increase the profit and decrease the risk of the portfolio. Unlike Graham, Kiviaho and Nikkinen (2012), Al Nasser and Hajilee (2016), who we also referred to in the first section, discovered that the opportunities for most international investors to obtain long-run gains through portfolio diversification were provided in the five observed emerging markets from different regions. Over the observed period, short-term diversification was beneficial to German investors only.

Mensi, Hammoudeh and Kang (2017) found that over the period from June 4$^{th}$, 1998 to April 28$^{th}$, 2016 the strong support for the benefits and risk reductions associated with portfolio investment was being brought by the portfolio which was diversified so as to consist of the stocks from four major developed stock markets of Japan, the USA, Asia and Europe (represented by the Nikkei 225 index, S&P 500 index, DJASIA index and Europe Stoxx 600 index) and the emerging BRICS indices. According to the authors, "the BRICS stock assets are particularly sought after for portfolio protection during downturns, indicating the ability of the BRICS assets to offer positive returns during stress periods and to play the role of a safe haven" (Mensi et al., 2017, p.154). Given that the dynamic conditional correlations in both bull and bear markets were discovered to be variable, investors should adjust their portfolio positions frequently during turbulent market conditions to reduce risk. Similarly to Mensi, Hammoudeh and Kang (2017), in the study which we elaborated in the previous section, Mensi, Hammoudeh, Reboredo and Nguyen (2014) proved that BRICS stock markets were beneficial to international investors in bearish markets for risk reducing. Such conclusion followed the evidence on BRICS stock markets co-movement with the global stock market in bullish markets, and their independence from the global stock market in bearish markets, with the exception of Brazil.

When Mensi, Shahzad, Hammoudeh, Zeitun, and Rehma (2017) compared the risk reduction effects that were achieved by including investments in BRIC emerging or

South Asian frontier (Bangladesh, Pakistan and Sri Lanka) stock markets into the portfolio constructed by investing in major developed stock markets (Japan, the UK and the USA), they found that diversification benefits generally varied over time and across frequencies from January 1st, 2000 through March 30th, 2016. South Asian frontier stock markets offered higher diversification benefits than BRIC markets, with the exception of China. More precisely, "for the short-time horizon the Pakistan stock market provided relatively the highest risk reduction during the pre- and during GFC periods, whereas the Sri Lankan stock market performed marginally well after the GFC crisis period, while Sri Lanka (China) offered the highest diversification benefits during the ESDC (after the two recent financial crises). For the medium-run, the Sri Lanka (Bangladesh) stock market presented the highest risk reduction during the pre- (post-) crises periods, while China provided the highest risk reduction during both the GFC and ESDC periods. [...] In the long term, China offered the highest risk reduction in the pre- and during GFC crisis period, while Sri Lanka in the ESDC and the post- ESDC crisis period continued to provide the best diversification benefits." (Mensi et al., 2017, p.146) In Asian frontier (Bangladesh, Pakistan and Sri Lanka) as well as emerging (China, India, Indonesia, Korea, Malaysia, the Philippines and Thailand) stock markets, diversification opportunities and diversification benefits for international portfolio investors from two major developed markets (the USA and Japan) were also discovered in the study of Narayana and Rehman (2017), which we partly presented in the last paragraph of the previous section.

Apart from earlier elaborated evidence related to the co-movement between five SEE markets (Bulgaria, Croatia, Romania, Slovenia and Turkey) and three developed counterparts (Germany, the UK and the USA) over the period from November 8th, 2000 to June 26th, 2013, the evidence on the existence of diversification benefits was also provided by Guidi and Ugur (2014). The scope of making diversification benefits was discovered for international investors from the USA, as well as for international investors from Germany and the UK, regardless of weak co-integration between these and SEE countries, whereby this may not be especially relevant for international investors with very short time horizons. Even though the correlation between the returns in the observed markets appeared or increased particularly from the onset of the financial crisis in September 2007 until May 2010, diversification benefits existed then as well.

Potential opportunities for the portfolio diversification in three African markets (Egypt, Kenya and Nigeria) and ten MENA countries (Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Qatar, Saudi Arabia, Tunisia and UAE), whereby they were observed from the perspective of investors from the United Kingdom and the United States, and those from France, the United Kingdom and the United States, were investigated by Mensah and Alagidede (2017) and Neaime (2016), respectively. Mensah and Alagidede (2017) proved that diversifying portfolio in African markets (excluding South Africa) can be beneficial to international investors. "There could be limit to portfolio diversification benefits, from the perspective of international investors, if the South African index and typical African stock indices are held together in a portfolio." (Mensah and Alagidede, 2017, p.2) Since, in the aforementioned study of Neaime

(2016), relatively less vulnerability to regional and global financial crises was revealed for the oil producing countries or the so-called MENA-GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE) than for non-oil producing countries (Egypt, Jordan, Morocco and Tunisia), MENA-GCC countries are still expected to be able to offer diversification potentials to regional and international investors.

