CROATIAN AND SLOVENIAN MUTUAL FUNDS AND BOSNIAN INVESTMENTS FUNDS[1]

Boris Podobnik, Faculty of Civil Engineering, University of Rijeka, Rijeka, and Zagreb School of Economics and Management, Zagreb, Croatia

Vanco Balen, Department of Mathematics, University of Zagreb, Zagreb, Croatia

Timotej Jagric[2], Department of Quantitative Economic Analysis, Faculty of Economics and Business, University of Maribor, Maribor, Slovenia

Marko Kolanovic, Bear, Stearns & Co. Inc., Equity Derivatives Strategy, New York

Abstract:

The paper provides a stock market performance analysis for three European emerging stock markets: Croatia, Slovenia, and Bosnia and Herzegovina. Using monthly observations we perform a detailed study of the performance of Croatian and Slovenian mutual funds and Bosnian investment funds. The risk/return measures of funds are assessed using the Sharpe ratio, Treynor ratio, Information ratio, Jensen's alpha, and Appraisal ratio. Furthermore, we analyze the timing ability of the funds. Descriptive statistics for the returns are given and different statistic tests are calculated in order to test OLS assumptions in the data. The results are also estimated by applying bootstrap method.

Keywords: stock market, mutual fund, investment fund, risk/return measures

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[1] Any errors in the paper are the authors'. Views expressed belong to the authors and do not reflect those of the above institutions.

[2] Corresponding author: Timotej Jagric, Department for Quantitative Economic Analysis, Faculty of Economics and Business, University of Maribor, Razlagova 14, 2000 Maribor, Slovenia, Tel.:+386 2 22 90 343, Fax.: +386 2 25 16 141, E-mail: timotej.jagric@uni-mb.si.

1. INTRODUCTION

Over the last few years, the mutual fund industry in transition economies has exploded. In the process of promotion mutual funds industry Slovenia and Croatia are in the forefront among transition economies, while on the other hand, the Bosnian market is still in its infancy. This paper studies the mutual fund industry in these countries in the first years of its development, i.e. in the period which is characterized by important flows to mutual funds. This period is interesting, since this is the period when some of the stock market seems not to be efficient (Podobnik et al. 2006, Jagric et al. 2005).

The mutual fund industry is among the most successful recent innovations. It is larger in countries with stronger rules, laws, regulations, and specifically where mutual fund investors' rights are better protected. The industry is also larger in countries with wealthier and more educated population, where the industry is older, trading costs are lower and in which defined contribution pension plans are more prevalent (Khorana et al. 2005). We think that the trends in Slovenian, Croatian, and Bosnian mutual fund industry reflect these findings.

Most research on mutual fund industry has been performed on US mutual funds. Recently there have been some studies of non-US mutual funds. In 2002 Otten and Bams performed cross-country analysis of European funds which includes Germany, France, Italy, the UK, Spain, and the Netherlands.

In the paper we evaluate the performance of mutual funds in Slovenia and Croatia, and investment funds in Bosnia and Herzegovina. We rank the funds on the basis of different parameters, which give us the opportunity to gain some additional insight into the properties of financial markets in transition economies. In order to provide robust results, we also apply

a bootstrap method and some additional statistical test of the properties of the observed data. To emphasize the financial perspective of South-East Europe, we also analyze returns of major financial indices in Croatia (CRO), Bosnia and Herzegovina (BiH), Slovenia (SLO), Serbia and Montenegro (S&M), Bulgaria (BULG), and Macedonia (MAC), and show that the financial equity market for the whole region in the recent years exhibited strong performance

This paper is organized as follows. In section two we introduce the performance measures used in evaluation of funds: the Sharpe ratio (1994), the Treynor ratio (1966), the Information ratio, the Jensen's alpha (1968), the Appraisal ratio (Treynor and Ficher, 1973), and the Treynor-Mazuy (1966) timing measure. In section three we briefly explain the data. In section four we calculate and discuss the performance measures of Croatian mutual funds, Bosnian investment funds and Slovenian mutual funds. Finally, the concluding remarks are given in section five.

2. RISK – RETURN STATISTICS

To evaluate performance of an investment, following Markowitz return – risk paradigm, one must always consider investment's return in conjecture with the performance risk as measured by standard deviation of returns (assuming the normality distribution). Capital Asset Pricing Model (CAPM) states that return on an investment *i* should be a linear function of the systematic or market risk (beta) and return premium over the market:

$$R_{i,t} = R_{f,t} + \alpha_i + \beta_i (R_{m,t} - R_{f,t}) + \varepsilon_{i,t} \qquad (1)$$

Here R_m is the market return, R_f risk free return, R_i return on fund i and t represents the time when the observations occur. $\varepsilon_{i,t}$ is a stochastic fund specific return, and β determines the level of fund's market exposure. By definition, for a risk-free investment beta is zero.

The constant term in the above regression, so called Jensen's α, indicates whether the portfolio manager is superior ($\alpha > 0$) or inferior ($\alpha < 0$) in stock selection compared to the market. In Jensen's paper (1968) this measure indicates the difference between fund's actual return and expected return the manager would earn if the money has passively invested at the same risk level of the market index. To further quantify manager's ability to predict market moves, Treynor and Mazuy (1966) added a quadratic term in CAPM model

$$R_{i,t} = R_{f,t} + \alpha_i + \beta_i (R_{m,t} - R_{f,t}) + \gamma_i (R_{m,t} - R_{f,t})^2 + \varepsilon_{i,t} \qquad (2)$$

From estimates of the above parameters one may distinguish between selection and timing ability. If alpha is positive and significantly different than zero, one identifies selection ability. The Treynor-Mazuy coefficient γ shows a manager's timing ability to shift funds into high beta stocks when the market is going to go up and to shift into low beta stocks when the market is going to go down.

Keeping in mind Markowitz return-variance paradigm, Sharpe found how two statistical measures (mean and standard deviation of return) can be replaced with just one, later called the Sharpe ratio. The Sharpe ratio is calculated by dividing the premium (excess) return by the standard deviation (total risk) of the return:

$$S_h = \frac{\overline{R} - R_f}{\sigma} \qquad (3)$$

where $\overline{R}$ is the average value of the return.

The advantage of using the Sharpe ratio for evaluation of fund performance is that it does not refer to any particular benchmark.

From equation 1, one easily derives the relation $\sigma^2 = \beta^2\sigma_M^2 + \sigma_e^2$ between the total risk, the systematic (market) risk, $\beta^2\sigma_M^2$, and unsystematic risk, σ_e^2, where the latter can be reduced or even eliminated through the proper diversification of the fund. The β coefficient is a very useful measure for an investor who holds multiple investments on the same market. This is because the unsystematic risk can be reduced by diversifying fund, but the systematic risk cannot be diversified away. Bearing this in mind, the Treynor ratio of a fund is defined by its premium return divided by its β

$$T_h = \frac{\overline{R} - R_f}{\beta} \tag{4}$$

By combining the Treynor ratio and the Sharpe ratio an investor can have a good picture of the fund performance. If a fund is not fully diversified, the Sharpe ratio could be low, but the Treynor ratio can be high.

