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EMERGING MARKETS OF SOUTH-EASTERN EUROPE: CROATIAN MUTUAL FUNDS AND BOSNIAN INVESTMENT FUNDS

Novi trgi Jugovzhodne Evrope: hrvaški vzajemni in bosanski investicijski skladi

Abstract

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In this article we study the performance of Croatian mutual funds and Bosnian investment funds. The risk/return measures are assessed by using the Sharpe ratio, the Treynor ratio, Jensen's Alpha, and the Treynor appraisal ratio. Furthermore, we analyze the timing ability of the funds using the quadratic regression of Treynor and Mazuy. To emphasize the financial perspective of South-eastern Europe, we also analyze returns of major financial indices in Croatia, Bosnia and Herzegovina, Slovenia, Serbia and Montenegro, Bulgaria, and Macedonia, and show that financial markets in the whole region exhibit a strong performance recently.
Keywords: financial market, mutual funds, investment funds, risk statistics

Izvleček

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V članku analiziramo donosnost hrvaških vzajemnih in bosanskih investicijskih skladov. Med možnimi merami tveganja in donosnosti smo izračunali Sharpov koeficient, Treynorjev koeficient, Jensenovo alfo in Treynorjev informacijski koeficient. Dodatno analiziramo še časovno usklajenost s kvadratno regresijo po Treynorju in Mazuyu. Da bi poudarili perspektivnost regije, analiziramo tudi donose pomembnejših indeksov na Hrvaškem, v Bosni, Sloveniji, Srbiji, Črni Gori, Bolgariji in Makedoniji. Rezultati kažejo na izjemno rast na vseh omenjenih trgih.
Ključne besed: finančni trgi, vzajemni skladi, investicijski skladi, mere tveganja

1. Introduction

Since the appearance of papers by Sharpe (1966) and Jensen (1968), the analysis of mutual fund performance has drawn considerable attention with the goal of finding outperforming and underperforming funds relative to a broad market. The question of how to evaluate the performance of a fund is far from being academic. Investors are typically interested in funds that have large annual returns and are capable of outperforming the market. As an example, one of the world's biggest mutual funds, Fidelity Magellan, is popular since it outperformed the S&P500 index in 11 of the 13 years (Alan 1990).

Funds usually try to attract potential investors by referring to their past performance. Although the past fund performance does not guarantee future performance, it is assumed that historic results have some predictive ability and usually serve as an initial step in the process of investment decisions (Ippolito 1992).

In this study we evaluate and rank performance of Croatian mutual funds and Bosnian privatization investment funds. To emphasize the financial perspective of South-eastern Europe, we 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 market for the whole region in recent years exhibits a strong performance.

This paper is organized as follows. In Section two we provide some motivation for analyzing Croatian and Bosnian mutual funds. In Section three we introduce the performance measures used in evaluation of funds: the Sharpe ratio (1994),

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the Treynor ratio (1966), the Information Ratio, Jensen's Alpha (1968), the Treynor appraisal ratio, and the Treynor-Mazuy (1966) timing measure. In Section four we briefly explain the data, then we compare the Croatian financial index, CROBEX, with the financial indices of some Central and South-eastern European countries. Finally, in Section five we calculate the performance measures of Croatian mutual funds and Bosnian investment funds and rank them according to the results.

2. Motivation for Analyzing the Croatian and Bosnian Mutual/Investment Funds

The Croatian financial market might be interesting as an example of a successful emerging market in Central and South-eastern Europe. In the last two years, as a result of both EU accession efforts and accumulated investment reports, the Croatian financial market exhibited an upward trend. Market capitalization has doubled in the case of the Zagreb Stock Exchange (ZSE), and in the 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, which 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 regulations to those of the 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-eastern 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 financial 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. Over the past 5 years, the Croatian market has witnessed strong growth in the 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. The retail market share increased to 39%. A visible flow of assets from money market instruments to investment funds was a result of several factors: low interest rates, education of retail investors, enhancement of the general investment culture, development of private banking, increase in the number of investment funds with various investment policies, and introduction of structured products to the market. During the last five years, all larger banks have launched at least one fund for most popular investment styles (equity, balanced, fixed income, and 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 2004.