Saiti, Bacha and Masih (2014), Majdoub and Mansour (2014), and Abbes and Trichilli (2015) dealt with diversification opportunities in Islamic markets. Saiti, Bacha and Masih (2014) examined empirically whether Islamic stock indices provide more diversification benefits for international (or more specifically, US-based) investors relative to the conventional indices. Using data which refer to Islamic (GCC region ex-Saudi, Indonesia, Malaysia and Turkey) and the Far East (China, Hong Kong, Japan, Korea and Taiwan) countries and the USA, and which cover the period from June 2007 to December 2011, they found that purely Islamic stock indices "do not provide more diversification benefits compared to their conventional counterparts as far as the US-based investor is concerned. However, there are regional diversification benefits, for example, both the conventional and Islamic MSCI indices of Japan, GCC ex-Saudi, Indonesia, Malaysia and Taiwan provide better diversification benefits compared to Korea, Hong Kong, China and Turkey. It tends to suggest that the Islamic countries provide better diversification benefit compared to the Far East countries." (Saiti et al., 2014, p.209) Furthermore, based on the findings about statistically significant, but very low conditional correlations of volatility for all the pair countries within the set of markets which consisted of five Islamic emerging markets (Indonesia, Malaysia, Pakistan, Qatar and Turkey) and the US market over the period from January 2008 to January 2013, which we presented in the previous section, Majdoub and Mansour (2014) concluded that investing in the observed Islamic markets can be of use to institutional and individual investors for risk reduction. Using data which refer to the period from June 2002 to December 2012, Abbes and Trichilli (2015) also discovered the presence of potential benefits from diversifying portfolio across Islamic emerging stock markets of Bahrain, Brazil, China, Chile, Egypt, India, Indonesia, Jordan, Korea, Kuwait, Malaysia, Mexico, Morocco and Oman, and the developed stock markets of Austria, Canada, France, Germany, Hong Kong, Italy, Japan, New Zealand, Singapore, Spain, Switzerland, the United Kingdom and the USA, in short term. The diversification benefits were even present during turbulent economic periods due to a decrease in the correlation of Islamic markets to the other markets during the financial turmoils.

The diversification opportunities in individual countries is the issue which Kellner and Rösch (2019), Bhuiyan, Rahman, Saiti and Ghani (2019), Gupta and Guidi (2012), Oloko (2018), Aluko, Fapetu and Azeez (2018), and Zaimović and Arnaut Berilo (2014) dealt with. The research results of some of the listed authors, i.e. those of Bhuiyan, Rahman, Saiti and Ghani, Gupta and Guidi, and Aluko, Fapetu and Azeez, were already presented partially in this paper and they will be completed here.

Kellner and Rösch (2019) analysed the data which refer to 29 developed (Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, Netherlands, Singapore, South Africa, Switzerland, the United Kingdom and the

United States) and emerging (Argentina, Brazil, Chile, Colombia, India, Jordan, Malaysia, Mexico, the Philippines, South Korea, Taiwan and Thailand) equity markets from all around the world, and which cover the period between January 2002 and September 2016 in order to check if there are international diversification opportunities from a country specific point of view. The authors stated in their study the following: "While developed markets such as Switzerland still provide higher potential in diversification in comparison to some emerging markets, the majority of high diversifying markets are emerging markets, e.g., Malaysia, Jordan or Chile in our analysis. However, we also find that emerging markets like Argentina or Brazil exhibit lower diversification benefits than most of the developed markets." (Kellner and Rösch, 2019, p.102065) International investors should avoid Argentine and Brazilian as well as South Korean markets because those markets "exhibit high individual risk levels in combination with high market linkages (Kellner and Rösch, 2019, p.102074).

