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DOMESTIC VS INTERNATIONAL RISK DIVERSIFICATION POSSIBILITIES IN SOUTHEASTERN EUROPEAN STOCK MARKETS

Sinisa Bogdan
Suzana Baresa
Zoran Ivanovic[1]

Abstract
Modern portfolio theory is one of the most important investment decision tools in finances. In 1952 Harry Markowitz set the foundations of the Modern portfolio theory, since than this theory was a backbone of many studies that dealt with investment decisions. This research applies mean-variance portfolio optimization on the international Southeastern Europe and domestic Croatian stock market exchange. Aim of this research is to compare risk diversification possibilities on the Southeastern European capital markets and on the Croatian Capital market. By analyzing nine stock market indices in the Southeastern Europe and twenty stocks from Zagreb Stock Exchange in the period of 36 months, results clearly show that internationally diversified portfolios offer better portfolio risk reduction than domestically diversified portfolios. Lowest achieved risk in international portfolio outperformed lowest achieved risk in domestic portfolio. Since risk is lower, returns are also much lower compared to domestic stock portfolios. Results of this research also report that domestic stock portfolios outperformed international portfolios at the risk level equal or higher than 0,97%, for the same risk, domestic portfolios offer greater returns.

Keywords: Modern portfolio theory, portfolio optimization, stock portfolio, stock market indices, Zagreb stock exchange.

Jel Classification: G11; C61

INTRODUCTION

One of the investment theory assumptions is that investors should diversify their portfolios. This research will try to answer a question if international investing is offering better diversification possibilities to investor than an investing in domestic securities. Different investors in the capital market are driven by different motives of investing.

[1] **Sinisa Bogdan**, PhD, Senior Teaching and Research Assistant; **Suzana Baresa**, PhD, Senior Teaching and Research Assistant; **Zoran Ivanovic**, PhD, Full Professor, University of Rijeka, Croatia.

There are several types of investors who operate on the capital market, they could be divided as: portfolio investors, speculators and arbitrageurs. Portfolio investor represents the type of the investor who selects stocks based on the principle of diversification. The principle of diversification means investing in various securities with the aim of removing their specific risks. Portfolio investor invests in securities over the long term with final aim to gain dividend or capital gain from the stock. Often times individual savers want to became portfolio investors, but they don't have enough funds and they must decide to invest in investment funds which will under the expert guidance of fund managers properly diversify their funding. Speculators buy and sell securities in order to realize capital gains only in the short run. Speculative transactions are characterized by a large and quick profit with high risk. When analyzing securities speculators generally apply technical analysis. Arbitrageurs are capital market participants who equate prices in different markets. "Arbitrageurs play a central role in standard finance. They trade to ensure that if a security has a perfect substitute-a portfolio of other securities that yields the same returns-then the price of the security equals the price of that substitute portfolio" (Shleifer and Summers 1990, 19).

Portfolio management can support two types of investment strategies: active and passive. If investor follows active investing strategy than he will try to achieve profit above the market average. He is much more aggressive than passive investor, and he is continually watching the market. Investors who follow passive strategy are firstly interested in safety during investments. Passive strategy implies not frequent decisions, which are mainly related to investment in stock indices, or reputable companies that have a good financial situation and successful history. In other words, this strategy supports investing in the well-diversified portfolios. Passive investing strategy doesn't try to win market average because it finds that market is efficient enough. The advantage of passive investing over active investing are transaction costs which are greater in active than in passive stock trading. Tinic (1972) in his research highlighted that two basic components of these costs are brokerage commissions including transfer taxes, and liquidity costs.

More than thirty years ago Jorion (1985, 259) concluded that "complete freedom of international capital movements would provide investors with a maximum opportunity for diversification". Today linkages between stock markets are increased, which present a component of regional or international capital market integration Volosovych (2005). This was confirmed also by Stoica, Perry and Mehdian (2015), they claimed that stock markets of Eastern and Western Europe have increasingly become more inter-connected.

Despite stock market integration this research will investigate risk diversification possibilities of passive investing in stock indices in the area of Southeastern Europe. Countries which are involved in this research are: Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Macedonia, Montenegro, Romania, Bulgaria and Greece. After finding risk diversification possibilities in international stock markets, authors will compare international risk diversification possibilities with investing in well diversified domestic stock portfolio from Zagreb Stock Exchange. More about necessary steps in portfolio building find in Ivanovic, Baresa and Bogdan (2013).