Despite increased investment in Croatian mutual funds, Croatia has a significantly lower average amount of investment in mutual funds per capita (222 EUR) compared to new EU member states (Poland, Hungary, Czech Republic, Slovakia, Slovenia), where the same amount per capita is 365 EUR. For further comparison, by the end of 1995, the capital invested in mutual funds in the U.S. was $10,933 per capita, while in Germany it was $2,143 (EFAMA, 2006).

In Bosnia it is not easy or straightforward to incorporate funds. Firstly, funds can only be invested in assets traded on the Sarajevo Stock Exchange, which rules out the ability to invest in non-liquid assets, such as property and private equity. It also rules out the possibility of investment in foreign markets. 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 the company selection process.

In Bosnia, local government and the international community have made great efforts since 1995 to transfer the country from a socialist to a market economy. The Sarajevo Stock Exchange (SASE) was established in 2001 and represents the beginning of a financial market for this area. This Exchange was launched by 100 companies, 8 brokerage houses and support from other exchanges. In the beginning, an auction trading system was used with the goal of switching to a continuous trading system (Begic, 2004).

After 2000, Bosnian's economic regeneration gathered pace. Positive signs of economic recovery gave a boost to the stock exchange, so trading volumes on the SASE grew by an average of 144% annually from 2002 to 2005. These and other positive signs encouraged analysts (Mujanovic, 2006) to cite the SASE as a catalyst for the development of the more fluid market economy hoped for in Bosnia and Herzegovina and across south-eastern Europe.

The rather disappointing performance of SASX-10 (an index measuring the performance of the ten largest SASE-listed companies) in 2006 could be attributed to a range of factors:

- The Federation parliament has so far failed to produce an update of the 1998 law on securities, which precludes investment outside the Federation by Federation-based investment funds.

- A legal framework for the creation of a Bosnian bond market does not yet exist, nor does obligatory support from the key financial institutions.

- Weakness of legal regulation.

- A lack of transparency. The Security Commission is still not in a position to compel shareholder-owned companies to publish their business results.

The development of investment funds in Croatia started when the Privatization Investment Fund Law was passed and when seven privatized investment funds (PIFs) were launched; in this way a large part of the state-owned corporate sector was transformed into private property. Many observers noted (Juric, 2005) that a mistake was made when the PIFs were allowed to transform themselves instantly into closed-end investment funds without any prior obligation to make their portfolios compliant with the Investment Funds Law, and then by their further transformations into holdings companies. The same evasion of the supervisory jurisdiction of the Securities Commission is not unique for the Croatian market, and the same behaviour was noticed in some other transition economies, notably in Slovenia.

The investment fund industry in Croatia was generated by large groups of banks. Motivated by expansion of their banking products, they started fund management firms and open-end investment funds. An important characteristic of the Croatian financial sector is the fact that this sector is already influenced by foreign financial conglomerates, which calls for appropriate measures to assure the chances for expansion of the domestic investment funds industry, as well as the protection of investors, especially small ones.

3. Risk – Return Statistics

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

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

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

The model is derived based on the following assumptions:

– Investors agree in their forecasts of expected returns, standard deviation and correlations. Therefore, all investors optimally hold risky assets in the same relative proportions.

– Investors generally behave optimally. In equilibrium, the prices of securities adjust so that when investors are holding their optimal portfolio, aggregate demand equals its supply.

– The model assumes that asset returns are (jointly) normally distributed random variables.

– The model assumes that the variance of returns is an adequate measurement of risk.

– The model assumes that given a certain expected return, investors will prefer lower risk (lower variance) to higher risk and conversely, given a certain level of risk, will prefer higher returns to lower ones.