The attractiveness of Malaysian sovereign bond market and Indian stock market was discovered by Bhuiyan, Rahman, Saiti and Ghani (2019) and Gupta and Guidi (2012), respectively. While diversification potential in Indian stock market in stable times is present for long-term investors due to the absence of the strong long-run relationship between Indian and developed markets, the opposite is true for Malaysian sovereign bond market. Namely, "in terms of long-term investment periods ranging from 128 to 265 days, the Malaysian sukuk market is less attractive, whereas for medium-term investment horizons ranging from 16 to 64 days to 64–128 days, the Malaysian sukuk market offers better diversification opportunities for developed market bond investors during the sample period. For short-term holding periods of 2–4 days and 4–16 days, the sukuk market offer effective portfolio diversification possibilities to developed market investors because of lower correlation among the markets." (Bhuiyan et al., 2019, p.685)

Both Oloko (2018) and Aluko, Fapetu and Azeez (2018) investigated diversification possibilities for international investors in Nigerian stock market, but they analysed this issue from different international investors' point of view. Hence, Oloko (2018) investigated if potential portfolio diversification benefits are available to international investors, focusing on the UK- and US-based investors and using data for the period from January 2004 to June 2015. On the other hand, Aluko, Fapetu and Azeez (2018) investigated whether international portfolio diversification is feasible for international investors, focusing on France-, Germany-, Japan-, the UK- and the US-based investors and using data for the period from January 2000 to December 2015, whereby this period was divided into three sub-periods in the context of the global financial crisis (pre-crisis period lasted up to December 2007, crisis period spanned December 2007 to June 2009, post-crisis period spanned until the end of the analysed period). In both studies, the suitability of Nigerian stocks for the investors intending to diversify portfolio internationally was proven. In the firstly-mentioned study, the financial risk or financial bubble was found to transmit from the US and the UK stock markets to Nigerian stock market, but the "US (UK) investor could minimize the effect of financial shocks from US (UK) stock market on his Nigeria – US (UK) equity portfolio by holding about 10% (25%), and taking short position of about 9.4 cent (16.6 pence), in Nigerian stocks"

(Oloko, 2018, p.219). In the secondly-mentioned study, the evidence on the suitability of Nigerian stocks for the investors from different countries differs depending on the applied research methodology, same as the evidence on the relationship between the Nigerian stock market and the five observed developed stock markets. It follows from the results which refer to the relationship between the Nigerian stock market and the five observed developed stock markets and which were obtained on the basis of the causality test that international diversification in Nigeria was beneficial to the German and Japanese investors over the entire observed period, and to all the investors in all the sub-periods except Japanese investors in the post-crisis period. It follows from the results obtained on the basis of the regression estimates that international diversification in Nigeria was beneficial to the UK and US investors over the entire observed period. Furthermore, international diversification in Nigeria was beneficial to almost all the investors in all the sub-periods except German investors before the crisis.

Zaimović and Arnaut Berilo (2014) examined the possibilities to diversify portfolio through combining an investment in developed and underdeveloped capital markets. To do this, the authors focused on the diversification opportunities between German and Bosnian stock markets before, during and after the global financial crisis, and they used the data for the period from January 3rd, 2006 to Jun 1st, 2011. Over the observed 6-year period, benefits of the international diversification among the analysed stock markets were determined, whereby they were considerable in the pre- and post-crisis periods and negligible in the crisis. Risk reduction and return increase could be achieved in the pre-crisis and post-crisis periods, but the best diversification effects were found in the post-crisis period.

## 4. Opportunities for the portfolio diversification across different segments of financial market: Empirical evidence

Opportunities for the portfolio diversification in emerging markets can also be seen through the possible effects of including an investment in different assets from different segments of financial market, for example, an investment in the stocks of different industries, the diversified equity funds of emerging markets, equity ETFs in emerging markets, gold, different foreign currencies, and bitcoin, to the portfolio consisting of an investment in developed markets only. The impact of the first to the fifth type of the listed investments on the performance of the portfolio consisting of an investment in developed markets only was investigated by Donadelli and Persha (2014), Basu and Huang-Jones (2015), Gad and Andrikopoulos (2019), Bekiros, Boubaker, Nguyen and Uddin (2017), and Tudor and Popescu-Dutaa (2012) respectively, and the impact of the last one was investigated by Carrick (2016), Briere, Oosterlinck and Szafarz (2015), Eisl, Gasser and Weinmayer (2015), and Guesmi, Saadi, Abid and Ftiti (2019).

Generally, the average equity risk premium (ERP) in emerging markets is considerably higher and more unstable than in developed markets. The main reasons for this occurrence have been widely debated, but this occurrence is often explained by the need