1. LITERATURE REVIEW

Founder of Modern portfolio theory is Harry Markowitz (1952) with his research *Portfolio Selection* published in the Journal of Finance, Markowitz emphasized

importance risk diversification and correlation in choosing stocks for portfolio. Later Markowitz (1959) expanded his research in a book-length study. His research become standard framework for studying portfolio optimization.

Authors will here provide an overview of the existing theory and some empirical evidences about application of portfolio optimization and emphasize the importance of international diversification. One of the first papers which highlighted the importance of international portfolio diversification was written by Grubel (1968) and Levy and Sarnat (1970) they have documented significant benefits from diversifying internationally. Later the importance of international portfolio diversification was subject of many studies. Solnik (1995, 89) concluded that "internationally diversified portfolio is likely to carry a much smaller risk than a typical domestic portfolio." Konno and Yamazaki (1991) demonstrated that they can use for portfolio optimization using the L_1 risk, model that leads to linear instead of quadratic program on Tokyo stock market. Bailey and Stulz (1990) considered that American investors must hold foreign stocks so they could reduce the portfolio variance which is consisted of domestic stocks without reducing its expected return. They have proved that U.S. investors should invest in Pacific Basin stocks (they used nine Pacific Basin stock market indices). According to Bailey and Lim (1992, 74) "adding foreign shares to a domestic equity portfolio is, on average, likely to reduce volatility while maintaining a desired ex ante return." These authors agree that "benefits from international diversification have been of increased interest to both investment professionals and academicians." Gilmore, McManus and Tezel (2005) in their research have presented results which indicate that for US investors optimally diversifying into Central European stocks will outperform investing solely in the domestic stock market. Abid et al. (2014) applied mean-variance portfolio optimization approach and stochastic dominance test to examine preferences for international diversification versus domestic diversification. In their research they used closing prices of the 30 highest capitalization US stocks to form domestically diversified portfolios and for internationally diversified portfolios they have used stock market indices from G6 countries. They could not find any domestically diversified portfolio that stochastically dominates all internationally diversified portfolios.

Except these mention papers there are also many other which show the importance of international diversification like: Divecha, Drach and Stefek (1992), and Michaud et al. (1996) and DeFusco et al. (1996).

2. DATA AND METHODOLOGY

This empirical work is based on the weekly prices from the 30/06/2013 to 30/06/2016 of the nine stock market indices of the Southeastern part of Europe and twenty stocks from Zagreb stock exchange. Start year was 2013 because authors find it is a sufficient period for analysis. Authors analyzed closing stock market prices or values of stocks and stock market indices on the sample which was consisted of 157 weeks. Considering that Croatian capital market belongs to emerging markets and the low level of stock liquidity is one of the key problems (see more in: Bogdan, Baresa and Ivanovic 2012; Minovic 2012; Benic and Franic 2009) weekly data were much more acceptable than daily prices. Missing data were replaced by the latest data. Choosing weekly prices, authors avoided missing data during holidays, because the area of Southeastern Europe is a meeting point of Orthodox Christianity, Islam and Roman Catholic Christianity. During data collection

there was only one issue with the Athens stock exchange when it was closed on 27th June 2015 because of the Greek government-debt crisis. It reopened on 3rd August 2015. Data on stock market indices prices were obtained from Bloomberg and official web pages of choosed stock exchange markets. Chosen stock markets indices from Southeastern Europe are: Romania (BET), Montenegro (MONEX), Greece (ASE), Bulgaria (SOFIX), Macedonia (MBI10), Croatia (CROBEX), Serbia (BELEX15), Bosnia and Herzegovina (SASX10) and Slovenia (SBITOP). Croatian stock prices were collected from the official web page of the Zagreb Stock Exchange. The main criterion in the selection of Croatian stocks was their liquidity, twenty stocks were chosen and they all are included in CROBEX. These stocks are: AD Plastik (ADPL-R-A), Adris grupa (ADRS-P-A), Arenaturist (ARNT-R-A), Atlantic Grupa (ATGR-R-A), Atlantska plovidba (ATPL-R-A), Belje (BLJE-R-A), Djuro Djakovic grupa (DDJH-R-A), Dalekovod (DLKV-R-A), Ericsson Nikola Tesla (ERNT-R-A), Hrvatski Telekom (HT-R-A), Ingra (INGR-R-A), Koncar-Elektroindustrija (KOEI-R-A), Kras (KRAS-R-A), Ledo (LEDO-R-A), Luka Ploce (LKPC-R-A), Luka Rijeka (LKRI-R-A), Uljanik Plovidba pomorski promet (ULPL-R-A), Varteks varazdinska tekstilna industrija (VART-R-1), Zagrebacka banka (ZABA-R-A) and Podravka (PODR-R-A). Weekly returns with no dividend yield, were calculated according to the following formula:

$$R_{iw} = \frac{P_{iw} - P_{iw-1}}{P_{iw-1}} \quad (1)$$

R_{iw} = Return of stock or stock index *i* in week *w*
P_{iw} = Price of stock or stock index *i* in week *w*