– The model assumes that there are no taxes or transaction costs, although this assumption may be relaxed with more complicated versions of the model.

– The market portfolio consists of all assets in all markets, where each asset is weighted by its market capitalization. This assumes no preference between markets and assets for individual investors, and that investors choose assets solely as a function of their risk-return profile. It also assumes that all assets are infinitely divisible as to the amount which may be held or transacted.

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 (1968) this measure indicates the difference between a fund's actual return and the expected return the manager would earn if the money has been passively invested at the same risk level of the market index. To further quantify the manager's ability to predict market moves, Treynor and Mazuy (1966) added a quadratic term in the CAPM model

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

If positive, the Treynor-Mazuy coefficient γ shows a manager's 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 the Markowitz return-variance paradigm, Sharpe found how two statistical measures (the 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:

$$S_h = \frac{\bar{R} - R_f}{\sigma} \tag{3}$$

where $\bar{R}$ 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.

The risk of a portfolio comprises systematic risk, also known as undiversifiable risk, and unsystematic risk, which is also known as idiosyncratic risk or diversifiable risk. Systematic risk refers to the risk common to all securities - i.e. market risk. Unsystematic risk is the risk associated with individual assets. Unsystematic risk can be diversified away to smaller levels by including a greater number of assets in the portfolio (specific risks "average out"). The same is not

possible for systematic risk within one market. Depending on the market, a portfolio of approximately 30 securities in developed markets will render the portfolio sufficiently diversified to limit exposure to systemic risk only. In developing markets, a larger number is required due to higher asset volatilities.

From Equation 1, one easily derives the relation $\sigma^2 = \beta^2 \sigma_M^2 + \sigma_e^2$ between total risk, and systematic (market) risk, $\beta^2 \sigma_M^2$, and unsystematic risk, σ_e^2. The σ_M represents the standard deviation of the market return and the σ_e standard deviation of $\varepsilon_{i,t}$. The relation between systematic and unsystematic risk is presented in Figure 1.

A rational investor should not take on any diversifiable risk, as only non-diversifiable risks are rewarded within the scope of the CAPM model. Therefore, the required return on an asset, that is, the return that compensates for risk taken, must be linked to its riskiness in a portfolio context. In the CAPM context, portfolio risk is represented by higher variance, i.e. less predictability. In other words, the beta of the portfolio is the defining factor in rewarding the systematic exposure taken by an investor.

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 the 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

$$T_h = \frac{\overline{R} - R_f}{\beta} \qquad (4)$$

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 the Sharpe ratio for a fund relative to any benchmark, not only the risk-free rate. Although originally called the "appraisal ratio" by Treynor and Black, the information ratio is the ratio of relative return to relative risk (known as "tracking error"). Whereas the Sharpe ratio looks at returns relative to a riskless asset, the information ratio is based on returns relative to a risky benchmark, which is known colloquially as a "bogey." Given an asset or portfolio of assets with random returns designated by Asset, and a benchmark with random returns designated by Benchmark, the information ratio has the form: Mean (Asset - Benchmark) / Sigma (Asset - Benchmark). Here Mean (Asset - Benchmark) is the mean of Asset minus Benchmark returns, and Sigma (Asset - Benchmark) is the standard deviation of Asset minus Benchmark returns. A higher information ratio is considered better than a lower information ratio.