of emerging markets to compensate investors for higher risks, lower market liquidity, higher transaction costs and consequently return instability. To discover, among other things, the contribution of different industrial stock markets to the higher equity risk premium paid by emerging markets to international investors and the extent to which emerging markets provide the benefits of cross-industry portfolio diversification to international investors, Donadelli and Persha (2014) used the data set which covers the period from December 1994 to June 2012 and which includes 19 emerging market countries from Asia (China, India, Malaysia, Pakistan, the Philippines, Sri Lanka and Thailand), Latin America (Argentina, Brazil, Chile, Colombia, Mexico and Peru), East Europe (Czech Republic, Hungary, Poland and Russia), Middle East (Turkey), and Africa (South Africa), as well as the United States. As the authors found, "some industries contribute more than others in determining the extra premia paid by emerging markets to international investors. In particular: (i) the healthcare and basic materials industries have mostly contributed to the extra premium paid by the Asian stock market; (ii) the East European and Latin American stock markets' extra performances have been largely driven by the utilities and consumer services industries, respectively." (Donadelli and Persha, 2014, p.299) Furthermore, the observed industrial stock markets were found to be highly related to each other both within and across countries and regions and that they generally co-move with developed stock markets. Due to stronger relationship between emerging and developed stock markets, the space in emerging markets where the international investors may exploit the benefits of cross-industry portfolio diversification is getting smaller, and the benefits are ever more negligible. When the authors conducted the separate analyses of the possible benefits of cross-industry portfolio diversification for the emerging market crises period of 1995–2002 and the post-crises period of 2003–2012, they stated in the conclusion the following: "While "crises period findings" point out that portfolios diversification benefits might still be exploited, "post-crises findings" show that industrial stock markets are internationally related, thus, lowering the probability to reduce portfolio risk through cross-industry diversification." (Donadelli and Persha, 2014, p.300)

Investments in mutual funds have traditionally been one of the most important ways for investors in developed markets to diversify their portfolios internationally. "However, with the spectacular growth of exchange-traded-funds (ETFs) in recent years, investors now have an alternative vehicle to construct a low cost, well-diversified portfolio. One important rationale for choosing to invest in traditional mutual funds over ETFs can be the expectation of 'abnormal' returns resulting from the perceived informational advantages or superior skills of fund managers. Hence it is important to evaluate whether these funds deliver any (ex-post) positive abnormal performance." (Basu and Huang-Jones, 2015, p.117) The evaluation of the performance of globally diversified emerging market equity funds was executed by the previously cited authors, i.e. Basu and Huang-Jones, by using data for the period from August 2000 through July 2010 and for 498 diversified emerging markets funds which covered Eastern Europe, Asia, Latin America, Africa, and Middle Eastern countries and originated in Austria, Australia, Chile, Denmark, Finland, Ireland, Italy, Luxembourg, Spain, Sweden, the UK and the US. According to the authors' findings, a vast majority (nearly 95%) of diversified emerging market equity funds "do not outperform the market benchmark even before

transaction costs. The systematic risk of most of the funds is similar to that of the market benchmark portfolio, which may suggest that they aim to offer diversification benefits to investors rather than seeking superior risk-adjusted returns through active fund management." (Basu and Huang-Jones, 2015, p.116) Therefore, the authors did not find support for the premise that mutual funds provide investors with abnormal returns. The impossibility of most of the diversified emerging market equity funds to outperform the market benchmark can be explained by two facts, as the authors stated. Firstly, in recent times, the informational efficiency in emerging markets has almost equalised to that in developed markets, making it almost as difficult for fund managers in emerging markets as for fund managers in developed markets to outperform the market benchmark. Secondly, the informational disadvantages of fund managers in the observed equity funds, which arose as a consequence of the fact that those funds were predominantly managed by foreign managers and were domiciled in developed markets, made fund managers unable to exploit any potential inefficiency in emerging markets and outperform the market benchmark.

The potential diversification benefits arising from an investment in ETFs were addressed by Gad and Andrikopoulos (2019). Specifically, the mentioned authors investigated if Shari'ah compliant ETFs could enhance the performance of a volatile portfolio comprising an investment in emerging market conventional ETFs. In the research, the authors used the data set covering the period from May 23rd, 2008 to July 24th, 2017 and including 17 ETFs (13 conventional emerging market ETFs and 4 Shari'ah compliant equity ETFs) which represent three asset classes such as conventional equity, conventional fixed-income securities, and Shari'ah compliant ETFs. Shari'ah compliant ETFs were found to be able to reduce the risk and improve the risk-adjusted returns of emerging market conventional portfolios. When the observed period was divided into two sub-periods, that is, the crisis and non-crisis periods, whereby the crisis period lasted from May 23rd, 2008 until May 31st, 2012 and covered the global financial crisis and the European sovereign debt crisis, and the non-crisis period lasted from June, 1st, 2012 until July 24th, 2017, it was found that "the Shari'ah compliant ETFs' role is more prevalent during the crisis period and receives a proportionally higher weight compared to the non-crisis period" (Gad and Andrikopoulos, 2019, p.135).

