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ROMANIAN EQUITY INVESTMENTS AND CURRENCY RISK: A EURO-BASED PERSPECTIVE

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Abstract:

This paper assesses the benefits and risks of international investments made on the Romanian stock market, from the perspective of euro-based investors. We investigate the contribution of exchange rate volatility to the total risk of these investments over a period of nine years, between January 2011 and December 2019, by using monthly values for the exchange rate between the Romanian leu and Euro and monthly values of the Romanian stock index. Our findings indicate that, on average, Romanian leu depreciated against euro, causing currency losses for the euro-based investor, counterbalanced by the Romanian index mean return, higher than euro countries index mean return during the period under analysis. However, comparing the exchange rate volatility with the volatility of the local index market, we find that that exchange rate returns have lower standard deviations values, which may suggest that the exchange rate volatility does not seem to be an additional factor to the total volatility of the Romanian stock market returns denominated in euro. This conclusion is supported by the values obtained for lambda, a synthetic indicator which measures the proportion of the volatility attributable to exchange rate fluctuations from the total volatility of the euro-based investor returns. Combined, these results imply that currency risk has only a moderate and controllable influence on international investments made by a euro-based investor on the Romanian stock market.

Key words: *international investments, currency risk, Romanian stock market*

1. Introduction

International diversification of investment portfolios has received great attention from both academic researchers and professional investors since Grubel (1968) first extended the Markowitz (1952) theory on mean-variance portfolio analysis at an international level. By definition, international investments represent those investments that

are made outside the domestic market and offer portfolio diversification and opportunities for risk minimization. Mainly, an investor is interested in expanding his horizon of returns and broadening his portfolio. These investments also serve as a mean of adding different financial instruments to the list when domestic markets are restricted and limited by their variety. Every domestic market attracts investors and it gives them access to opportunities and to instruments that allow for the mitigation of currency risk and may guarantee greater gains. In order to offset risks, investors usually choose to diversify their portfolio. However, greater returns obtained on international markets come with additional risks. Each domestic market has some limitations of international investing and there are some barriers that international investors have to overcome, such as: political and economic turbulence, which can greatly affect investments; accessibility and availability of vital information related to foreign firms and markets and to comply with the domestic rules, various issues can arise in terms of legislation and operating conditions imposed by the local market.

One of the limitations refers to credit risk meaning that investors should carefully exercise trades with due prominence to credit ratings. Another concern of international investors refers to liquidity risk, which is one of the biggest issues of investing in international markets. Liquidity risk is present when a financial or non-financial company is not able to meet short term financial demands. This usually occurs due to the inability to convert a security or hard asset to cash without a loss of capital or income. On one hand, most of the investors in developed economies invest in the growing economies to seek prospects of higher returns. On the other hand, international investments boost foreign economies and bring influx of money. These are responsible for scaling up market confidence and corporate credence. Basically, these investments provide greater options but they also have their share of risks. International investments are also exposed to exchange rate risk, meaning that foreign investments are prone to the risk of currencies' value changing. Volatility and fluctuations can affect all transactions dramatically, but particularly the high sized ones. International investors or multinational companies that have assets or business operations in foreign countries are exposed to currency risk and the level of uncertainty increases drastically compared to the home country, which leads to unpredictable gains and losses. Currency risk or exchange rate risk appears from the change in the price of one currency in relation to another.

International investors focus on different assets such as foreign stocks or portfolios and foreign currencies. Hence, the risks and returns earned from contributing across the national borders are not necessarily connected to the risk exposure and return of the foreign asset or portfolio, but also to the changes in the exchange rate between the foreign currency and the domestic currency of the investor. Any change in the asset prices affects the returns of the portfolios, for instance the changes in exchange rates. Nowadays, the world is strongly influenced by exchange rates fluctuations and currency volatility which have a significant impact on international investment outcomes. Currency volatility is characterized by frequent and rapid changes to exchange rates in the foreign exchange (forex) market. High volatility represents a dramatic change in the price and the return of a currency over a shorter or longer period of time in any direction. Low volatility, on the other hand, refers to small fluctuations in the price of the currency. It is quite difficult to evaluate

the impact of currency volatility on investments, because currency movements affect the volatility of an investment, once by its volatility, but also through the connection between exchange rate changes and foreign returns.