Generally, one can define Sharpe ratio for a fund relative to any benchmark, not only risk-free rate. For the active return defined as difference between the fund's return and the benchmark return, the mean divided by its standard deviation is called the Information ratio.

The Appraisal Ratio is a transformation of the Jensen's alpha (see Treynor and Ficher, 1973), defined to adjust the Jensen's alpha for the unsystematic risk σ_e through the equation:

$$AR_h = \frac{\alpha}{\sigma_e} \tag{5}$$

For funds with low Appraisal ratio, investors pay a higher price (in terms of risk) for fund's market outperformance (alpha).

3. THE DATA

The data set includes the time series of mayor financial indices for the six transition South-East economies: Croatia, Slovenia, Bosnia and Herzegovina, Serbia and Montenegro, Macedonia, and Bulgaria. According to empirical analysis performed by Sirri and Tuffano (1998), investors are more inclined to make their investment decisions based on fund's return as opposed to fund's risk adjusted return. Table 1 reports annualized returns calculated as percentage rates for the following financial indices: CROBEX (Croatia), SBI20 (Slovenia), BELEX20 (Serbia & Montenegro), SOFIX (Bulgaria), MBI-10 (Macedonia). Since Bosnian market index is still not available, as a representative for a Bosnian capital market, in Table 1 we report Bosnian Investments Funds Index (BIFX). One can notice that for some years, annual returns exceeded 100% in countries such as Macedonia, Bosnia and Herzegovina and Bulgaria. These types of returns are unseen in developed markets and economies.

<TABLE 1 ABOUT HERE>

We also use data for mutual funds in Croatia and Slovenia, and data for Bosnian privatization investment funds (PIFs). Funds selected for the analysis are presented in Table 2. Selection was based on the number of observations and the importance of funds on the observed market. The mutual funds started at different points in time, but all are present at the end of the period. The returns, $R_{i,t}$ are defined for each fund i as $R_{i,t} = \ln(S_{i,t} / S_{i,t-1})$, where $S_{i,t}$ is the month-end performance of fund i at month t. As a risk-free rate benchmark, we use three-month Treasury bill issued by national banks in selected countries. We believe that it could be more appropriate to apply one-month Treasury bill or any other asset with even shorter period to expire, however it was not possible to select such asset in the case of the observed markets. We think that like in the case of developed countries, where the returns of three-month Treasury bill can be considered as a good proxy of risk-free rate, also in the selected countries the returns reflect a true risk-free rate.

<TABLE 2 ABOUT HERE>

As we outlined in the introduction, the selection of stock markets is also based on the differences in the presence of long memory. Additionally to the already mentioned references in the introduction, we performed a robust test of long memory. According to Lo and MacKinlay (1988) it is necessary to examine the variance ratio tests for several selected values of q and the random walk hypothesis is rejected if the test statistics are rejected for all q values. From Appendix 1 and 2 we see that for all Croatian funds and Bosnian PIFs random walk hypothesis can not be rejected. In contrast to these results, we can reject random walk hypothesis for all Slovenian funds.

Since, the models are estimated with standard least square method, we also performed statistical test for the departure of classical assumptions of the selected method (see Appendix

1, 2, and 3). In some cases the data does not support all of the classical assumptions, however the applied bootstrap method confirms the robustness of the results. This technique is also applied due to the fact that we had low number of observations in some cases.

4. RESULTS AND DISCUSSION

4.1 Croatian mutual funds

Croatian financial market might be interesting as an example of one of successful emerging markets in the Central and South-East Europe. Particularly, Croatian market has a chance to become equally successful as the neighboring Slovenian market was in the last decade (Jagric et al., 2004; Jagric et al., 2005). In 1999 The Wall Street Journal Europe put the Slovenian mutual fund Galileo (size of 100 million €) at the top among open-end funds in the region. In 2003 the U.S. Lipper company under the request of the same journal put Galileo at the top of the list of 15 most successful open investment funds in the world. However, the performance of the Slovenian funds in last two years has changed as we will show later in our analysis.

In the last two years, as a result both of EU accession efforts and accumulated investment reports, Croatian equity market having two stock exchange markets exhibited upward trend. Equity market capitalization has doubled in case of the Zagreb Stock Exchange (ZSE) and in case of the Varazdin Stock Exchange (VSE) it has increased by four times. The market capitalization of all the companies listed on the Zagreb Stock Exchange is equal to 23 billion € that should be compared with the Prague Stock Exchange with 50 billion € and the Ljubljana Stock Exchange with 15 billion € (EFAMA, 2006). One of strategic goals for the Croatian financial system is to adjust its rules and regulation to those of EU. This would encourage foreign investors to enter this market and attract more foreign capital.

Aside from Greece, investing in mutual funds is not widespread in the countries of South-East Europe. Only recently has interest in mutual funds begun to grow. Reasons for this increasing attention are to be found in both positive trends in the security market and the low interest rates applied by banks to saving deposits. The gradual transfer of some deposits to mutual funds can be also expected.

The Croatian mutual fund market emerged with four funds in the period 1999/2000. Similar as in Slovenia, over the past 5 years, Croatian market witnessed a strong growth of mutual fund industry, with roughly nine funds launched each year. During the same time period, total institutional assets grew from 2.56 billion € to 37.53 billion €. The average annual growth of assets was 17%. Assets of pension and investment funds experienced the highest average annual return (96% and 127%). For the period 2000-2005, total retail investment in mutual funds grew by HRK 2.6 billion. Retail market share increased to 39%. A visible flow of asset from money market instruments to investment funds was a result of several factors: low interest rates, education of retail investors, enhancement of general investment culture, development of private banking, increase in number of investment funds with various investment policies, introduction of structured products to the market. During the last five years, all larger banks launched at least one fund for most popular investment styles (equity, balanced, fixed income, money market). The increase in total assets is continuously accelerating, so in 2005 mutual funds grew by more than 533.33 million € or more than 85% compared to year 2004 (Croatian National Bank, 2006).

Despite increased investment in Croatian mutual funds, Croatia has significantly lower average amount of investment in mutual funds per capita (222 EUR in 2004) compared to New Europe countries (Poland, Hungary, Czech Republic, Slovakia, Slovenia), where the

same amount per capita is 365 EUR. For further comparison, by the end of the year 1995, the capital invested in mutual funds in the U.S. was $10,933 per capita, while in Germany it was $2,143 (Krahnen et al., 2006).