After calculating weekly returns, the next step was to calculate mean value of returns which will be needed in later calculations. According to the table one it can be noticed that among nine foreign stock markets five stock markets have positive mean return values, Montenegro stock index has mean value of return equal to zero, while Athens stock exchange, Zagreb stock exchange, and Sarajevo stock exchange have negative mean values of return. Volatility (which is measured by standard deviation) of all stock indices is in range 1–2%, except ASE which has volatility 5,31% this is also the highest value of standard deviation among stock indices, lowest volatility has CROBEX 1,05%.

Table 1. Descriptive statistics of stock market indices

	BET	MONEX	ASE	SOFIX	MBI10	CROBEX	BELEX15	SASX10	SBITOP
Min	-5,49%	-4,72%	-20,18%	-5,76%	-4,88%	-3,18%	-5,02%	-3,81%	-4,89%
Max	4,33%	5,34%	16,03%	8,34%	6,78%	2,98%	5,83%	4,11%	5,99%
Volatility	1,87%	1,71%	5,31%	1,82%	1,60%	1,05%	1,63%	1,23%	1,84%
Return	0,12%	0,08%	-0,14%	0,04%	0,00%	-0,05%	0,16%	-0,03%	0,09%

According to the figure 1, in the observed period 30/06/2013–30/06/2016 MONEX started at level of 9.593,89 points, it reached highest peak in 05/08/2015 13.036,16 points after that it declined to the level of 10.459,1 at the end of the observed period. Romanian stock market index BET in the observed period started at the level of 5.277,05 points it reached its highest value 7.603,24 points in 31/07/2015, and later it declined on the level 6.266,14 points at the end of the observed period. Macedonian stock market index MBI10 started at level of 1.710,91 points, it reached highest peak in 30/01/2015 1.874,42 points after that, it declined to the level of 1.711,56 points at the end of the observed

period. Croatian stock market index CROBEX started at level of 1.804,18 points, it reached highest value in 03/10/2014 1.927,23 points after that it declined under the level of 1.653,32 at the end of the observed period. Values of BET and MONEX are shown on the left side of the y axis, while values of MBI10 and CROBEX are shown on the right side of the y axis in the figure 1.