The contagious effects, systematic risk and financial uncertainty, which were expressed during the global financial crisis, encouraged global investors to seek more attractive diversifiers compared to stocks. Due to low perceived risk in an environment of high systematic risk, low correlations with stocks and dependence on risk factors which differ from those that affect stock returns, gold has been attracting a greater attention of global investors at times of making a decision about diversifying their portfolios and greater portfolio diversification opportunities have been expected from gold. The role of gold as a diversifier, among other things, for the stocks issued by BRICS countries, over the period from January 1st, 2000 to July 31st, 2014, was investigated by Bekiros, Boubaker, Nguyen and Uddin (2017). As the authors stated, "our results mainly show evidence of heterogeneity of causal interactions between gold and BRICS stock markets with causality from gold to stocks being more important in short to medium horizons.

They also indicate an increase in gold-stock co-movement in the long run and a leading effect of gold market over the BRICS stock markets during the recent global financial crisis. Finally, we document a time-varying conditional dependence between gold and stocks, which is larger during bad times than during good times." (Bekiros et al., 2017, p.318) It follows from the obtained research results that gold acted as a diversifier for the stocks issued by BRICS countries in both normal and bear markets, but its diversification potential tended to decrease in the long run.

Similarly to gold, foreign currencies could be sometimes said to act as a diversifier for the stocks. This statement can be supported by the findings of Tudor and Popescu-Dutaa (2012). The mentioned authors investigated the causal relationship between stock prices and exchange rates movements for seven developed countries (Australia, Canada, France, Hong Kong, Japan, the United Kingdom and the United States) and six emerging market countries (Brazil, China, India, Korea, Russia and South Africa) during the period from January 1997 to March 2012. They found "that the equity market and the evolution of the exchange rate are two interactive time series in the case of Korea. […] Other results reveal that the evolution of the exchange rate has an impact on next month stock market index returns in the case of Brazil and Russia while the equity market is a risk factor for the exchange rate only in the case of the United Kingdom." (Tudor and Popescu-Dutaa, 2012, p.275) In the other analysed markets, the mutual impact of stock prices and exchange rates movements was not found. Foreign currencies were able to act as a diversifier for the stocks issued there.

Carrick (2016) examined whether Bitcoin can be considered a complement or a substitute to fiat developed market currencies and emerging market currencies and how including Bitcoin into a currency basket would affect the risk-adjusted returns of already diversified currency portfolio. In the research, the authors used the data referring to the value and volatility of the major currencies (Australian Dollar, British Pound, Canadian Dollar, Euro, Japanese Yen and Swiss Franc) and emerging market currencies (Brazilian Real, Chilean Peso, Chinese Yuan, Colombian Peso, Indonesian Rupiah, Indian Rupee, Malaysian Ringgit, Mexican Peso, Philippine Peso, Polish Zloty, Russian Ruble, South Korean Won, Thai Baht and Turkish Lira) with which Bitcoin's value and volatility were compared. The observed period lasted from January 1$^{st}$, 2011 to December 31$^{st}$, 2015. Bitcoin was found to be negatively correlated at statistically significant levels with all of the major currencies in the analysed period, except the Swiss Franc, and all of the emerging market currencies, except the Chinese Yuan. A negative correlation between the emerging market currencies and Bitcoin "is an interesting finding as currency risk is a major issue with emerging market currencies, but emerging market currencies have become a common way to diversify risk and balance both currency portfolios and general investment portfolios" (Carrick, 2016, p.2328). Due to the negative correlations between Bitcoin and most currencies, including Bitcoin into currency baskets could be of use for portfolio managers to reduce risk and increase the risk-adjusted returns. Therefore, Bitcoin can be considered to be a complement to other currencies, especially emerging market currencies.