When investments are made in emerging markets, investors fundamentally assess the risk exposure of exchange rates. These markets are well-known to have a higher level of instability and financial insecurity, comparing to developed markets. A major negative impact of exchange rate fluctuations comes from the crisis that struck the emerging countries in the 1990s, likewise the financial uncertainty they actually experience. Therefore, these proved that international investors are in trouble. Due to this background, various studies came up with "legitimate" risk premium related to investments in external markets that would offset investors for assuming higher risks than at home and one of the studies explains the arbitrage pricing models in order to determine the risk which national stock markets are exposed or different industries to exchange rate changes.

Considering that managing exchange rate risk in emerging markets is still on debate among researchers, this paper examines the impact that exchange rate volatility and currency risk has on the risk-return profile of international investments in Romania. We analyse the importance of currency risk from the perspective of an investor with euro as reference currency, with a focus on the contribution that currency fluctuations have on the exchange rate of the Romanian leu against the euro and the total risk of investments. Our analysis extends between January 2011 and December 2019 and the paper is organized as follows: Chapter 2 reviews the literature review on this topic, Chapter 3 presents the data and methodology, Chapter 4 analyses the main results and Chapter 5 concludes.

2. Literature review

The empirical literature on exchange rate volatility and currency risk in international investments grows day by day and there are many studies that have analysed how currencies fluctuate over the time and how these evolutions affect investors' decisions. Exchange rates fluctuations have a significant impact on the risk-return of investments made over the borders, in a different currency than the base currency of the investor. There are several analyses based on this approach towards the end of the 20th century – see Jorion (1985) or Bugar and Maurer (2000) -, which showed that investors are not able to manage the instability of exchange rate changes to make profit from international investments. In addition, it is hard to cover the costs generated by the owning resources abroad. Also, Giovannini and Jorion (1989) pointed out that currency movements influence the total return and the volatility of foreign currencies and occasionally, due to currency changes, the investment return might surpass the capital gain or income, especially in the short-run. Simultaneously, empirical investigations show that currency risk, as estimated by the standard deviation of the exchange rate movement, is lower than the risk of the financial exchange. Another approach refers to the exchange risk of investments. By selling or forwarding currency contracts, investors have the possibility to hedge foreign currencies in order to reduce or even eliminate the foreign exchange risk. There are also other options to minimize the exchange risk through buying put currency alternatives or obtaining foreign currency to fund the investment. Hence, currency risk would be

eliminated more easily in terms of international investment techniques and would make investors more confident, given the well-documented behavioural approaches, like the presence of herding on foreign trading, on both individual stock and portfolio level (Senarathne and Jianguo, 2018).

Moreover, the contribution of currency risk declines with the dimension of the investment horizon; an investor with a longer time horizon should care less about currency risk than an investor who is preoccupied with monthly fluctuations.