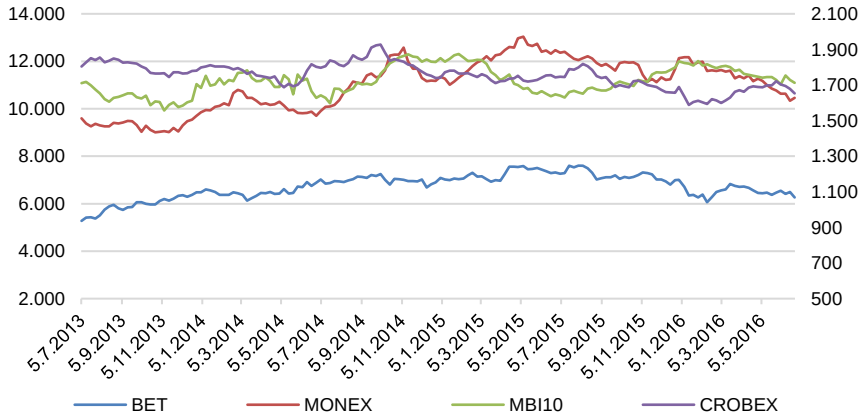

Figure 1. Weekly indices movement: BET, MONEX, MBI10 and CROBEX

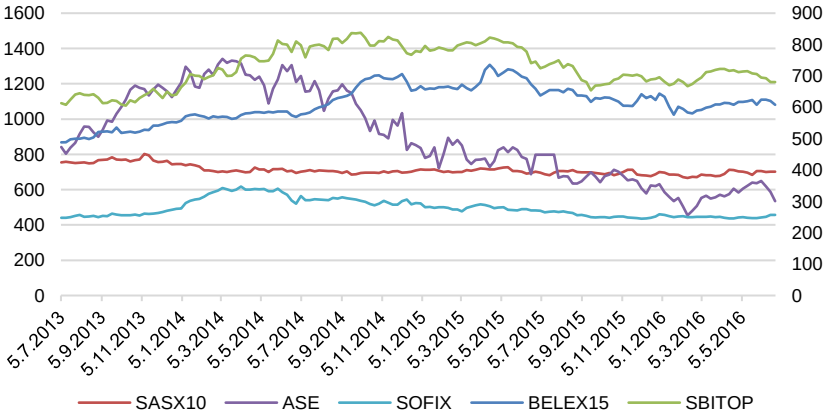

Figure 2. Weekly indices movement: BELEX15, SASX10, SBITOP, ASE and SOFIX

In the Figure 2 most volatile stock index ASE started in the observed period at the level of 840,92 points, it reached peak at 1.341,24 points in 07/03/2014 and after that, bearish trend started with high signs of volatility to the end of observed period. The end value of the observed period was 534,78 points. Slovenian stock market exchange index SBITOP started at level of 612,65 points, it reached highest peak in 03/10/2014 837,76 points after that it declined to the level of 680,92 points at the end of the observed period. Serbian stock market exchange index BELEX15 started at level of 488,3 points, it reached highest peak in 17/04/2015 735,5 points after that it declined to the level of 608,03 points at the end of the observed period. Bulgarian stock market exchange index

SOFIX started at the level of 443 points, it reached highest peak 04/04/2014 617,61 points after that it declined to the level of 456,61 points at the end of the observed period. Bulgarian stock market exchange index SOFIX started at the level of 440,25 points, it reached highest peak 04/04/2014 617,61 points after that it declined to the level of 456,37 points at the end of the observed period. Bosnian stock market exchange index SASX10 started at the level of 755,09 points, it reached highest peak 08/11/2013 802,31 points after that it declined to the level of 702,32 points at the end of the observed period. Values of SASX10, ASE and SOFIX are on the left side of the y axis, while values of SBITOP and BELEX15 are on the right side of the y axis in the figure 1.

After calculating descriptive statistics for stock market indices in the South-East Europe, in the next table is presented descriptive statistics of stocks from Zagreb stock exchange.

Table 2. Descriptive statistics of stock returns

	ADPL-R-A	ADRS-P-A	ARNT-R-A	ATGR-R-A	ATPL-R-A	BLJE-R-A	DDJH-R-A
Min	-9,14%	-13,54%	-12,63%	-5,70%	-15,59%	-14,15%	-48,59%
Max	13,77%	14,15%	16,56%	8,14%	29,02%	17,27%	38,57%
Volatility	3,05%	2,94%	4,17%	1,92%	5,35%	4,18%	8,64%
Return	-0,02%	0,24%	0,62%	0,21%	-0,43%	-0,75%	0,00%
	DLKV-R-A	ERNT-R-A	HT-R-A	INGR-R-A	KOEI-R-A	KRAS-R-A	LEDO-R-A
Min	-22,22%	-16,13%	-7,52%	-10,82%	-5,37%	-8,74%	-4,08%
Max	25,95%	8,49%	8,48%	21,40%	6,55%	9,68%	9,30%
Volatility	6,31%	2,65%	2,02%	5,22%	2,02%	2,59%	1,63%
Return	-0,18%	-0,21%	-0,13%	-0,01%	-0,03%	0,16%	0,14%
	LKPC-R-A	LKRI-R-A	ULPL-R-A	VART-R-1	ZABA-R-A	PODR-R-A	
Min	-6,92%	-18,66%	-15,29%	-11,00%	-5,16%	0,00%	
Max	18,96%	22,61%	34,61%	12,03%	7,35%	0,00%	
Volatility	3,17%	4,18%	3,58%	7,19%	3,67%	2,30%	
Return	0,08%	-0,56%	-0,27%	0,18%	0,26%	0,24%	

According to the table two in the sample of the 20 presented stocks, 10 of them have negative mean returns in the observed period, while nine of them have positive mean returns. One stock DDJH-R-A has 0% mean return in the observed period. Three stocks with the highest volatility are: DDJH-R-A 8,64%, VART-R-1 7,19% and DLKV-R-A 6,31%. Three stocks with lowest volatility are KOEI-R-A 2,02%, ATGR-R-A 1,92% and LEDO-R-A 1,63%.