In the performance evaluation process, we start by estimating CAPM (equation 1) parameters for fourteen Croatian mutual funds for the period from 1 January 2004 to 31 December 2005. Parameters are estimated by OLS – the standard method of linear regression. Table 3 shows risk and return statistics for 14 Croatian mutual funds and CROBEX index. In particular, we show the average monthly return (μ), total risk (σ_D), unsystematic risk (σ_e), skewness (S), kurtosis (K), systematic risk (β), the 95 % bootstrapping confidence interval (left side (β^-), right side (β^+) and the mean value ($\overline{\beta}$) of the interval), and the R^2 for the regression. We see that, if only return is considered, for the last two years only KD Victoria and JIE Ilirika outperformed CROBEX (KD Victoria having an average monthly log-return of 2.3% and JIE Ilirika 2.5%). KD Victoria and JIE Ilirika are also the riskiest among all the funds, which is reflected by the highest standard deviations. KD Victoria, JIE Ilirika, RBA Central Europe, RBA Balanced, and FIMA Equity have shown practically the same average return, but total risk of each one of them is substantially lower than total risk of the CROBEX index. Eight funds exhibit negative skewness, and RBA Bl, Ilirika JIE and Fima Eq exhibit kurtosis grater than 6.

<TABLE 3 ABOUT HERE>

The values for R^2 statistics calculated between 0.103 and 0.822 indicate that CROBEX index does not fully explain the mutual fund returns. The beta of these funds is typically less than 0.7. This is due to fact that the funds invest across asset classes – stocks, bonds and cash

(bond part of the portfolio typically reduces the risk and return). Equity exposure of funds is not limited to domestic securities only.

In order to investigate potential market timing ability, next we analyze the timing coefficients in the Treynor-Mazuy model. The analysis reported in Table 3 shows that only 3 of the 14 timing coefficients γ are positive, where only one of them significant at the 5% level (Ilirika JIE). We note that the funds with positive γ values (RBA Balanced, Ilirika JIE and FIMA Equity) also had the largest average returns. On the other hand, negative γ values calculated for the other 11 funds imply perverse timing since the managers in those funds increase exposure to the market when the market performs badly and decrease exposure in good market. Generally, the managers on Croatian market are not able to correctly predict market performance. Cumby and Glen (1990) reported the same result by analyzing international mutual funds, where evidence of no timing ability or perverse timing ability was found.

<TABLE 4 ABOUT HERE>

Table 4 contains the results obtained for Sharpe ratio, Traynor ratio, Information ratio IR, Jensen's α, and Appraisal ratio AR. The funds are ranked according to the Sharpe rule which states that in assessing between two funds we have to choose the fund with the higher Sharpe ratio. The Sharpe ratio for mutual funds is typically between 0.5 and 3. Rule of a thumb is that if the annualized Sharpe ratio is over 1.0, the fund had a 'pretty good' year. Outstanding funds have Sharpe ratio over 2.0. From this point of view, RBA Central Europe fund might be characterized as outstanding, while JIE Ilirika, KD Victoria, RBA Balanced, FIMA Equity, ZB Euroaktiv, and ST Balanced might be characterized as 'pretty good'. As far as Sharpe ratio is considered, those 7 funds have superior performance over its benchmark. We find that rankings obtained by Sharpe and Treynor rules are not the same, implying that funds are not

well diversified. However, we also note that two funds with the largest Sharpe ratio also exhibit the largest values for Treynor and Appraisal ratio.

From Table 4 we find that 11 of the 14 Jensen's α are positive implying that the overall fund performance is superior to the market index, CROBEX. Of these 11 positive estimates, only one is significant at the 5% level (RBA Central Europe). As a comparison, Ippolito (1989) by analyzing 143 US mutual funds showed that 127 out of 143 funds had alphas equal to zero, 12 had positive alphas and only 4 had negative alphas.

In order to test the robustness of the results above, we additionally perform some standard statistical test. In Appendix 1 we report the Jarque-Bera statistic (JB) to test normality, Ljung-Box statistic employed to identify correlations in errors, White test for heteroscedasticity in errors, the Dickey-Fuller test (DF) for stationarity, and Variance-ratio test widely used to conclude about the random walk hypothesis. According to Grinblatt & Titman (1994) the Jensen measure is biased if the fund and benchmark returns are nor jointly normal or are non-linear. In Appendix 1 we show that only for Ilirika JIE and RBA Bl normality can be rejected. Note that these two funds are also characterized with the largest kurtosis. Apart from two funds, the Ljung-Box test can not reject the hypothesis of independence in the residual series. Applying the DF test from Appendix 1 we conclude that in all cases we cannot reject stationarity. Applying the White test, we conclude that heteroscedasticity is present only in RBA Bl fund. According to Lo and MacKinley (1998) the random walk hypothesis can be rejected if the Variance-ratio test statistics are rejected for all analyzed lags q. We find from the Table in Appendix 1 that the random walk hypothesis can not be rejected for all funds.

4.2 Bosnian mutual funds

Next we analyze performance of the Bosnian investment funds. In Bosnia and Herzegovina it is not easy or straightforward to incorporate funds. Firstly, the funds are only allowed to invest in assets traded on the Sarajevo Stock Exchange (2006), which rules out the ability to invest in non-liquid assets, such as property and private equity. The possibility of investment in foreign markets is also ruled out. Secondly, the domestic market itself is dominated by privatization investment funds (PIFs), financial institutions and state-controlled companies. Access to companies that are not controlled by the state appears to be dictated by PIFs. This leaves little space for mutual funds in company selection process.

<TABLE 5 ABOUT HERE>

In Table 5 we report their average monthly log-returns for the period from 1 April 2003 to 1 April 2006. As far as return is considered, for the three-year period among funds we particularly point out CROBIH, BONUS, FORTUNA, and HERBOS which exhibit excellent performance. The average monthly log-return ranges from 2.6% to 4.5% (31% to 54% in annual terms), where BIFX index has log-return equal to 3.3%. Nevertheless, those excellent results for returns are followed by very high standard deviation ranging on monthly level between 10% and 14%. Only HERBOS, FORTUNA and NAPRIJED have β value close to 1, if simple regression is employed. Timing coefficients γ in the Treynor-Mazuy model are estimated using individual funds. Analysis of timing coefficients γ shows that 8 of the 9 timing coefficients γ are negative.

To quantify relation between risk and reward for bearing it, we calculate different risk adjusted performances. In Table 6 we rank all the funds according to the Sharpe rule where we find that three funds outperform the benchmark for the past three year period. We find similar ranking according to Treynor ratio with deviations found for BOSFIN and PROPLUS.