Briere, Oosterlinck and Szafarz (2015) and Eisl, Gasser and Weinmayer (2015) examined how including Bitcoin into an already well-diversified portfolio affects the risk and return of newly-created portfolio, that is, whether it enhances the performance of newly-created portfolio or not. In the research, the first group of authors used the data covering the period from July 23rd, 2010 to December 27th, 2013 and the portfolio consisting of both traditional assets (worldwide stocks, bonds and hard currencies) and alternative investments (investments in commodities, real estate and hedge funds), and the second group of authors used the data covering the period from July 18th, 2010 to April 30th, 2015 and the portfolio consisting of both traditional assets (stocks, bonds and currencies) and alternative investments (investments in commodities such as gold or oil). The both analysed periods involve two crises that Bitcoin experienced. The first crisis started in June and ended in July 2011, and the second one started in March and ended in April 2013. According to the authors' findings, Bitcoin offers significant diversification benefits to investors. In other words, the portfolio with Bitcoin provides investors with superior risk-return trade-offs compared to similar portfolio without Bitcoin. Such capability of Bitcoin follows from its low correlations with other assets. As Briere, Oosterlinck and Szafarz (2015) discovered, "including even a small proportion of BTCs in a well-diversified portfolio may dramatically improve risk-return characteristics" (Briere, Oosterlinck and Szafarz, 2015, p.371). Similarly to Briere, Oosterlinck and Szafarz (2015), but more precisely, Eisl, Gasser and Weinmayer (2015) discovered that it is sufficient for Bitcoin to be "included in efficient portfolios with mean weights ranging from 1.65% to 7.69%" (Eisl et al., 2015, p.18), in order for an optimal diversification effect to be achieved. It is important to note here that the authors emphasised that the research results should be considered with caution because the data about correlations between Bitcoin and other assets from which the research results are derived, can change over time and become considerably different from the current ones in the future. Same as Briere, Oosterlinck and Szafarz (2015) and Eisl, Gasser and Weinmayer (2015), Guesmi, Saadi, Abid and Ftiti (2019) also proved that Bitcoin can offer diversification advantages for a global market portfolio. This statement can be backed up with the following authors' statement: "We show that a short position in the Bitcoin market allow hedging the risk investment against all different financial assets. We also find that hedging strategies involving gold, oil, emerging stock markets and Bitcoin reduce considerably a portfolio's risk (variance), as compared to the risk of a portfolio composed of gold, oil and stocks from emerging stock only. Taken together, our results show that Bitcoin may offer diversification and hedging benefits for investors." (Guesmi et al., 2019, p.432) To draw this conclusion, the authors implemented the research using the data which covered the period from January, 1st, 2012 to May 1st, 2018.

## Conclusion

Although the benefits of international correlation-based portfolio diversification have reduced for both developed and emerging markets over time, potential for portfolio diversification still exists in all emerging markets areas around the world. Even when

international diversification potential is observed from a country specific point of view, the majority of high-diversifying markets have been discerned to belong to emerging markets. However, diversification potential is not stable, but it varies over time, across individual countries, and for different investment horizons. Thus, investing selectively in emerging markets may provide significant diversification benefits. Such portfolio investment can be more profitable investment alternative compared to portfolio investment in developed markets over time and for different time horizons, especially in crisis periods.

The inclusion of an investment in different assets from different segments of emerging financial market, for example, an investment in the stocks of different industries, the diversified equity funds of emerging markets, equity ETFs in emerging markets, gold, different foreign currencies, and bitcoin, into the portfolio consisting of an investment in developed markets only can also provide the benefits of international correlation-based portfolio diversification to investors. Same as the potential for the portfolio diversification in different areas, the potential for the portfolio diversification across different segments of financial market is not stable, but it varies over time, across individual assets, and for different investment horizons. Bitcoin and the Shari'ah compliant ETFs could be expected to create stronger diversification potential, especially in the crisis period.

The expected evolution, dynamics (term- and time-variability) and direction of cross-country, cross-area and cross-assets correlations, as well as the expected presence or absence of volatility transmission across countries and areas will determine whether and to what extent international portfolio diversification will be possible and beneficial. Due to the variability of key preconditions for international portfolio diversification, investors should frequently adjust their portfolio positions. To help investors in finding potential for the portfolio diversification in emerging markets, researchers need to provide as up-to-date evidence on this potential as possible. Therefore, the future research could be directed at continuous search for attractive portfolio diversification opportunities in emerging markets. Furthermore, the future research could also be directed at scientific evaluation of the expected effects of changes in economic conditions on the potential for portfolio diversification at all times. Based on the obtained knowledge, the researchers could help policy makers to timely and effectively adjust national macroeconomic and financial policies in emerging market countries in order to maximise the interest of foreign investors in portfolio investment in a particular country.

## References

Abbas, Q., Khan, S., & Shah, S. Z. A. (2013). Volatility transmission in regional Asian stock markets. *Emerging Markets Review*, *16*, 66-77. https://doi.org/10.1016/j.ememar.2013.04.004

Abbes, M. B., & Trichilli, Y. (2015). Islamic stock markets and potential diversification benefits. *Borsa Istanbul Review*, *15*(2), 93-105. https://doi.org/10.1016/j.bir.2015.03.001

Al Nasser, O. M., & Hajilee, M. (2016). Integration of emerging stock markets with global stock markets. *Research in International Business and Finance*, *36*, 1-12. https://doi.org/10.1016/j.ribaf.2015.09.025

Aluko, O. A., Fapetu, O., & Azeez, B. A. (2018). International portfolio diversification in the Nigerian stock market: A global financial crisis perspective. *Future Business Journal*, *4*(2), 189-194. https://doi.org/10.1016/j.fbj.2018.06.001