3. EMPIRICAL RESULTS

After presenting data, very important was to present relations among indices and stocks from Zagreb Stock Exchange. Correlation has a significant effect on the risk in the stock portfolio. In order to reduce risk, it is always better to have uncorrelated stocks in portfolio. Correlation coefficients can range from +1,00 to –1,00. If correlation coefficient is +1,00 that means, two stocks are moving together in the same direction. If investor combines stocks that move together in the same direction he won't diversify risk. On the other side, if correlation coefficient is -1,00 it means that prices of two stocks are moving opposite to each other. Therefore, if investor wants to diversify his portfolio risk, he has to invest in securities that have negative correlation, zero correlation or low

positive correlation. In the next table is presented correlation matrix of the international stock indices in the Southeastern Europe.

Table 3. Correlation matrix of stock indices returns

	BET	*MONEX*	*ASE*	*SOFIX*	*MBI10*	*CROBEX*	*BELEX15*	*SASX10*	*SBITOP*
BET	1,00								
MONEX	0,03	1,00							
ASE	0,32	0,05	1,00						
SOFIX	0,15	0,16	0,12	1,00					
MBI10	0,08	0,16	-0,03	0,21	1,00				
CROBEX	0,33	0,07	0,16	-0,03	-0,03	1,00			
BELEX15	0,27	0,18	0,11	0,17	0,18	0,15	1,00		
SASX10	0,04	0,14	0,03	0,09	-0,08	-0,01	-0,08	1,00	
SBITOP	0,31	0,04	0,12	0,21	0,11	0,28	0,30	0,01	1,00

According to the table 3 highest correlation have: CROBEX and BET 0,33; ASE and BET 0,32; SBITOP and BET 0,31. Lowest correlation coefficient have SASX10 and MBI10 -0,08; SASX10 and BELEX15 -0,08 and CROBEX and SOFIX -0,03. Most of the correlation coefficients among international stock indices are low positive, and some are negative which makes them ideal for building a diversified portfolio. Table 4 presents correlation coefficients among stocks from the Zagreb Stock Exchange.

Table 4. Correlation matrix of stocks return from Zagreb stock exchange

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*
1	1,00																			
2	0,03	1,00																		
3	0,00	0,11	1,00																	
4	0,08	0,16	0,16	1,00																
5	0,06	0,26	0,13	0,13	1,00															
6	-0,11	0,20	0,18	0,12	0,08	1,00														
7	0,04	0,02	-0,07	0,17	0,08	0,04	1,00													
8	-0,06	-0,05	0,00	0,18	0,05	0,25	-0,02	1,00												
9	0,05	0,18	-0,01	0,13	0,12	0,18	0,06	0,18	1,00											
10	0,12	0,23	0,06	0,17	0,13	0,10	0,04	0,00	0,14	1,00										
11	0,02	0,00	0,12	0,08	-0,05	0,10	-0,10	0,32	0,05	0,20	1,00									
12	0,13	0,19	0,08	0,04	0,10	0,03	-0,05	-0,12	0,11	0,13	0,02	1,00								
13	0,10	-0,05	0,09	0,00	-0,04	0,01	0,12	0,03	0,09	0,12	0,15	-0,01	1,00							
14	0,15	0,21	0,03	0,26	0,19	0,02	0,08	0,08	0,19	0,18	0,11	0,15	-0,04	1,00						
15	0,09	0,13	0,15	0,11	0,06	0,11	0,04	0,06	0,02	0,06	0,05	0,12	-0,09	0,02	1,00					
16	0,15	0,01	0,02	0,10	0,11	-0,10	-0,02	0,03	0,17	0,14	0,21	0,09	0,07	0,11	0,08	1,00				
17	0,08	0,23	0,09	0,16	0,37	0,10	0,10	0,17	0,24	0,14	0,07	-0,05	0,06	0,12	0,09	0,03	1,00			
18	-0,01	0,22	-0,12	0,11	0,28	0,01	0,07	0,10	0,13	0,04	-0,05	-0,02	-0,11	0,18	-0,04	0,18	0,08	1,00		
19	0,08	0,17	0,08	0,06	0,10	0,16	-0,09	0,03	0,08	0,15	0,06	0,08	-0,08	0,14	0,03	0,03	0,13	0,02	1,00	
20	0,11	0,09	0,20	0,18	0,01	0,06	0,00	0,03	0,13	0,15	0,13	0,26	0,01	0,14	0,07	-0,02	0,05	0,10	-0,05	1,00