In Table 5 we see that these two funds are characterized by smaller β values that explain larger values for Treynor ratio. From the values calculated for Information ratio, we see that four funds exhibit better performance than the benchmark, as far as return is concerned.

<TABLE 6 ABOUT HERE>

Results for the funds, reported in Table 6, indicate that 8 of the 9 alpha estimates are positive indicating that the managers might have had the superior ability in market stock selection. Of these 8 positive estimates, one is significant at the 5% level.

In Appendix 2 we show that only for FORTUNA and MIGROUP normality can be rejected. The Ljung-Box test can not reject the hypothesis of independence in the residual series for all PIFs. Applying the DF test from Appendix 2 we conclude that in all cases we cannot reject stationarity. Applying the White test, we conclude that heteroscedasticity is present only in BOSFIN PIF. We find from the Table in Appendix 2 that the random walk hypothesis can not be rejected for all PIFS.

4.1 Slovenian mutual funds

In Slovenia, the net inflows into the mutual funds managed by domestic administrators dropped significantly in 2005 although the number of the funds increased. Apart from the stronger presence of foreign mutual funds another reason for such dynamics was domestic fund's investment structure. A large part of it consists of domestic securities, having mainly dropped in 2005. Data clearly demonstrates the connection with domestic stock market: in the time of slowing down on Ljubljana stock exchange, the net flows into mutual funds with mainly domestic investment changed in favor of net flows into mutual funds with mainly

foreign investment. Developments in recent years showed that the Slovenian capital market does not follow the dynamics in the more developed foreign capital markets. The growth of mutual funds in near future is therefore almost unpredictable.

The asset allocation of mutual funds shows, that funds have tended to diversify their portfolio in favour of foreign securities. This strategy was due to behaviour of mutual funds managers, who dislike small and illiquid domestic capital markets with inelastic supply, which are unable to absorb additional funds without causing excessive price movements. The tendency to invest more in foreign securities was further intensified by deregulations in 2004 and is not specific to Slovenia. Similar strategies were observed in other new members of EU (Estonia and Czech Republic).

In Slovenia the number of savers in mutual funds is now over 200.000. There is a number of different products which are available: sectoral mutual funds, regional mutual funds, index funds etc. With a growing number of mutual funds one can recognize increased problem for managers of mutual funds, since they will have to increase their efforts strongly if they want to hold the market share. It seems that big suppliers with more than 10 funds and with broad specter of investment possibilities have a big advantage in the future. Increased competition will further strengthened competition and consolidation. Mergers and take-over are expected.

In the last two years another convergence to developed markets emerged: banks, leaded by NLB, Bank Austria and Raiffeisen Krekova bank, started to offer mutual funds in over-the-counter manner. This kind of marketing was a great success which significantly affected market shares. The banks in Slovenia encouraged the formation of strong fund industry, since they begun to see the fund business as a complement or substitute to their traditional deposit-taking activities.

Developments presented above are reflected in the results which are reported in tables 7 and 8. As far as return is considered, we find that seven Slovenian mutual funds ourperformed SBI index for the period analyzed. R^2 values range from 0.113 to 0.819 implying that SBI20 does not fully explain the funds return. All values of β are lower than one (less than 0.75) due to the fact that most of funds are 'balanced' i.e. allocate capital between stocks, bonds and cash. Table 7 further shows that none of the timing coefficients gamma is significantly positive at the 5% level.

<TABLE 7 ABOUT HERE>

From fourteen funds analyzed, ten of them are with Sharp ratio larger than 1. All funds exhibit positive Jensen's α indicating that the managers might have had the superior ability in market stock selection. For seven of them we find statistically significant α. For other funds hypothesis that α is zero can not be rejected. We find that rankings obtained by applying the Sharpe ratio, Treynor ratio, and the Appraisal ratio are with few exceptions very similar, implying that the funds are very well diversified.

<TABLE 8 ABOUT HERE>

These results show a different picture of the industry as it was expected in the studies conducted before the slowdown appeared in 2005 (Jagric et al., 2004; Jagric et al., 2005). We believe that, while a pull back in this market is possible in the near term, the long-term outlook for Slovenia is still very attractive. There are three main drivers for growth: strong economic development and consumer growth, structural improvements and relatively attractive valuations for this emerging market.

In Appendix 3 we show that only for four funds normality can not be rejected. This was expected due to the properties of the Slovenian stock market (Podobnik et al. (2006) and results in Appendix 3). The Ljung-Box test can not reject the hypothesis of independence in the residual series for all PIFs. Applying the DF test from Appendix 3 we conclude that in all cases we cannot reject stationarity. Applying the White test, we conclude that heteroscedasticity is present only in KMG fund.

5. CONCLUSIONS

Stock market investment has been gradually increasing after the Fall of Socialism in the newly industrialized countries of Central and East Europe. As a representative market, Poland was considered as the best worldwide stock market performer in 1993, while in 2003 The Wall Street Journal Europe ranked the Slovenian mutual fund Galileo at the top of 15 most successful open funds in the world, indicating that the money has been gradually moving from north to south.

Using times series of monthly log-returns we analyzed the performance of mutual funds in Croatia and Slovenia, and investment funds in Bosnia and Herzegovina. There are several interesting properties, which make these markets worth examining. We provided some evidence for long memory for Slovenian stock market. Additionally, for all three markets high correlation can be identified between the funds returns. This is especially evident in the case of Slovenia, where almost all coefficients are close to one.

In our analysis, the best performing funds are ranked on risk-adjusted basis just because the returns are equally important as the absolute value of return. Applying the standard CAPM

single index model and the quadratic Treynor & Mazuy model, we analyzed the selection and timing abilities of these funds. It is assumed that OLS errors can be used only if the residuals are independent and identically distributed. We show that for most of the funds analyzed these two conditions are fulfilled. Clearly, on may expect that more appropriate results would be obtained if adjusted errors were employed using for example the Newey-West procredure. However, by applying bootstrap method, we provide extremely robust results also for cases, where residuals do not fulfill the required conditions.

With rare exceptions, for all the markets we found no evidence of market timing ability as Hendrics et al. (1993) previously found for US mutual funds. Also, for all the markets generally we found selection ability neither. The defensive characteristic of the funds are due to beta values shown to be generally smaller than one. One of the benefits for investment in mutual funds in this region is that most of the funds are further diversified through investment in different markets of the region.

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TABLE 1: PROPORTIONAL RETURN FOR MAYOR INDICES OF SOUTH-EAST EUROPEAN TRANSIENT COUNTRIES

Country	Year				
	01	**02**	**03**	**04**	**05**
Slovenia	18.6	56.0	17.5	25.1	-0.06
Croatia	16.6	13.4	0.01	32.1	27.6
Serbia and Montenegro	N/A	N/A	N/A	N/A	40.2
Macedonia	N/A	N/A	N/A	N/A	129.0
Bulgaria	11.3	52.9	147.0	39.2	32.4
Bosnia and Herzegovina	N/A	N/A	N/A	151	23.2

Note: Proportional returns are measured in percentage and dividends are not included. Inflation (or risk-free return) also not included, but are generally very small.