Arouri, M. E. H., Nguyen, D. K., & Pukthuanthong, K. (2012). An international CAPM for partially integrated markets: Theory and empirical evidence. *Journal of Banking & Finance*, *36*(9), 2473-2493. https://doi.org/10.1016/j.jbankfin.2012.05.004

Basu, A. K., & Huang-Jones, J. (2015). The performance of diversified emerging market equity funds. *Journal of International Financial Markets, Institutions and Money*, *35*, 116-131. https://doi.org/10.1016/j.intfin.2015.01.002

Bekaert, G., & Harvey, C. R. (2017). Emerging equity markets in a globalizing world. Netspar Discussion Papers, DP 05/2014-024. *Available at SSRN*: https://ssrn.com/abstract=2344817 or http://dx.doi.org/10.2139/ssrn.2344817

Bekiros, S., Boubaker, S., Nguyen, D. K., & Uddin, G. S. (2017). Black swan events and safe havens: The role of gold in globally integrated emerging markets. *Journal of International Money and Finance*, *73*, 317-334. https://doi.org/10.1016/j.jimonfin.2017.02.010

Bhuiyan, R. A., Rahman, M. P., Saiti, B., & Ghani, G. B. M. (2019). Does the Malaysian Sovereign sukuk market offer portfolio diversification opportunities for global fixed-income investors? Evidence from wavelet coherence and multivariate-GARCH analyses. *The North American Journal of Economics and Finance*, *47*, 675-687. https://doi.org/10.1016/j.najef.2018.07.008

Briere, M., Oosterlinck, K., & Szafarz, A. (2015). Virtual currency, tangible return: Portfolio diversification with bitcoin. *Journal of Asset Management*, *16*(6), 365-373. https://doi.org/10.1057/jam.2015.5

Carrick, J. (2016). Bitcoin as a complement to emerging market currencies. *Emerging Markets Finance and Trade*, *52*(10), 2321-2334. https://doi.org/10.1080/1540496X.2016.1193002

Christoffersen, P., Errunza, V., Jacobs, K., & Jin, X. (2014). Correlation dynamics and international diversification benefits. *International Journal of Forecasting*, *30*(3), 807-824. https://doi.org/10.1016/j.ijforecast.2014.01.001

Christoffersen, P., Errunza, V., Jacobs, K., & Langlois, H. (2012). Is the potential for international diversification disappearing? A dynamic copula approach. *The Review of Financial Studies*, *25*(12), 3711-3751. https://doi.org/10.1093/rfs/hhs104

Das, D., Kannadhasan, M., & Bhattacharyya, M. (2019). Do the emerging stock markets react to international economic policy uncertainty, geopolitical risk and financial stress alike?. *The North American Journal of Economics and Finance, 48,* 1-19. https://doi.org/10.1016/j.najef.2019.01.008

Donadelli, M., & Persha, L. (2014). Understanding emerging market equity risk premia: Industries, governance and macroeconomic policy uncertainty. *Research in International Business and Finance*, *30*, 284-309. https://doi.org/10.1016/j.ribaf.2013.09.008

Eisl, A., Gasser, S., & Weinmayer, K. (2015). Caveat emptor: Does Bitcoin improve portfolio diversification?. *Available at SSRN*: https://ssrn.com/abstract=2408997 or http://dx.doi.org/10.2139/ssrn.2408997

Gad, S., & Andrikopoulos, P. (2019). Diversification benefits of Shari'ah compliant equity ETFs in emerging markets. *Pacific-Basin Finance Journal, 53,* 133-144. https://doi.org/10.1016/j.pacfin.2018.10.009

Graham, M., Kiviaho, J., & Nikkinen, J. (2012). Integration of 22 emerging stock markets: A three-dimensional analysis. *Global Finance Journal*, *23*(1), 34-47. https://doi.org/10.1016/j.gfj.2012.01.003

Guesmi, K., Saadi, S., Abid, I., & Ftiti, Z. (2019). Portfolio diversification with virtual currency: Evidence from bitcoin. *International Review of Financial Analysis, 63,* 431-437. https://doi.org/10.1016/j.irfa.2018.03.004

Guidi, F., & Ugur, M. (2014). An analysis of South-Eastern European stock markets: Evidence on cointegration and portfolio diversification benefits. *Journal of International Financial Markets, Institutions and Money*, *30*, 119-136. https://doi.org/10.1016/j.intfin.2014.01.007

Gupta, R., & Guidi, F. (2012). Cointegration relationship and time varying co-movements among Indian and Asian developed stock markets. *International Review of Financial Analysis*, *21*, 10-22. https://doi.org/10.1016/j.irfa.2011.09.001