Figure 1: *Systematic and Non-Systematic Risk*
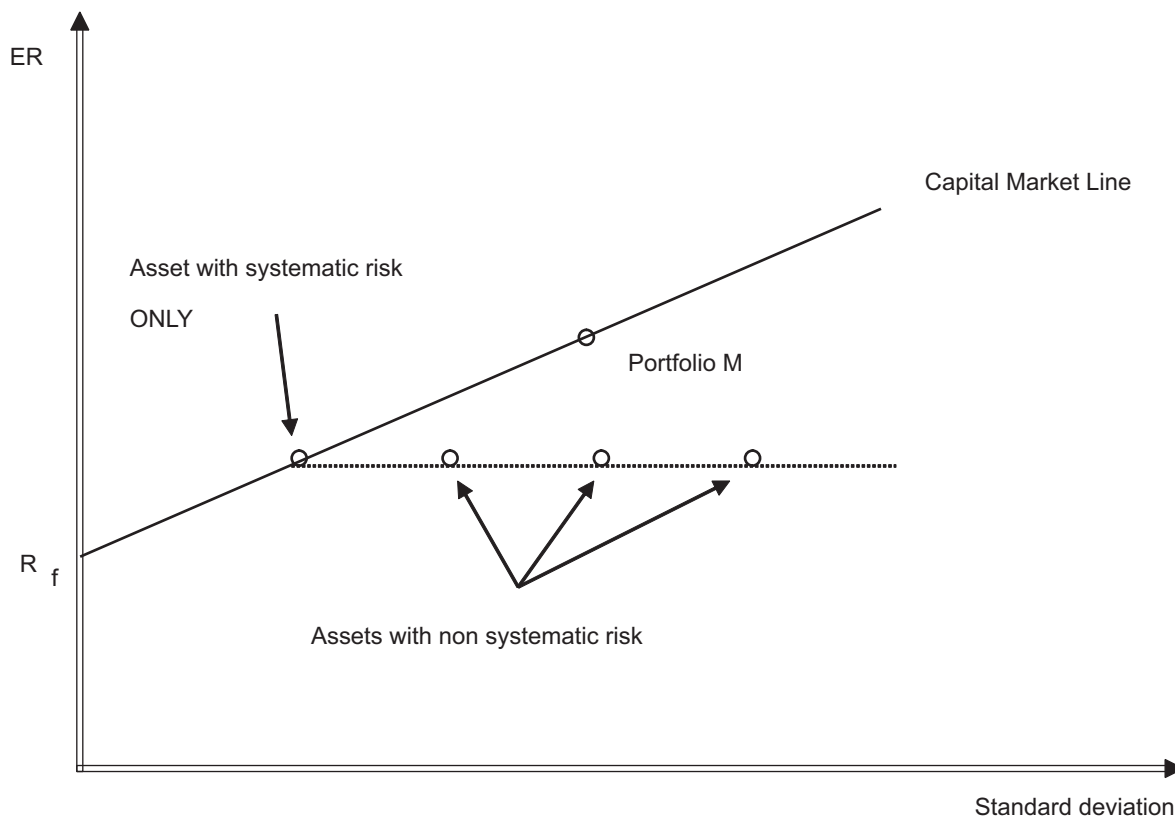
The Appraisal ratio adjusts Jensen's α for the unsystematic risk σ_e through the equation:

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

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

4. The Data

The data set includes the time series of major financial indices for the six south-eastern transition economies: Croatia, Slovenia, Bosnia and Herzegovina, Serbia and Montenegro, Macedonia, and Bulgaria. We also use fourteen open-end Croatian mutual funds managed by Croatian banks and financial management companies. The mutual funds start 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. The assets of Croatian mutual funds are composed of both domestic and foreign investments in transferable securities such as equity shares, bonds, bills of the central bank, bank deposits and other nationally registered investments.

According to empirical analysis performed by Sirri and Tuffano (1998), investors are more inclined to make their investment decisions based on a fund's return as opposed to a fund's risk adjusted return. Table 1 reports annualized returns calculated as proportional percentage rates for the following financial indices: CROBEX (Croatia), SBI20 (Slovenia), BELEX20 (Serbia & Montenegro), SOFIX (Bulgaria), and MBI-10 (Macedonia). Since the Bosnian market index is still not publicly available, in Table 1 we report the BIFX index, an abbreviation for Bosnian Investments Funds Index, as a representative for a Bosnian financial market. 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: *Proportional Return for Major Indices of South-Eastern European Transition 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) is also not included, but is generally very small.