TABLE 2: SELECTED MUTUAL AND PRIVATIZATIN INVESTMENT FUNDS

FUND (COUNTRY)	START	N	A.R.	FUND (COUNTRY)	START	N	A.R.
NKD (SLO)	31/12/99	81	0.192	ILIRIKA JIE (CRO)	31/12/04	24	0.300
NKS (SLO)	31/12/99	81	0.180	RBA ACTIVE (CRO)	31/12/04	24	0.084
KDS (SLO)	31/03/00	78	0.180	ZB GLOBAL (CRO)	31/12/04	24	0.108
RPMK (SLO)	29/09/00	72	0.204	ZB TREND (CRO)	31/12/04	24	0.096
TGR (SLO)	31/08/00	73	0.156	ERSTE BALANCED (CRO)	31/12/04	24	0.060
ZI (SLO)	31/12/99	81	0.168	ST BALANCED (CRO)	31/12/04	24	0.156
PRA (SLO)	31/12/99	81	0.228	ST GLOBAL (CRO)	31/12/04	24	0.108
KBH (SLO)	31/12/99	81	0.204	HI – GROWTH (CRO)	31/12/04	24	0.072
KMR (SLO)	31/12/99	81	0.168	HI – BALANCED (CRO)	31/12/04	24	0.048
AVV (SLO)	31/12/99	81	0.156	CROBIH (BIH)	31/03/03	36	0.540
ABP (SLO)	31/12/99	81	0.132	BONUS (BIH)	31/03/03	36	0.540
KMG (SLO)	31/12/99	81	0.180	HERBOS (BIH)	31/03/03	36	0.504
MLP (SLO)	31/12/99	81	0.108	FORTUNA (BIH)	31/03/03	36	0.468
MXP (SLO)	31/12/99	81	0.108	MIGROUP (BIH)	31/03/03	36	0.324
RBA CE (CRO)	29/04/05	9	0.252	BOSFIN (BIH)	31/03/03	36	0.312
ZB EUROAKTIV (CRO)	30/06/04	19	0.156	PROPLUS (BIH)	31/03/03	36	0.312
RBA BALANCED (CRO)	31/12/04	24	0.240	NAPRIJED (BIH)	31/03/03	36	0.348
FIMA EQUITY (CRO)	30/06/04	19	0.252	EUROFOND (BIH)	31/03/03	36	0.300
KD VICTORIA (CRO)	31/12/04	24	0.276				

Note: All series end at 31/12/05. START – beginning of the time series, N – number of observations, A.R. – annual proportional return.

TABLE 3: CROATIAN MUTUAL FUNDS FOR MONTHLY RECORDED LOG-RETURNS

FUND	μ	σ_D	σ_e	S	K	β	β^-	β^+	$\overline{\beta}$	R^2	β	γ
RBA Ce	0.021	0.021	0.009	-0.268	2.545	0.680 (5.027)*	0.436	0.917	0.683	0.808	0.853 (3.223)	-5.920 (-0.771)
ZB Eu	0.013	0.023	0.022	-0.718	2.507	0.105 (1.357)	-0.037	0.248	0.109	0.103	0.152 (1.608)	-0.578 (-0.879)
RBA Bl	0.020	0.039	0.017	1.260	7.938	0.542 (9.437)*	0.432	0.647	0.540	0.809	0.511 (7.140)	0.373 (0.736)
KD Vict	0.023	0.044	0.025	0.379	4.359	0.570 (6.866)*	0.413	0.727	0.570	0.692	0.584 (5.577)	-0.170 (-0.229)
ILIRIKA JIE	0.025	0.047	0.039	2.068	6.684	0.353 (2.376)*	0.084	0.622	0.354	0.320	0.152 (0.993)	2.439 (2.328)*
RBA Ac	0.007	0.027	0.027	-0.080	2.130	0.077 (0.859)	-0.084	0.245	0.075	0.034	0.165 (1.516)	-1.057 (-1.375)
ZB Gl	0.009	0.021	0.012	-0.016	3.421	0.274 (6.781)*	0.196	0.347	0.274	0.686	0.284 (5.574)	-0.118 (-0.328)
ZB Tr	0.008	0.021	0.020	-0.666	2.486	0.094 (1.392)	-0.030	0.216	0.095	0.085	0.151 (1.817)	-0.681 (-1.161)
ERSTE Bl	0.005	0.020	0.018	-0.172	2.349	0.103 (1.661)	-0.010	0.214	0.101	0.116	0.187 (2.598)	-1.009 (-1.983)
ST Bl	0.013	0.029	0.023	0.972	3.942	0.271 (3.506)*	0.131	0.435	0.268	0.369	0.296 (3.045)	-0.302 (-0.438)
ST Gl	0.009	0.036	0.033	0.003	3.072	0.225 (2.014)	0.015	0.421	0.227	0.162	0.264 (1.880)	-0.470 (-0.473)
FIMA Eq	0.021	0.044	0.019	0.710	4.620	0.564 (8.608)*	0.439	0.697	0.566	0.822	0.529 (6.565)	0.426 (0.757)
HI - Gr	0.006	0.025	0.021	-0.640	2.558	0.208 (3.005)*	0.075	0.329	0.207	0.301	0.266 (3.157)	-0.711 (-1.189)
HI - Bl	0.004	0.019	0.016	-0.683	2.609	0.158 (2.935)*	0.056	0.251	0.157	0.291	0.224 (3.569)	-0.808 (-1.816)
CROBEX	**0.022**	**0.065**		0.713	4.781	**1**				**1**		

Note: Average monthly log-return (μ), total risk (standard deviation (σ_D)), unsystematic risk (σ_e), systematic risk (β), and R^2 values are calculated from the simple regression of equation 1. Coefficient couples (β, γ) are estimated with multiple regression of equation 2. For the benchmark we use CROBEX index. Average risk-free annual return for the period analyzed is 4.3 %.

"* " - Significant at 5% level.

We apply the bootstrap method to estimate the 95% confidence intervals ($\beta^-, \beta^+, \overline{\beta}$) of a population parameter. The method is based on resampling with replacement from the original sample. Among possible bootstrapping options, we choose an approach where residuals obtained in regression analysis are resampled.