Hadhri, S., & Ftiti, Z. (2019). Asset allocation and investment opportunities in emerging stock markets: Evidence from return asymmetry-based analysis. *Journal of International Money and Finance*, *93*, 187-200. https://doi.org/10.1016/j.jimonfin.2019.01.002

Kellner, R., & Rösch, D. (2019). A country specific point of view on international diversification. *Journal of International Money and Finance, 98,* 102064-102076. https://doi.org/10.1016/j.jimonfin.2019.102064

Koepke, R. (2019). What drives capital flows to emerging markets? A survey of the empirical literature. *Journal of Economic Surveys*, *33*(2), 516-540. https://doi.org/10.1111/joes.12273

Majdoub, J., & Mansour, W. (2014). Islamic equity market integration and volatility spillover between emerging and US stock markets. *The North American Journal of Economics and Finance*, *29*, 452-470. https://doi.org/10.1016/j.najef.2014.06.011

Mensah, J. O., & Alagidede, P. (2017). How are Africa's emerging stock markets related to advanced markets? Evidence from copulas. *Economic Modelling*, *60*, 1-10. https://doi.org/10.1016/j.econmod.2016.08.022

Mensi, W., Hammoudeh, S., & Kang, S. H. (2017). Risk spillovers and portfolio management between developed and BRICS stock markets. *The North American Journal of Economics and Finance*, *41*, 133-155. https://doi.org/10.1016/j.najef.2017.03.006

Mensi, W., Hammoudeh, S., Reboredo, J. C., & Nguyen, D. K. (2014). Do global factors impact BRICS stock markets? A quantile regression approach. *Emerging Markets Review*, *19*, 1-17. https://doi.org/10.1016/j.ememar.2014.04.002

Mensi, W., Shahzad, S. J. H., Hammoudeh, Zeitun, S. R., & Rehma, M. U. (2017). Diversification potential of Asian frontier, BRIC emerging and major developed stock markets: A wavelet-based value at risk approach. *Emerging Markets Review*, *32*, 130-147. https://doi.org/10.1016/j.ememar.2017.06.002

Miyajima, K., Mohanty, M. S., & Chan, T. (2015). Emerging market local currency bonds: diversification and stability. *Emerging Markets Review*, *22*, 126-139. https://doi.org/10.1016/j.ememar.2014.09.006

Najeeb, S. F., Bacha, O., & Masih, M. (2015). Does heterogeneity in investment horizons affect portfolio diversification? Some insights using M-GARCH-DCC and wavelet correlation analysis. *Emerging Markets Finance and Trade*, *51*(1), 188-208. https://doi.org/10.1080/1540496X.2015.1011531

Narayana, S., & Rehman, M. U. (2017). Diversification opportunities between emerging and frontier Asian (EFA) and developed stock markets. *Finance Research Letters*, *23*, 223-232. https://doi.org/10.1016/j.frl.2017.06.007

Neaime, S. (2016). Financial crises and contagion vulnerability of MENA stock markets. *Emerging Markets Review*, *27*, 14-35. https://doi.org/10.1016/j.ememar.2016.03.002

Oloko, T. F. (2018). Portfolio diversification between developed and developing stock markets: The case of US and UK investors in Nigeria. *Research in International Business and Finance*, *45*, 219-232. https://doi.org/10.1016/j.ribaf.2017.07.153

Piljak, V. (2013). Bond markets co-movement dynamics and macroeconomic factors: Evidence from emerging and frontier markets. *Emerging Markets Review*, *17*, 29-43. https://doi.org/10.1016/j.ememar.2013.08.001

Rehman, M. U., & Shah, S. Z. A. (2016). Determinants of Return's Co-Movement for Effective Portfolio Diversification Among Regional Stock Markets. *Revista Evidenciação Contábil & Finanças*, *4*(1), 84-96. https://doi.org/10.18405/recfin20160106

Saiti, B., Bacha, O. I., & Masih, M. (2014). The diversification benefits from Islamic investment during the financial turmoil: The case for the US-based equity investors. *Borsa Istanbul Review*, *14*(4), 196-211. https://doi.org/10.1016/j.bir.2014.08.002

Tudor, C., & Popescu-Dutaa, C. (2012). On the causal relationship between stock returns and exchange rates changes for 13 developed and emerging markets. *Procedia-Social and Behavioral Sciences*, *57*, 275-282. https://doi.org/10.1016/j.sbspro.2012.09.1186

Zaimović, A., & Arnaut Berilo, A. (2014). Risk diversification between stock markets in Germany and Bosnia and Herzegovina. *South East European Journal of*