The exchange rate exposure was defined by Adler and Dumas (1984) as the amounts of foreign currencies which represent the sensitivity of the future, real domestic-currency (market) value of any physical or financial asset to random variations in the future domestic purchasing powers of these foreign currencies, at some specific future date. They also suggest some strategies which refer to hedging in order to eliminate the exchange rate exposure of the firm. Moreover, exchange rates may affect the value of the companies through various channels. For instance, a specialized firm in export might benefit from a depreciation of the local currency, as it leads to a decrease in price of the product and becomes more affordable to foreign customers. While other firms which import materials may suffer from a depreciation of local currency and it causes increasing in costs of production. International finance textbooks – see, for example Eiteman, Stonehill and Moffett (2000) or Shapiro (2019) came up with another definition in terms of exposure to currency risk as the degree to which a firm is afflicted by exchange rates changes; international research illustrates a better homogeneity with respect to the exchange rate exposure that an enterprise faces. Companies might encounter few difficulties in a certain period of time when exchange rates fluctuate: (1) transaction exposure - it is the risk that companies take when currency exchange rates fluctuate and the firm has already undertaken a financial obligation and the payment is denominated in the foreign currency. Thus, shifting exchange rates drives to major capital losses and high level of vulnerability for international investors; (2) translation exposure (also known as translation risk) - is the risk that the firm's equities, liabilities, assets or income will change in value because of the exchange rate changes. It happens when the investor denominates parts of the equities, assets, liabilities or the income in a foreign currency; (3) economic exposure - the present value of the firm is modified due to the changes in the future cash flows, cost of capital, foreign investments and earnings caused by unexpected currency fluctuations. In contradiction to transaction exposure and translation exposure, economic exposure is quite difficult to measure accurately and challenging to hedge.

Horobet and Lupu (2006) analysed several countries from Central and Eastern Europe (Czech Republic, Hungary, Poland and Romania) in terms of changes in real exchange rates which were measured against euro. The results show the lack of contemporaneous and lagged exposures; these can be described as a failure of stock market investors to incorporate changes in the competitive positions of firms in these nations within the stock market. Burnside (2011) examined the average returns to high-interest currencies, while Frankel and Poonawala (2010) are concerned about efficiency in emerging derivative markets from the forward rate bias perspectives. Jiang et al. (2013) analysed how investors behave in terms of choosing the best portfolio in individual foreign markets and how exchange rate risk influences portfolios. They demonstrated that the right

portfolio includes the traditional mean-variance efficient portfolio and an element with a design to hedge against currency risk.

In a more recent study, Boudoukh, Richardson, Thapar and Wang (2019) explore different hedging policies for portfolios diversified on international equity markets, using the MSCI World Index as a proxy for this type of portfolios, from the perspective of investors located in G-10 countries. The authors use weekly data on the indices and exchange rates under analysis, for the period between January 1981 and December 2017 and employ two different approaches in constructing the portfolios (1) a classical mean-variance optimization method and (2) a modified portfolio mean-variance optimization (MVMPO), which considers also the potential of one currency to hedge both equity and other currencies risk. They find that full hedging decreased the total volatility of internationally diversified portfolios from an average of 16.5% to an average of 14.9%, while applying an optimal hedging ratio further reduced the total portfolio volatility to an average of 12.7%. Another interesting finding of this research is that optimally hedged international equity portfolios are similar for all G-10 investors. In a similar study, Du, Wang, Hsu and Lai (2018) highlight the contribution of exchange rate fluctuations in international investments by making a comparative analysis between fully hedged and fully unhedged internationally diversified portfolios, from the perspective of Chinese investors. They conduct the study over a period of nine years, ranging between 2006 and 2014 and construct efficient portfolios using assets from the US stock market. The authors conclude that hedged portfolios display higher Sharpe ratios than the unhedged ones, highlighting once again the importance of managing the exchange rate risk in international investments.

Rezessy and András (2010) analyse currency risk premium in four emerging European economies: Czech Republic, Hungary, Poland and Slovakia. They specify that this concept of "currency risk premium" draw the attention of the economic and financial literature. Additionally, the theoretical part of the presence of risk premium in regard to the failure of the hypothesis of the forward rate is an unbiased indicator of long standing time spot rate, it also includes essential practical backlash for financial market investigation exclusively in emerging economies. Exchange rates in emerging markets can be considerable and fairly volatile with a significant impact on the prices of financial assets. Furthermore, central banks and financial markets have considerable interest in evaluating the risk premium. With respect to adopting euro as national currency, Csajbók (2004) and Cjakkok and Rezessy (2006) admitted that European countries willing to join the Eurozone need to properly assess the currency risk and risk premium in the process of adopting the euro. In a more recent study, Belaşcu (2016) addresses a similar question in the case of another three EU countries: United Kingdom, Sweden and Denmark.