TABLE 4: RISK/RETURN MEASURES CALCULATED FOR DIFFERENT FUNDS

Fund	S_h	T_h	IR	α	AR
RBA Ce	2.908	0.314	2.011	0.130 (2.832)*	4.026
ILIRIKA JIE	1.608	0.748	0.144	0.182 (1.348)	1.344
KD Vict	1.504	0.406	0.048	0.103 (1.566)	1.207
RBA Bl	1.480	0.369	-0.210	0.078 (1.719)	1.325
FIMA Eq	1.407	0.379	-0.917	0.029 (0.499)	0.452
ZB Eu	1.362	1.037	-0.949	0.074 (1.085)	0.983
ST Bl	1.107	0.410	-0.627	0.050 (0.814)	0.628
ZB Gl	0.929	0.251	-0.928	0.007 (0.228)	0.176
ZB Tr	0.733	0.566	-0.798	0.032 (0.599)	0.462
ST Gl	0.516	0.290	-0.764	0.015 (0.164)	0.123
RBA Ac	0.429	0.522	-0.814	0.023 (0.322)	0.248
HI - Gr	0.343	0.140	-1.022	-0.018 (-0.321)	-0.247
ERSTE Bl	0.190	0.125	-1.004	-0.010 (-0.209)	-0.161
HI - Bl	0.152	0.063	-1.091	-0.025 (-0.598)	-0.461
CROBEX	**1.060**	**0.179**	**0**	**0**	**0**

Note: Sharpe ratio S_h, Traynor ratio T_h, Information ratio IR, Jensen's α, and Appraisal ratio AR. Benchmark market portfolio is CROBEX index.

"* " - Significant at 5% level.

TABLE 5: BOSNIAN INVESTMENT FUNDS FOR MONTHLY RECORDED DATA

Fund	μ	σ_D	σ_e	S	K	β	β^-	β^+	$\overline{\beta}$	R^2	β	γ
CROBIH	0.045	0.108	0.095	0.742	3.659	0.490 (3.127)*	0.197	0.800	0.482	0.229	0.954 (4.207)*	-2.056 (-2.651)*
BONUS	0.045	0.132	0.106	0.242	2.039	0.741 (4.237)*	0.429	1.078	0.740	0.352	1.277 (5.073)*	-2.368 (-2.753)*
HERBOS	0.042	0.135	0.080	0.473	3.264	1.026 (7.779)	0.784	1.293	1.029	0.647	1.183 (5.686)*	-0.692 (-0.973)
FORTUNA	0.039	0.132	0.071	1.064	3.959	1.058 (9.082)*	0.833	1.308	1.054	0.714	1.037 (5.569)*	0.091 (0.143)
MIGROUP	0.027	0.104	0.063	0.794	5.569	0.784 (7.560)*	0.580	0.990	0.791	0.634	0.940 (5.805)*	-0.691 (-1.248)
BOSFIN	0.026	0.111	0.105	0.783	3.319	0.331 (1.917)*	0.012	0.670	0.329	0.100	1.000 (4.347)*	-2.961 (-3.764)*
PROPLUS	0.026	0.118	0.116	0.574	4.305	0.216 (1.135)	-0.111	0.610	0.225	0.038	0.553 (1.877)	-1.491 (-1.480)
NAPRIJED	0.029	0.142	0.091	0.748	4.144	1.035 (6.921)*	0.752	1.310	1.033	0.592	1.054 (4.407)*	-0.084 (-0.103)
EUROFOND	0.025	0.118	0.100	0.589	3.252	0.581 (3.515)*	0.264	0.901	0.569	0.272	1.237 (5.687)*	-2.904 (-3.905)*
BIFX	**0.033**	**0.106**		**1.561**	**6.615**	**1**				**1**		

Note: Average monthly log-return (μ), total risk (standard deviation (σ_D)), unsystematic risk (σ_e), systematic risk (β), and R^2 values are calculated from the simple regression of equation 1. Coefficient couples (β, γ) are estimated with multiple regression of equation 2. For the benchmark we use CROBEX index. For the benchmark we use BIFX index. Average risk-free annual return for the period analyzed is 1.3 %.

"* " - Significant at 5% level.

We apply the bootstrap method to estimate the 95% confidence intervals ($\beta^-, \beta^+, \overline{\beta}$) of a population parameter. The method is based on resampling with replacement from the original sample. Among possible bootstrapping options, we choose an approach where residuals obtained in regression analysis are resampled.

TABLE 6: RISK/RETURN MEASURES CALCULATED FOR DIFFERENT INVESTMENT FUNDS

Fund	S_h	T_h	IR	α	AR
CROBIH	1.391	1.065	0.373	0.335 (1.639)*	1.018
BONUS	1.149	0.709	0.381	0.243 (1.064)	0.661
HERBOS	1.063	0.484	0.417	0.106 (0.614)	0.381
FORTUNA	0.983	0.426	0.283	0.048 (0.312)	0.194
MIGROUP	0.851	0.391	-0.320	0.008 (0.060)	0.037
BOSFIN	0.771	0.891	-0.195	0.169 (0.749)	0.466
PROPLUS	0.746	1.409	-0.155	0.222 (0.893)	0.555
EUROFOND	0.702	0.492	-0.249	0.065 (0.301)	0.187
NAPRIJED	0.675	0.321	-0.153	-0.061 (-0.315)	-0.195
BIFX	**1.04**	**0.382**	**0**	**0**	**0**

Note: Sharpe ratio S_h, Traynor ratio T_h, Information ratio IR, Jensen's α, and Appraisal ratio AR. For the benchmark market portfolio we use BIFX index. CROBIX, BONUS, and FORTUNE provide more reward per unite of risk, either variance or beta, than the benchmark.

"* " - Significant at 5% level.