We also use data for mutual funds in Croatia 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.

Table 3 shows Croatian funds and their performance statistics for the period 2001-2005. We divide the mutual funds in two groups (equity and balanced) based on their portfolio strategy. As a benchmark for these funds, we used the CROBEX index. The CROBEX index is a value weighted index composed of 23 stocks traded on the Zagreb Stock Exchange (ZSE). As a risk free rate benchmark, we used a three month treasury bill issued by the Croatian National Bank.

5. Results of the Analysis

In this section the results for Croatian and Bosnian mutual funds are presented separately. All estimations were performed with Matlab v6.0. Parameters of regression models for each mutual fund are obtained by applying the ordinary least square method. The models were also tested for the assumptions of the selected method, and no critical

Table 2: *Selected Mutual and Privatization Investment Funds*

FUND (COUNTRY)	START	N	A.R.	FUND (COUNTRY)	START	N	A.R.
RBA CE (CRO)	29/04/05	9	0.252	HI – GROWTH (CRO)	31/12/04	24	0.072
ZB EUROAKTIV (CRO)	30/06/04	19	0.156	HI – BALANCED (CRO)	31/12/04	24	0.048
RBA BALANCED (CRO)	31/12/04	24	0.240	CROBIH (BIH)	31/03/03	36	0.540
FIMA EQUITY (CRO)	30/06/04	19	0.252	BONUS (BIH)	31/03/03	36	0.540
KD VICTORIA (CRO)	31/12/04	24	0.276	HERBOS (BIH)	31/03/03	36	0.504
ILIRIKA JIE (CRO)	31/12/04	24	0.300	FORTUNA (BIH)	31/03/03	36	0.468
RBA ACTIVE (CRO)	31/12/04	24	0.084	MIGROUP (BIH)	31/03/03	36	0.324
ZB GLOBAL (CRO)	31/12/04	24	0.108	BOSFIN (BIH)	31/03/03	36	0.312
ZB TREND (CRO)	31/12/04	24	0.096	PROPLUS (BIH)	31/03/03	36	0.312
ERSTE BALANCED (CRO)	31/12/04	24	0.060	NAPRIJED (BIH)	31/03/03	36	0.348
ST BALANCED (CRO)	31/12/04	24	0.156	EUROFOND (BIH)	31/03/03	36	0.300
ST GLOBAL (CRO)	31/12/04	24	0.108				

Note: All series end at 31/08/06. START – beginning of the time series, N – number of observations, A.R. –annual return.

deviations of the assumptions were found. Therefore, the estimated parameters are best linear unbiased estimates.

In order to estimate the CAPM, it is necessary to define the market portfolio. The market portfolio should in theory include all types of assets that are held by anyone as an investment (including works of art, real estate, human capital, etc.) In practice, such a market portfolio is unobservable and we substitute a stock index as a proxy for the true market portfolio. Roll (1977) showed that this substitution is not innocuous and can lead to false inferences as to the validity of the CAPM (generally referred to as Roll's critique), but we believe that for selected markets no better proxy is available.

In addition to the problem of defining the true market portfolio, the model does not appear to adequately explain the variation in stock returns in some cases. Empirical studies show that low beta stocks may offer higher returns than the model would predict. Either that fact is itself rational (which saves the Efficient Market Hypothesis but makes the CAPM wrong), or it is irrational (which saves the CAPM, but makes the EMH wrong. Indeed, this possibility makes volatility arbitrage a strategy for reliably beating the market). Due to the fact that there are no definite results which would support the EMH for selected markets, the CAPM might be valid and therefore useful for analyzing the performance of the mutual funds.