One of the main theoretical frameworks as seen from the investors' view describes volatility spillover between equity, investments and exchange rate markets. Karoui (2006) finds that investors who had already made investments in stocks will search for other financial markets which may be more profitable and efficiently if their local currency depreciates compared to the foreign currency. Therefore, the relationship between exchanges rates and stock prices will be negative. On the other hand, international investors who have not yet invested will find the stocks cheap and they will buy the specific stocks. Consequently, the effect leads to a positive relationship between exchange rates

and stock prices. Concluding, this section reviews the most relevant studies made by other researchers in this field, who analyse how exchange rate volatility and currency risk affect international investments. These studies show how currencies fluctuate over the time, in which manner these changes affect investors' decision making and the importance of exchange rates fluctuations, which have a powerful impact in terms of currency risk. As a consequence, international investors have to be aware and to take into consideration the risk exposure of potential future loss.

3. Research methodology and data

In order to evaluate the contribution of currency risk to the total risk of an international investment, made by a euro-based investor in Romania, we use monthly data on exchange rates and stock indices between 1st of January 2011 and 31th of December 2019.

We extract the values of the stock market index from Romania and the stock index for the euro currency, together with the exchange rate between the euro and the Romanian leu from Investing.com, which is a financial market platform, providing real-time data, quotes, charts, financial tools, news and analysis across 250 exchanges around the world. Taken into consideration Formula 1 stated above, the euro returns gained by the euro-based investor on the Romanian market are calculated as following:

$$R_t^{EUR} = \ln P_t^{FC} X_t^{EUR/FC} - \ln P_{t-1}^{FC} X_{t-1}^{EUR/FC} = \ln(P_t^{FC} - P_{t-1}^{FC}) - \ln(X_t^{EUR/FC} - X_{t-1}^{EUR/FC})$$

$$= R_t^{FC} + X_t^{EUR/FC} \quad (1)$$

R_t^{EUR} is the return in the CEE markets expressed in euro, P_t^{FC} represents the stock market index in the CEE countries at time t, the price of the stock market index is denominated in domestic currency units, R_t^{FC} is the return of the stock market in the foreign currency at moment t/t. Another element of the equation is $X_t^{EUR/FC}$, the exchange rate fluctuation of the CEE currencies against the euro at moment t/t-1. The formula presented above shows the way how the euro investor obtained the return in the Romanian markets. Therefore, the return is composed of return in the home currency and the exchange rate fluctuation.

We compute the variance of the respective returns using the same mechanism as in equation 3. This formula denotes the risk of an investment made by a euro-based investor in the Romanian stock market.

$$\text{var}(R^{EUR}) = \text{var}(R^{FC}) + \text{var}(X^{EUR/FC}) + 2 \text{cov}(R^{FC}, X^{EUR/FC}) \quad (2)$$

where $\text{var}(X^{EUR/FC})$ is the variance of exchange rate changes in the CEE currencies against the euro and $\text{cov}(R^{FC}, X^{EUR/FC})$ represents the covariance between the return in

foreign currency and the covariance of exchange rate changes against the euro. evaluate the contribution of

In order to better highlight the contribution of the exchange rate volatility to the total volatility of an investment by a euro-based investor on the Romanian stock market, we calculate the values of a variable, denoted λ , using the methodology proposed by Horobet and Dumitrescu (2008) and Horobet, Draghici and Constantin (2011):

$$\lambda = \frac{\text{var}(X^{EUR/FC}) + 2\text{cov}(R^{FC}, X^{EUR/FC})}{\text{var}(R^{EUR})} = 1 - \frac{\text{var}(R^{FC})}{\text{var}(R^{EUR})} \quad (3)$$