TABLE 7: SLOVENIAN MUTUAL FUNDS FOR MONTHLY RECORDED LOG-RETURNS

Fund	μ	σ_D	σ_e	S	K	β	β^-	β^+	$\overline{\beta}$	R^2	β	γ
NKD	0.016	0.029	0.014	0.375	2.921	0.621 (15.794)*	0.543	0.700	0.621	0.762	0.629 (13.148)*	-0.197 (-0.300)
NKS	0.015	0.026	0.014	0.632	4.199	0.554 (14.044)*	0.473	0.632	0.552	0.717	0.522 (10.962)*	0.795 (1.212)
KDS	0.015	0.024	0.012	0.987	5.521	0.535 (14.676)*	0.470	0.598	0.534	0.742	0.496 (10.655)*	0.832 (1.336)
RPMK	0.017	0.028	0.014	0.715	4.226	0.598 (13.703)*	0.514	0.692	0.598	0.731	0.559 (9.586)*	0.766 (1.013)
TGR	0.013	0.019	0.009	0.192	2.540	0.427 (14.375)*	0.366	0.479	0.426	0.747	0.487 (12.903)*	-1.215 (-2.443)
ZI	0.014	0.030	0.013	0.445	3.640	0.678 (18.459)*	0.611	0.750	0.677	0.814	0.682 (15.242)*	-0.086 (-0.140)
PRA	0.019	0.054	0.051	0.505	18.349	0.451 (3.152)*	0.196	0.760	0.460	0.113	0.355 (2.047)*	2.367 (0.993)
KBH	0.017	0.058	0.054	-0.064	18.838	0.551 (3.643)*	0.287	0.847	0.552	0.145	0.430 (2.356)*	2.964 (1.179)
KMR	0.014	0.032	0.015	0.639	4.036	0.716 (16.919)*	0.637	0.799	0.718	0.786	0.683 (13.361)*	0.822 (1.168)
AVV	0.013	0.030	0.019	0.930	4.398	0.557 (9.943)*	0.451	0.668	0.558	0.559	0.533 (7.833)*	0.590 (0.630)
ABP	0.011	0.022	0.009	0.702	3.982	0.505 (18.785)*	0.453	0.556	0.505	0.819	0.501 (15.299)*	0.108 (0.240)
KMG	0.015	0.031	0.014	0.973	5.677	0.694 (17.929)*	0.618	0.770	0.696	0.805	0.654 (14.091)*	0.968 (1.514)
MLP	0.009	0.014	0.007	0.634	4.400	0.294 (14.144)*	0.255	0.336	0.295	0.719	0.293 (11.550)*	0.042 (0.121)
MXP	0.009	0.019	0.010	0.223	3.006	0.406 (14.395)*	0.348	0.458	0.406	0.726	0.400 (11.657)*	0.147 (0.310)
SBI	**0.014**	**0.0403**		**0.574**	**5.014**	**1**				**1**		

Note: Average monthly log-return (μ), total risk (standard deviation (σ_D)), unsystematic risk (σ_e), systematic risk (β), and R^2 values are calculated from the simple regression of equation 1. Coefficient couples (β, γ) are estimated with multiple regression of equation 2. For the benchmark we use CROBEX index. For the benchmark we use SBI index. Average risk-free annual return for the period analyzed is 6%.

"* " - Significant at 5% level.

We apply the bootstrap method to estimate the 95% confidence intervals ($\beta^-, \beta^+, \overline{\beta}$) of a population parameter. The method is based on resampling with replacement from the original sample. Among possible bootstrapping options, we choose an approach where residuals obtained in regression analysis are resampled.

TABLE 8: RISK/RETURN MEASURES CALCULATED FOR DIFFERENT FUNDS

Fund	S_h	T_h	IR	α	AR
RPMK	1.528	0.245	0.013	0.059 (2.759)*	1.195
KDS	1.466	0.233	0.049	0.060 (3.385)*	1.389
TGR	1.381	0.221	-0.478	0.036 (2.477)*	1.059
NKS	1.323	0.218	0.172	0.061 (3.161)*	1.262
NKD	1.312	0.209	0.321	0.064 (3.286)*	1.312
KMG	1.117	0.174	0.207	0.046 (2.421)*	0.967
MLP	1.102	0.181	-0.530	0.022 (2.127)*	0.849
ZI	1.028	0.159	0.009	0.035 (1.939)	0.774
KMR	1.014	0.159	0.107	0.037 (1.797)	0.718
ABP	1.002	0.155	-0.382	0.024 (1.799)	0.719
PRA	0.899	0.373	0.318	0.120 (1.702)	0.679
AVV	0.893	0.167	-0.156	0.033 (1.199)	0.479
MXP	0.799	0.131	-0.603	0.009 (0.687)	0.274
KBH	0.715	0.262	0.188	0.085 (1.143)	0.456
SBI	**0.769**	**0.161**	**0**	**0**	**0**

Note: Sharpe ratio S_h, Traynor ratio T_h, Information ratio IR, Jensen's α, and Appraisal ratio AR.

Benchmark market portfolio is SBI index.

"* " - Significant at 5% level.

APPENDIX 1: STATISTICAL TESTS FOR CROATIA

Fund	JB test statistic	Ljung-Box test Statistic (LB(n))	White test		DF test statistic	Variance-ratio test			
			R^2	Test statistic		Test statistic (q=2)	Test statistic (q=4)	Test statistic (q=6)	Test statistic (q=8)
ERSTE Bl	0.793	37.986*	0.010	0.234	-6.294*	0.257*	0.240	0.176	0.136
FIMA Eq	2.217	4.628	0.037	0.696	-2.926*	0.853	0.458	0.458	0.279
HI - Bl	1.927	25.668	0.001	0.020	-5.696*	0.317*	0.268	0.211	0.151
HI - Gr	1.790	31.450	0.027	0.659	-6.229*	0.298*	0.233*	0.183	0.130
ILIRIKA JIE	12.444*	4.367	0.284	4.265	-2.747*	0.856	0.449	0.283	0.453
KD Vict	1.418	8.705	0.003	0.062	-3.466*	0.868	0.515	0.351	0.373
RBA Ac	1.080	22.428	0.035	0.839	-5.502*	0.308*	0.207*	0.105	0.115
RBA Bl	22.738*	5.065	0.294	7.066*	-4.104*	0.629	0.431	0.340	0.284
RBA Ce	0.433	8.790	0.191	1.718	-2.701*	0.980	1.262	0.662	NaN
ST Bl	3.523	23.119	0.034	0.807	-4.000*	0.529*	0.297	0.335	0.152
ST Gl	0.034	18.316	0.025	0.606	-4.234*	0.456*	0.263	0.255	0.117
ZB Eu	1.742	13.165	0.105	1.997	-4.072*	0.649	0.360	0.187	0.260
ZB Gl	0.017	17.353	0.012	0.293	-4.696*	0.428*	0.309	0.319	0.249
ZB Tr	1.993	33.513*	0.042	1.018	-6.257*	0.233*	0.189*	0.128	0.108
CROBEX	3.515	5.464			-4.043*	0.625	0.375	0.381	0.304

“* “ - Significant at 5% level. LB(n) is the Ljung-Box statistic at lag n, distributed as a chi-squared with n degrees of freedom.