5.1 Croatian Mutual Funds

In the performance evaluation process, we start by estimating CAPM (Equation 1) parameters for fourteen Croatian mutual funds. In Table 3 we show the annual return for each of the 14 Croatian mutual funds. The return stated in percent per annum, R_f, is converted to continuous monthly return, R_f, as follows $R_f = \ln(1+R_f)/12$. The average three month Treasury bill return was 4.2% for the period 1 January 2001 - 31 December 2005.

Focusing solely on returns, one can see (Table 3) that fund KD Victoria had outperformed its benchmark almost every year since its inception. The RBA balanced fund also exhibited good performance relative to the CROBEX index. Some Croatian funds posted negative returns in 2001 and 2002, as they invested in foreign markets that significantly underperformed in those two years.

Table 4 shows risk and return statistics for 14 Croatian mutual funds and the CROBEX index calculated over the past 2 years. In particular, we show the average monthly return (μ), total risk (standard deviation (σ_D)), unsystematic risk (σ_e), systematic risk (β), and R-squared values, all calculated from the simple regression of Equation 1. These parameters are calculated from market data and Equation 1. We also report the coefficient couples (β, γ) of the Treynor-Mazuy model after multiple regression of Equation 2 is applied. We see that if only return is considered, for the last two years only KD Victoria, having a mean monthly return of 2.3%, outperformed CROBEX. KD Victoria is also the riskiest among all the funds, which is reflected by the highest standard deviation. KD Victoria, RBA Central Europe, RBA Balanced, and FIMA Equity have shown practically the same average return, but the total risk of each one of them is substantially lower than the total risk of the CROBEX index.

The beta of these funds is typically less than 0.7. This is due to the fact that the funds invest across asset classes – stocks, bonds and cash (the 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, we next analyze the timing coefficients in the Treynor-Mazuy model. The analysis reported in Table 4 shows that only 3 of the 14 timing coefficients γ are positive, where only one of them is significant at the 5% level (Ilirika JIE). We note

Table 3: *Annual Return for Different Croatian Mutual Funds (in %)*

Fund	Begin	01	02	03	04	05	size of fund in millions of €
RBA Balanced	Aug 02	N/A	4.1	8.0	29.0	30.0	205
RBA Active	Oct 03	N/A	N/A	3.7	19.0	23.5	8.7
RBA Cent. Europe	Apr 05	N/A	N/A	N/A	N/A	17.9	63
ZB Global	Jul 01	-0.1	-2.4	4.8	12.1	16.5	137
ZB Trend	Nov 02	N/A	-4.4	6.2	7.4	19.0	67
ZB Euroaktiv	Jun 04	N/A	N/A	N/A	3.8	19.1	41
KD Victoria	May 99	52.0	24.1	-2.25	42.8	23.7	34
ILIRIKA JIE	Oct 04	N/A	N/A	N/A	10.1	31.9	8.9
ERSTE Balanced	Jan 01	-11.2	-15.9	3.2	5.4	11.7	7.4
ST Balanced	Oct 03	N/A	N/A	57.8	16.2	24.6	3
ST Glob. Equity	Oct 00	-7.7	-43.8	24.8	5.4	26.4	2.4
FIMA Equity	Jun 04	N/A	N/A	N/A	30.2	15.1	4.6
HI - Growth	Feb 02	N/A	-32.2	7.6	6.0	16.9	6
HI - Balanced	Feb 02	N/A	-25.3	2.41	5.54	11.5	5.9
CROBEX	Jan 01	16.6	13.4	0.01	32.1	27.6	

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 poorly, and decrease exposure in a strong market. Generally, managers on the 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 5 contains the results obtained for the Sharpe ratio, the Treynor ratio, the Information ratio IR, Jensen's α, and the Treynor 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. A 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 a Sharpe ratio over 2.0. From this point of view, the RBA Central Europe fund might be characterized as outstanding, while KD Victoria, RBA Balanced, FIMA Equity, ZB Euroaktiv, and ST Balanced

might be characterized as 'pretty good.' As far as the Sharpe ratio is considered, those 6 funds have superior performance over its benchmark. We find that rankings obtained by the Sharpe and Treynor rules are not the same, implying that funds are not well diversified.