The formula above shows that changes in exchange rate of the Romanian leu against euro do not depend only on the volatility of the foreign exchange market, but also on the covariance between the Romanian stock market returns and exchange rate changes. Thus, the exchange rate volatility will not determine automatically a higher volatility in the returns accessible for the foreign investors, caused by the value and sign of the covariance. Mostly, the exchange rate volatility has a significant contribution to the risk of any investor in the CEE markets. This contribution depends on the ratio between the covariance and the variance of changes in the exchange rates. To be more specific, if

$$\frac{\text{cov}(R^{FC}, X^{EUR/FC})}{\text{var}(X^{EUR/FC})} > -0.5$$

, as an explanation, the foreign investor faces a higher probability of risk due to the exchange rate fluctuations. The reverse case of the equation

$$\frac{\text{cov}(R^{FC}, X^{EUR/FC})}{\text{var}(X^{EUR/FC})} \leq -0.5$$

shows that the exchange rate fluctuations do not have any impact on the volatility of returns in the domestic currency of the foreign investor.

4. Results and discussing of findings

In this part of the paper, we highlight the most important findings regarding the contribution of the exchange rates volatility to the total volatility of an investment made by a euro-based investor on the Romanian equity market. In this respect, Figure 1 pictures the returns obtained by the euro-based investor in the Romanian stock market index, denominated in local currency (RET_RO) and in euro (RET_EUR_RO), as well as the changes of the exchange rate of the Romanian leu against the euro, while Table 1 summarizes the descriptive statistics of these series of returns.

The monthly mean return of the Romanian index from 2011 to 2019 was 0.0056, higher than the mean of resulting EUR return (0.0043). Simultaneously, the exchange rate return shows a negative mean, denoting that, on average, the RON depreciated against EUR during the entire period. As a consequence, despite the higher index positive return compared to the euro return, changes in the value of the RON against EUR between 2011 and 2019 have negatively impacted the mean EUR return. Skewness is negative for both EUR and the Romanian index return, as well as for the exchange rate return, meaning that

these series display asymmetric distributions, with the mean below their median values. Kurtosis values (higher than 3) show leptokurtic return distributions for all three variables and the Jarque-Bera test of normality expresses that returns are normally distributed. The standard deviation of returns is the highest in the case of EUR-denominated returns (0.0546), showing that both the index returns and exchange rate return contributed to a higher volatility of returns in EUR for the euro-based investor.

Figure 1. Returns of a euro-based investor from investing in the Romanian stock index, 2011-2019

Source: Authors' representations in Eviews

Table 1. Descriptive statistics of returns from investments in the Romanian stock index, 2011-2019

	RET_RO	RET_RONEUR	RET_EUR_RO
Mean	0.0056	-0.0013	0.0043
Median	0.0108	-0.0013	0.0090
Std. Dev.	0.0507	0.0101	0.0546
Skewness	-0.9238	-0.4156	-0.9114
Kurtosis	4.5202	5.0980	4.2692
Jarque-Bera	28.387	25.2522	24.4651
Probability	0.0000	0.0000	0.0000

Source: Author's calculations in Eviews

Table 2 presents the descriptive statistics of Romanian stock investments' returns rolling variance (RO_VARINDEX and RO_VAREUR) and also the exchange rate between RON and EUR returns rolling variance (RO_VARRON). The mean of RON returns rolling variance from 2011 to 2019 was 0.002569 per month, lower than the mean of the resulting EUR return rolling variance (0.002945 per month). Concurrently, the rolling variance of the exchange rate return presents a positive mean by denoting on average that RON appreciated against EUR during that specific period of time. All means have higher values than their corresponding medians; which leads to asymmetric return distributions, given by the positive values of the skewness. Kurtosis values (lower than 3) point out platykurtic return distributions for all rolling variances and the Jarque-Bera test of normality shows that the rolling variances are normally distributed. Moreover, the standard deviation of rolling variances has the highest value in the case of EUR return (0.001830), implying that both

the index return, express in RON and exchange rate return variances contributed to a higher volatility of returns in EUR.