APPENDIX 2: STATISTICAL TESTS FOR BOSNIA

Fund	JB test statistic	Ljung-Box test statistic (LB(n))	White test		DF test statistic	Variance-ratio test			
			R^2	Test statistic		Test statistic (q=2)	Test statistic (q=4)	Test statistic (q=6)	Test statistic (q=8)
CROBIH	3.242	18.084	0.018	0.631	-4.485*	0.742	0.380*	0.242	0.268
BONUS	2.003	24.614	0.083	2.991	-4.834*	0.720	0.442	0.134*	0.272
HERBOS	1.207	13.502	0.002	0.073	-4.966*	0.677	0.355*	0.169*	0.216
FORTUNA	6.840*	18.872	0.005	0.168	-4.595*	0.798	0.287*	0.238	0.277
MIGROUP	10.794*	14.604	0.141	5.078	-4.280*	0.570*	0.401	0.285	0.241
BOSFIN	3.301	20.749	0.183	6.604*	-4.617*	0.772	0.321*	0.249	0.249
PROPLUS	3.408	18.691	0.001	0.037	-4.503*	0.649*	0.357*	0.199	0.259
NAPRIJED	4.203	17.958	0.003	0.101	-6.183*	0.466*	0.273*	0.157*	0.212
EUROFOND	1.863	17.922	0.086	3.090	-4.270*	0.756	0.416	0.203	0.285
BIFX	28.360*	14.731			-4.483*	0.690	0.418	0.222	0.253

"* " - Significant at 5% level. LB(n) is the Ljung-Box statistic at lag n, distributed as a chi-squared with n degrees of freedom.

APPENDIX 3: STATISTICAL TESTS FOR SLOVENIA

Fund	JB test statistic	Ljung-Box test statistic (LB(n))	White test		DF test statistic	Variance-ratio test			
			R^2	Test statistic		Test statistic (q=2)	Test statistic (q=4)	Test statistic (q=6)	Test statistic (q=8)
ABP	8.921*	17.054	0.050	4.033	-7.796*	0.503*	0.318*	0.198*	0.164*
AVV	16.648*	30.753	0.004	0.347	-9.646*	0.449*	0.204*	0.193*	0.143*
KBH	787.558*	18.902	0.009	0.714	-12.931*	0.405*	0.129*	0.105*	0.098*
KDS	30.180*	28.647	0.069	5.394	-6.560*	0.629*	0.318*	0.228*	0.205*
KMG	33.575*	25.770	0.089	7.204*	-6.563*	0.571*	0.356*	0.220*	0.197*
KMR	8.167*	24.199	0.009	0.706	-6.774*	0.614*	0.357*	0.228*	0.209*
MLP	10.717*	29.219	0.028	2.253	-6.821*	0.618*	0.357*	0.190*	0.178*
MXP	0.652	16.483	0.001	0.063	-8.093*	0.479*	0.270*	0.162*	0.156*
NKD	1.877	21.846	0.009	0.768	-6.944*	0.536*	0.359*	0.236*	0.186*
NKS	9.123*	22.893	0.011	0.868	-7.217*	0.506*	0.349*	0.232*	0.177*
PRA	742.66*6	24.712	0.010	0.822	-12.776*	0.394*	0.125*	0.093*	0.098*
RPMK	9.425*	17.636	0.007	0.530	-7.549*	0.489*	0.306*	0.208*	0.170*
TGR	1.266	24.892	0.059	4.274	-7.433*	0.589*	0.326*	0.202*	0.199*
ZI	3.551	20.355	0.000	0.023	-7.651*	0.593*	0.331*	0.205*	0.175*
SBI20	5.014	20.111			-7.075*	0.577*	0.305*	0.196*	0.189*

“* “ - Significant at 5% level. LB(n) is the Ljung-Box statistic at lag n, distributed as a chi-squared with n degrees of freedom.

APPENDIX 4: CORRELATION ANALYSIS FOR CROATIA

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Fund
1	1.00	0.74	0.96	0.96	0.67	0.79	0.93	0.84	0.94	0.93	0.95	0.95	0.88	0.97	0.80	ERSTE balanced
2		1.00	0.89	0.84	0.86	0.97	0.59	0.96	0.97	0.89	0.81	0.83	0.94	0.78	0.99	FIMA equity
3			1.00	0.99	0.84	0.88	0.85	0.92	0.96	0.97	0.96	0.98	0.96	0.97	0.91	HI balanced
4				1.00	0.88	0.84	0.90	0.90	0.94	0.95	0.97	0.99	0.94	0.98	0.88	HI growth
5					1.00	0.88	0.72	0.95	0.97	0.86	0.82	0.84	0.93	0.81	0.90	ILIRIKA JIE
6						1.00	0.60	0.98	0.98	0.93	0.77	0.80	0.96	0.84	0.97	KD Victoria
7							1.00	0.68	0.92	0.81	0.92	0.92	0.73	0.93	0.62	RBA Active
8								1.00	1.00	0.96	0.85	0.93	0.99	0.89	0.99	RBA Balanced
9									1.00	0.98	0.98	0.86	0.97	0.94	0.97	RBA CE
10										1.00	0.95	0.96	0.98	0.96	0.94	ST Balanced
11											1.00	0.97	0.89	0.97	0.83	ST Global
12												1.00	0.96	0.99	0.88	ZB Euroaktiv
13													1.00	0.93	0.98	ZB Global
14														1.00	0.86	ZB Trend
15															1.00	CROBEX

APPENDIX 5: CORRELATION ANALYSIS FOR BOSNIA

	1	2	3	4	5	6	7	8	9	10	Fund
1	1.00	0.98	0.98	0.97	0.89	0.98	0.93	0.94	0.96	0.98	CROBIH
2		1.00	0.99	0.96	0.88	0.99	0.92	0.97	0.99	0.99	BONUS
3			1.00	0.98	0.85	0.98	0.89	0.97	0.97	0.99	HERBOS
4				1.00	0.81	0.96	0.86	0.95	0.94	0.97	FORTUNA
5					1.00	0.88	0.94	0.85	0.90	0.91	MIGROUP
6						1.00	0.94	0.97	0.99	0.98	BOSFIN
7							1.00	0.89	0.94	0.93	PROPLUS
8								1.00	0.98	0.98	NAPRIJED
9									1.00	0.98	EUROFOND
10										1.00	BIFX

APPENDIX 6: CORRELATION ANALYSIS FOR SLOVENIA

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Fund
1	1.00	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.99	NKD
2		1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	NKS
3			1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	0.99	1.00	0.99	KDS
4				1.00	1.00	0.98	1.00	1.00	1.00	0.99	1.00	1.00	0.98	0.98	0.99	RPMK
8					1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	TGR
9						1.00	0.99	0.99	0.99	1.00	0.99	0.99	0.99	0.99	0.99	ZI
10							1.00	1.00	0.99	1.00	1.00	1.00	0.99	0.99	0.99	PRA
11								1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	KBH
12									1.00	1.00	1.00	1.00	0.99	0.99	0.99	KMR
13										1.00	1.00	1.00	0.99	0.99	0.99	AVV
14											1.00	1.00	0.99	0.99	0.99	ABP
16												1.00	0.99	0.99	0.99	KMG
17													1.00	0.99	0.98	MLP
18														1.00	0.99	MXP
19															1.00	SBI20