From Table 5 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 has alphas equal to zero, 12 had positive alphas, and only 4 had negative alphas.

5.2 Bosnian Mutual Funds

Next we analyze performance of the Bosnian investment funds. In Table 6 we report their monthly log-return for the observed period. As far as return is concerned, for the three year period among funds we particularly point out CROBIH, BONUS, FORTUNA, and HERBOS, which exhibit excellent performance. The monthly average log-return ranges from 2.6% to 4.5% (31% to 54% in annual terms), where the BIFX index has log-return equal to 3.3%.

Table 4: *Croatian Mutual Funds for Monthly Recorded Log Returns*

Fund	μ	σ_D	σ_e	β	R^2	β	γ
RBA Ce	0.021	0.021	0.009	0.680 (5.027)*	0.808	0.853 (3.223)	-5.920 (-0.771)
ZB Eu	0.013	0.023	0.022	0.105 (1.357)	0.103	0.152 (1.608)	-0.578 (-0.879)
RBA Bl	0.020	0.039	0.017	0.542 (9.437)*	0.809	0.511 (7.140)	0.373 (0.736)
KD Vict	0.023	0.044	0.025	0.570 (6.866)*	0.692	0.584 (5.577)	-0.170 (-0.229)
ILIRIKA JIE	0.025	0.047	0.039	0.353 (2.376)*	0.320	0.152 (0.993)	2.439 (2.328)
RBA Ac	0.007	0.027	0.027	0.077 (0.859)	0.034	0.165 (1.516)	-1.057 (-1.375)
ZB Gl	0.009	0.021	0.012	0.274 (6.781)*	0.686	0.284 (5.574)	-0.118 (-0.328)
ZB Tr	0.008	0.021	0.020	0.094 (1.392)	0.085	0.151 (1.817)	-0.681 (-1.161)
ERSTE Bl	0.005	0.020	0.018	0.103 (1.661)	0.116	0.187 (2.598)	-1.009 (-1.983)
ST Bl	0.013	0.029	0.023	0.271 (3.506)*	0.369	0.296 (3.045)	-0.302 (-0.438)
ST Gl	0.009	0.036	0.033	0.225 (2.014)	0.162	0.264 (1.880)	-0.470 (-0.473)
FIMA Eq	0.021	0.044	0.019	0.564 (8.608)*	0.822	0.529 (6.565)	0.426 (0.757)
HI – Gr	0.006	0.025	0.021	0.208 (3.005)*	0.301	0.266 (3.157)	-0.711 (-1.189)
HI – Bl	0.004	0.019	0.016	0.158 (2.935)*	0.291	0.224 (3.569)	-0.808 (-1.816)
CROBEX	0.022	0.065		1	1		

Note: For the benchmark we use the CROBEX index. Risk-free annual return is 4.3%.

* Significant at 5% level.

Table 5: *Risk/Return Measures Calculated for Different Funds*

Fund	S_h	T_h	R	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 BI	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 BI	1.107	0.410	-0.627	0.050 (0.814)	0.628
ZB GI	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 GI	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 BI	0.190	0.125	-1.004	-0.010 (-0.209)	-0.161
HI – BI	0.152	0.063	-1.091	-0.025 (-0.598)	-0.461
CROBEX	1.060	0.179	0	0	0

Note: The benchmark market portfolio is the CROBEX index.

* Significant at 5% level.