Note: 1=ADPL-R-A, 2=ADRS-P-A, 3=ARNT-R-A, 4=ATGR-R-A, 5=ATPL-R-A, 6=BLJE-R-A, 7=DDJH-R-A, 8=DLKV-R-A, 9=ERNT-R-A, 10=HT-R-A, 11=INGR-R-A, 12=KOEI-R-A, 13=KRAS-R-A, 14=LEDO-R-A,15=LKPC-R-A, 16=LKRI-R-A, 17=ULPL-R-A, 18=VART-R-1, 19=ZABA-R-A, 20=PODR-R-A.

According to the table 4, there are 28 negative correlation coefficients, 75 coefficients range from 0 to 0,1; 71 coefficients range from 0,1 to 0,2; 14 coefficients range from 0,2 to 0,3 and only 2 coefficients range from 0,3 to 0,4. According to the statistics it can be concluded that there are good risk diversification possibilities among stocks from Zagreb

Stock Exchange. After calculating correlation coefficients first step was to calculate return and risk of the portfolio with equal shares of foreign stock indices or with equal shares of domestic stocks. Portfolio rate of return [$E(r_p)$] was calculated as a weighted average of expected returns of securities in the portfolio, the weights (w_i) are shares of securities in the portfolio. In continuation is the formula of the portfolio expected return:

$$E(r_p) = w_i E(r_i) + w_j E(r_j) \dots \dots \dots \dots w_n E(r_n) \quad (1)$$

or simplified

$$E(r_p) = \sum_{i=1}^{n} w_i E(R_i) \quad (2)$$

After calculating portfolio return the next step was to calculate the portfolio risk. General formula for the variance of the return rate which is consisted of *n* stocks:

$$\sigma_p^2 = \sum_{i=1}^{n} w_i^2 \sigma_i^2 + 2 \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} w_i w_j Cov\,(R_i, R_j) \quad (3)$$

$Cov(R_i,R_j)$ presents covariance between the rate of return of the *i* and the *j* security, *w* presents weight of the stock. In all portfolios worth that every stock participates in portfolio under the condition:

$$\sum_{i=1}^{n} w_i = 1 \quad (4)$$

Short selling was not allowed, so all shares were positive sizes, as it follows:

$$w_i \geq 0 \quad (5)$$

After calculating return and risk, optimal portfolios were calculated first for foreign stock market indices and then for domestic market.

Table 5. Optimal foreign portfolios

	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8	FP9
				Portfolio shares (%)					
BET	0,00	23,39	20,87	17,74	14,63	11,21	7,78	4,36	2,64%
MONEX	0,00	15,05	22,81	19,87	16,78	13,98	11,18	8,39	6,98%
ASE	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00%
SOFIX	0,00	0,00	3,63	4,50	4,84	5,21	5,59	5,98	6,16%
MBI10	0,00	0,00	0,00	2,73	6,82	8,66	10,50	12,34	13,27%
CROBEX	0,00	0,00	0,00	0,00	1,61	9,67	17,71	25,78	29,78%
BELEX15	100,00	61,56	41,67	34,92	28,61	23,86	19,11	14,36	11,99%
SASX10	0,00	0,00	2,13	11,43	18,48	20,83	23,19	25,53	26,72%
SBITOP	0,00	0,00	8,90	8,81	8,24	6,59	4,93	3,27	2,45%
Σwi	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
$E(r_p)$	0,16%	0,14%	0,12%	0,10%	0,08%	0,06%	0,04%	0,02%	0,01%
σ_p	1,63%	1,27%	1,09%	0,97%	0,87%	0,78%	0,71%	0,67%	0,65%

In the table 5 there are nine presented foreign portfolios of stock indices. Authors have calculated 15 portfolios and they are shown in the Figure 1. First foreign portfolio (FP1) present portfolio with maximum return 0,16%. According to this portfolio investor should invest all the money into BELEX15. This portfolio has also the highest risk σ_p= 1,63%. In the second foreign portfolio (FP2) weight of BELEX15 is reducing on 61,56%, but weights of MONEX 15,05% and BET 23,39% are growing. FP2 has return E(r_p) 0,14% and estimated risk σ_p 1,63%. Portfolio with lowest volatility is foreign portfolio number nine (FP9). This portfolio has return 0,01% and risk 0,65%. The constraint in FP9 was: the return must be greater than 0%. In this portfolio the largest weights have CROBEX 29,78%, SASX10 26,72%, and MBI10 13,27%. Other weights are: BELEX15 11,99%, MONEX 6,98%, SOFIX 6,16%, SBITOP 2,45% and BET 2,64%.