Table 2. Descriptive statistics of investment return rolling variance in Romania

	RO_VARRON	RO_VAREUR	RO_VARINDEX
Mean	0.000105	0.002945	0.002569
Median	6.14E-05	0.002488	0.002398
Std. Dev.	8.88E-05	0.001830	0.001588
Skewness	0.953162	0.742080	0.733568
Kurtosis	2.519930	2.594336	2.684304
Jarque-Bera	17.39044	10.65282	10.13469
Probability	0.000167	0.004862	0.006299

Source: Authors' calculations in Eviews

Figure 2 shows the distribution of the three monthly return series between 2011 and 2019 on the left and the boxplots of returns on the right. Both graphs indicate the presence of outliers and extreme values, as well as the higher spread of variances for the euro return, as compared to the Romanian index return and the currency return.

Figure 2. Rolling variance of returns of a euro-based investor from investing in the Romanian stock index, 2011-2019

Source: Authors' representations in Eviews

Figure 3 displays the 12-months rolling variance of the euro investment in Romania, i.e. in the Romanian stock market index. In 2011 the euro investment return variance enjoyed a significant decline in value from 0.0066 to 0.0022 per month, but afterwards the variance sharply increased up to 0.0076 in the following year, reaching the highest value. In 2013 a sudden decline in variance occurred up to 0.0017, since then the rolling variance of the return fluctuated between 0.0007 (the lowest value) and 0.0032 per month during the interval 2014 and mid-2018. At the end of 2018/beginning of 2019 the return variance rose to 0.0048, but in 2019 its tendency was to decrease again.

Figure 3. Rolling variance of euro investment return in Romania stock market index, 2011-2019

Source: Authors' representation in Eviews

Figure 4 shows the variation of changes for the exchange rate of RON against EUR. In 2011 the return variance increased to 0.00032 (maximum value per month) from 0.000258, but in the same year, it dropped drastically up to 0.00016. Between 2012 and beginning of 2013 the value fluctuated between 0.00012 and 0.00030. The most significant decrease happened between mid-2013 and mid-2014, the return variance fell from 0.00030 to 0.000048, but afterwards small changes in value occurred, varying between 0.000048 and 0.000012. At the end of 2018 it reached the lowest value of 0.000011 throughout this period of time.

Figure 4. RONEUR return rolling variance, 2011-2019

Source: Authors' representation in Eviews

Figure 5 presents the rolling variance of returns in RON, accessible for an investor in the Romanian stock market index. In 2011 there was a drop in value from 0.0050 to 0.0017, followed by a sudden increase of 0.0069 in mid-2012, attaining the highest possible value of the entire period. By mid-2013 the variance return declined up to 0.0014, a very low value compared to the previous year. The lowest value of 0.0005 was reached at the end of 2014. From 2014 to the end of 2018 the variance of RON-denominated

returns fluctuated between 0.0007 and 0.0028, but afterwards, at the beginning of 2019 the value rose significantly up to 0.0047 per month. After mid-2019 there was a major decline in value from 0.0044 to 0.0015 and from 2019 it is in constant decrease.

Figure 5. Romanian index return rolling variance, 2011-2019

Source: Authors' representation in Eviews

The correlation between the rolling variances of the Romanian index returns and RON/EUR changes is presented in Figure 6, with a Hodrick-Prescott filter applied in order to point out the trend between 2011 and 2019. Overall, during this period of time the value was below 0, reaching very low values in 2011 (minimum -0.60) and 2017 (-0.53) whereas in 2014 the variance return had the highest value (0.29). There were some exceptions when the value exceeded 0; the end of 2017 and a few months in 2018, but generally, then it had negative values. Since 2019, the variance return has been decreasing constantly. The HP filter applied to the correlation highlights general values under and above 0, but also expresses that these variables are very poorly correlated, mostly negative correlation.