Table 6: *Bosnian Investment Funds for Monthly Recorded Data*

Fund	μ	σ_D	σ_e	β	R^2	β	γ
CROBIH	0.045	0.108	0.095	0.490 (3.127)*	0.229	0.954 (4.207)*	-2.056 (-2.651)*
BONUS	0.045	0.132	0.106	0.741 (4.237)*	0.352	1.277 (5.073)*	-2.368 (-2.753)*
HERBOS	0.042	0.135	0.080	1.026 (7.779)	0.647	1.183 (5.686)*	-0.692 (-0.973)
FORTUNA	0.039	0.132	0.071	1.058 (9.082)*	0.714	1.037 (5.569)*	0.091 (0.143)
MIGROUP	0.027	0.104	0.063	0.784 (7.560)*	0.634	0.940 (5.805)*	-0.691 (-1.248)
BOSFIN	0.026	0.111	0.105	0.331 (1.917)*	0.100	1.000 (4.347)*	-2.961 (-3.764)*
PROPLUS	0.026	0.118	0.116	0.216 (1.135)	0.038	0.553 (1.877)	-1.491 (-1.480)
NAPRIJED	0.029	0.142	0.091	1.035 (6.921)*	0.592	1.054 (4.407)*	-0.084 (-0.103)
EUROFOND	0.025	0.118	0.100	0.581 (3.515)*	0.272	1.237 (5.687)*	-2.904 (-3.905)*
BIFX	0.033	0.106		1	1		

Note: For the benchmark we use the BIFX index. Risk-free annual return is 1.3%.

* Significant at 5% level.

Table 7: *Risk/Return Measures Calculated for Different Investment Funds*

Fund	S_h	T_h	R	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: For the benchmark market portfolio we use the BIFX index. CROBIX, BONUS, and FORTUNE provide more reward per unit of risk, either variance or beta, than the benchmark.

* Significant at 5% level.

Nevertheless, those excellent results for returns are followed by very high standard deviations, ranging on the 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 the relation between risk and the reward for bearing it, we calculate different risk adjusted performances. In Table 7 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 a similar ranking according to the Treynor ratio, with deviations found for BOSFIN and PROPLUS. In Table 5 we see that these two funds are characterized by smaller β values, which explains the larger values for the Treynor ratio. From the values calculated for the Information ratio, we see that four funds exhibit better performance as far as return is concerned.

Results for the funds reported in Table 7 indicate that 8 of the 9 alpha estimates are positive, indicating that managers might have had superior ability in market stock selection. Of these 8 positive estimates, one is significant at the 5% level.

6. Conclusions

Data clearly show that the world's best performing region over the last decade is Eastern Europe. The MSCI Eastern Europe has gained 27.2% per year since 2000, and even throughout the bear market from 2000 to 2002, the benchmark grew on. The strong growth of the financial market was noticed in Croatia and Bosnia as well. Based on the empirical analysis, we ranked funds according to their risk adjusted performance. Due to a strong outperformance of emerging markets over the past two years, the performance of Croatian funds was strong relative to the performance of mutual funds invested in developed markets. Our analysis included calculating Jensen's alpha, Sharpe's ratio and other standard risk-return statistics. The negative value of the Treynor - Mazuy coefficient suggested poor market timing ability. Further study should be performed to investigate its causes.

Particularly important for development of the Croatian market in the last two years are new and innovative banking products which offer an opportunity of combined investment in mutual funds and life insurance policies, a possibility for investment in mutual funds to serve as a collateral security, and also investment in a range of saving/investment products. In this way, investments of individual investors have the chance to grow faster than those of corporate investors.

The creation of a financial market represents a challenge for the local top management in both countries. In the beginning, local top management perceived disclosure requirements as a threat instead of an opportunity to educate potential investors about their companies. By 2007, local investors had made substantial progress in the learning and understanding of market operations, brand identity, market transparency and efficiency.

We believe that while a pull back in these markets is possible in the short term, the long-term outlook for South-

eastern European markets is still very attractive. There are three main factors driving growth: strong economic development and consumer confidence growth, structural improvements (lower levels of inflation, rising foreign reserves, better credit ratings for government bonds, etc.), and relatively attractive valuations for these emerging markets.

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