Table 6. Optimal domestic portfolios from ZSE

	DP1	DP2	DP3	DP4	DP5	DP6	DP7
	Portfolio shares (%)						
ADPL-R-A	0,00	0,00	0,00	0,00	0,00	2,40	2,92
ADRS-P-A	0,00	4,81	8,80	8,63	5,89	1,86	0,31
ARNT-R-A	100,00	73,67	48,31	26,39	7,93	1,73	0,48
ATGR-R-A	0,00	0,00	9,74	16,92	16,95	13,92	12,33
ATPL-R-A	0,00	0,00	0,00	0,00	0,00	0,00	0,00
BLJE-R-A	0,00	0,00	0,00	0,00	0,00	0,00	2,04
DDJH-R-A	0,00	0,00	0,00	0,00	0,00	0,00	0,00
DLKV-R-A	0,00	0,00	0,00	0,00	0,00	0,63	0,53
ERNT-R-A	0,00	0,00	0,00	0,00	0,00	2,07	2,89
HT-R-A	0,00	0,00	0,00	0,00	0,00	6,30	8,46
INGR-R-A	0,00	0,00	0,00	0,00	0,00	0,00	0,00
KOEI-R-A	0,00	0,00	0,00	0,00	0,01	12,40	13,95
KRAS-R-A	0,00	0,00	1,56	11,00	16,79	15,14	14,01
LEDO-R-A	0,00	0,00	0,00	6,82	24,11	22,72	21,67
LKPC-R-A	0,00	0,00	0,00	0,00	4,69	6,68	6,41
LKRI-R-A	0,00	0,00	0,00	0,00	0,00	0,00	1,01
ULPL-R-A	0,00	0,00	0,00	0,00	0,00	0,20	1,47
VART-R-1	0,00	4,44	3,24	2,07	0,86	0,77	0,63
ZABA-R-A	0,00	9,41	11,09	10,07	7,55	4,76	3,71
PODR-R-A	0,00	7,67	17,26	18,10	15,23	8,43	7,19
Σwi	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
E(rp)	0,62%	0,52%	0,42%	0,32%	0,22%	0,12%	0,07%
σp	4,17%	3,16%	2,29%	1,56%	1,10%	0,97%	0,96%

In the table 6 there are seven presented domestic portfolios of stocks from Zagreb Stock Exchange. Authors have calculated total of 28 portfolios and they are shown in the Figure 3. First domestic portfolio (DP1) present portfolio with the maximum return 0,62%. According to this portfolio investor should invest all the money into stock ARNT-R-A. This portfolio has also the highest risk σ_p= 4,17%. In the second domestic portfolio (DP2) weight of ARNT-R-A is reducing on 73,67%, but weights of ADRS-P-A 4,81%, VART-R-1 4,44%, ZABA-R-A 9,41% and PODR-R-A 7,67% are rising. DP2 has return E(r_p) 0,52% and estimated risk σ_p 3,16%. Portfolio with the lowest volatility is portfolio number seven (DP7). This portfolio has the lowest achieved volatility 0,96% and return 0,07%. This portfolio consists of assets with the following weights: LEDO-R-A 21,67%, KRAS-R-A 14,01%, KOEI-R-A 13,95, ATGR-R-A 12,33, HT-R-A 8,46%, PODR-R-A 7,19%, LKPC-R-A 6,41%, ZABA-R-A 3,71%, ADPL-R-A 2,92%,

ERNT-R-A 2,89%, BLJE-R-A 2,04%, ULPL-R-A 1,47%, LKRI-R-A 1,01%, VART-R-1 0,63%, DLKV-R-A 0,53%, ARNT-R-A 0,48% and ADRS-P-A 0,31%. All calculated domestic and foreign optimal portfolios are shown in the Figure 3, where the diversification effect is clearly visible.