Figure 6. The correlation between rolling variances of Romanian index returns and exchange rate returns, 2011-2019

Source: Authors' representation in Eviews

With respect to the lambda indicator, its values are calculated using Equation 3 and are displayed in Figure 7. Lambda shows the proportion of exchange rate return volatility in the total volatility of a euro-denominated investment return, made on the Romanian stock market. Generally, the contribution of exchange rate volatility to the euro returns was small; the maximum value reached was 0.37 in 2011, but also during mid-2013 and mid-2017 the return was quite high, fluctuating between 0.26 and 0.15. In 2014, the return had negative values (minimum -0.09), but then it increased up to 0.18 after few months. From the end of 2017 and mid-2019, the value returns experienced small fluctuations between 0.003 and 0.008. From 2019 it is in constant growth. The HP filter, observable in Figure 7, shows that lambda varied, as a trend, between 0 and 0.25, showing that currency risk contributed, as an average, with a maximum of 25% to the volatility of a euro-denominated investment in the Romanian index.

Figure 7. Lambda values and the HP filter applied for Romania, 2011-2019

Source: Author's representation in Eviews

It is also interesting to observe the correlation between lambda and currency return - index return rolling volatilities correlation, displayed in Figure 8. As the figure shows, the two variables are not very correlated. From 2011 to 2013 these variables are negatively correlated, this lower correlation between the two leading to a lower contribution of currency risk to the volatility of a euro investment. By 2014 these variables were positively correlated, but it lasted only for several months. After mid-2014 until mid-2017 lambda and index return variance got separated again from each other. At the end of 2017 the variables became connected once again till December 2018, but with an exception in July 2018 when both diverged. From 2019 their tendency is to go in different directions.

Figure 8. Lambda and correlation of currency and index returns rolling variance for Romania, 2011-2019

Source: Authors' representation in Eviews

5. Conclusions

This paper studies the impact of exchange rate volatility to the risk-return profile of international investments on the Romanian stock market, during 1st of January 2011 and 30th of December 2019, from the perspective of a euro-based investor. Simultaneously, we also aim at finding out how the contribution of currency risk is affected by the correlation of currency and the Romanian index returns rolling variance.

Our results show that the euro-based investor experiences gains, but also losses generated by the investment made in Romanian equities between January 2011 and December 2019. With respect to exchange rate returns, RON depreciated against EUR, indicating that the foreign currency decreased in value against euro, causing losses for the investor. Mainly, the Romanian index return mean was higher than euro return, showing that all changes in the value of and RON against EUR have negatively influenced the euro return mean. Moreover, EUR return standard deviation is higher than the standard deviation of RON-denominated returns, suggesting that the exchange rates return contributed to a higher volatility of return in EUR. Comparing the exchange rate volatility with the volatility of the local index market, it is observable that the RON/EUR exchange rate returns have lower standard deviations than the standard deviation of the local index market, which may suggest that the exchange rate volatility is not an additional factor for the volatility of the Romanian stock market, when returns are denominated in euro.

Furthermore, regarding the contribution of currency risk to the total risk of an investment made in Romania by a euro-based investor (calculated as lambda), currency risk contributed, on average, with a maximum of 25% to the volatility of a euro-denominated investment in its index, indicating a small contribution. Last but not least, it is very important to point out that lambda and currency return-index return rolling volatility correlation on the Romanian stock market are mostly uncorrelated, denoting that lower correlation conducts to a weaker contribution of currency risk to the volatility of a euro investment. Finally, our results contrast with other studies' findings on the impact of

currency risk on equity investments, as we saw only a moderate influence of currency fluctuations on international investments made by a euro-based investor on the Romanian stock market. This was the effect of the well managed dirty floating exchange rate regime in Romania, which smoothed out to a large extent the RON volatility against major currencies, and particularly the euro.

6. References

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