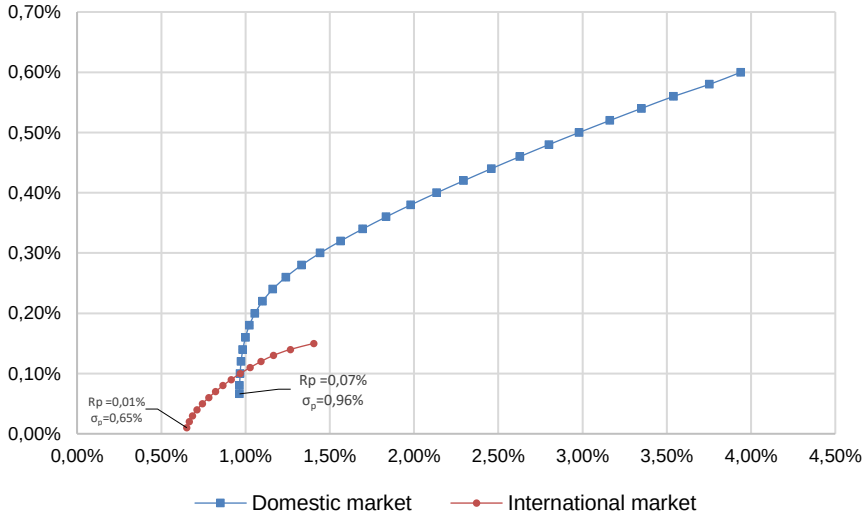

Figure 3. Efficient frontiers of domestic and international diversified stock portfolios

Figure 3 illustrates and compares efficient frontiers of domestic and foreign stock market. "Rational investor wants to hold diversified portfolios in order to limit risks, so choosing a properly balanced portfolio is an important issue for any investor" (Brigham and Houston, 2009, 5). On this figure x axis represent risk (standard deviation) and y axis represent return. After comparing both efficient frontiers authors concluded that efficient frontier which represents domestic portfolios has better opportunities for earnings, although it has larger risk. Efficient frontier that represents foreign portfolios has lower returns, but also much lower risk. All foreign portfolios on the efficient frontier which have larger risk than 0,97% are considered inefficient, because on the domestic market is possible to find portfolio with the same risk but with larger return. According to this research authors have concluded that internationally diversified portfolios offers better possibility for risk diversification to a certain level of risk.

CONCLUSION

International investing across global financial markets can greatly reduce diversification than investing in a single country. There are a number of advantages and disadvantages of investing in the international financial markets. Some of the benefits of such investments are greater possibilities to choose assets from which investor can construct the portfolio. Investors can benefit from exchange rate and they have broader credit base if they invest in the foreign capital markets. From the other side there are also some disadvantages like: restrictions on the flow of capital between countries, political risk,

different laws, it is also very important to notice that foreign investing brings some risks of its own, most notably "exchange rate risk," which is the danger that exchange rate shifts in wrong direction for investor.

In order to prove that international diversification outperforms domestic diversification in this paper there are compared two sets of optimal portfolios using the Markowitz Modern portfolio theory, one with international stock market indices from Southeastern Europe stock markets and one with domestic stocks from Zagreb stocks Exchange. Ongoing global financial and economic crisis certainly left circumstances on the stock markets in Southeastern Europe, this can be clearly seen from the charts or from the mean returns. Five of nine stock market indices have achieved positive returns (BET, MONEX, SOFIX, BELEX15 and SBITOP), but they are low, highest return has stock index from Serbian stock exchange BELEX16: 0,16%. Stock index MBI10 has achieved mean return 0% and three stock indices have negative return values (ASE, CROBEX and SASX10) for the observed period 30/06/2013–30/06/2016. In the same time period on the domestic Zagreb Stock Exchange market there is analyzed sample of 20 stocks, 9 stocks have positive mean value of return, one stock has mean value of return equal to 0% and 10 stocks have negative mean values of returns. After calculating correlation coefficients, it was concluded that on the domestic and on the international stock market exist diversification possibilities, because the most of the correlation coefficients were low positive or negative. Based on this data optimal portfolios were calculated both on international and domestic stock market. Research results suggest that investors who are willing to accept a higher risk level and higher return possibilities should follow domestic diversification strategy and vice versa, those who are willing to accept lower risk level and lower return possibilities should follow international diversification strategy. Better risk diversification possibilities can be achieved on the international stock market. Portfolio with the lowest volatility on international stock market had return 0,01% and risk 0,65%. As it can be seen in the figure 3 domestic portfolio outperformed international when the risk is equal or higher than 0,97% at the same risk domestic portfolios have larger returns. There are no domestic portfolios on the risk level lower than 0,97%. This can support the statement that international risk diversification is better than domestic. Risk avoiders will rather choose international than domestic diversification.

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