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# **OPPORTUNITIES TO IMPROVE THE PORTFOLIO PERFORMANCE BASED ON DIVIDEND STRATEGIES AND EQUITY HOME BIAS**

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**Abstract:** The article examines the equity home bias puzzle and the "Dogs of the Dow" dividend strategy under conditions of the Bulgarian capital market. It was found out that local investors hold 74.1% of their portfolios in domestic stocks, although ICAPM suggests weight of 0.007%, and the "Dogs of the Dow" strategy generates annual risk-adjusted hyper-profitability of 11.18%. Following the dividend strategy, combined with good international diversification provides good opportunities to improve portfolio performance.

**Keywords:** market efficiency; international diversification; equity home bias; dividend puzzle; the "Dogs of the Dow" strategy.

**JEL:** G11, G14, G15

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## **Introduction**

The analysis of market environment is an important part of the investment process which includes evaluation of the actual trading conditions and the degree of their conformity to the requirements of the applied investment strategy.<sup>1</sup> Such an analysis is the basis for the portfolio selection of markets and the set of tools that will be evaluated. The lack of well-developed capital market in Bulgaria leaves the answer to such

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an important question with great potential for attracting new investors, for the future. The Bulgarian Stock Exchange (BSE) has become an unattractive market for investors due to its low liquidity, the small number of listed companies, active positions and successful IPO, the lack of a segment for trading in financial derivatives, and other factors. Analyses show that the crisis causes serious market anomalies, occurring on the world stock exchanges, which to a greater extent and frequency also occur on the BSE, and this finds expression mostly in the comparative market efficiency with the valuation of assets. Besides being an additional risk that must be taken into account in portfolio investments, these results can be viewed as an opportunity to realize hyper-profitability. The exploitation of market inefficiencies is most often associated with the implementation of arbitrage (hedging) strategies – simultaneous long and short positions in target tools (portfolios). The implementation of such strategies on the Bulgarian capital market is almost impossible because there are no options and futures instruments, and the opportunities for short sales are very limited (a small number of companies, meeting the necessary criteria and the high associated costs). The aim of the author is to propose realistic and easy for practical use investment strategies for improving the portfolio performance of investors on the Bulgarian Stock Exchange. The object of analysis is the Bulgarian capital market and the subject – the success rate of the "Dogs of the Dow (BGTR30)" investment strategy and the optimality of the international diversification of Bulgarian investors.

## 1. Review of specialized literature

### *a) Equity home bias*

Equity home bias (EHB) disturbs the optimality of international portfolio diversification related to maintaining unreasonably high proportion of domestic stocks. According to the leading neoclassical theoretical model – the International Capital Asset Pricing Model<sup>2</sup> (ICAPM), the weight of domestic stocks in investors' portfolios should be equal to the share of the particular country in the global capitalization. This statement results from the law of one price and the assumption that there is an optimal international portfolio which all countries should possess. The profitability of foreign assets and their correlation with the domestic market are the leading factors. French<sup>3</sup> and Poterba

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<sup>2</sup> See **Solnik**, B.H. An equilibrium model of the international capital market. // Journal of economic theory, 8(4), 1974, pp.500-524; **Adler** M., Dumas B. International portfolio choice and corporation finance: A synthesis. // The Journal of Finance, 38(3), 1983, pp. 925-84.

<sup>3</sup> See **French**, K.R. and Poterba, J.M. Investor diversification and international equity markets (No. w3609). National Bureau of Economic Research. 1991.

(1991) conducted one of the first studies on the degree of international diversification of six of the world's largest economies. The obtained results, of over 90% share of domestic investment in most countries of the sample, far outweigh the theoretical assumptions. The concurrent studies, increasing the time range and the analyzed countries, confirm the presence of EHB, which seems more pronounced in emerging markets.<sup>4</sup> With the rapid development of mutual funds, regional and global ETF, e-commerce and the integration of stock exchanges, international diversification has been moderately increasing in recent years, but it is still far from the efficient levels. For this reason, the problem is often classified as a puzzle.

In specialized financial literature there are a number of proposals – why investors fail to take advantage of the significant benefits of international diversification. One group of studies refers to the role of corporate governance and the quality of financial supervision. Gelos<sup>5</sup> and Wei (2005) found a significant relationship between transparency on the one hand and the quantity of the attracted international capital on the other. Funds invest less in countries with less transparent corporate and political governance and in times of crisis withdraw their investments faster than them. An important factor in the course of analysis is the average level of majority ownership (insider ownership) in public companies. The low levels of free-float, on the one hand, indicate weak institutional supervision (protection of investors) and management problems (agency problems) between different classes of owners<sup>6</sup>, while on the other hand – purely technically, prevent foreign investors from owning greater share in domestic companies, hence EHB decreases<sup>7</sup>.

The direct barriers to international investment<sup>8</sup>, transaction costs<sup>9</sup>

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<sup>4</sup> See **Baele**, L., Pungulescu, C., Ter Horst, J. Model uncertainty, financial market integration and the home bias puzzle. // *Journal of International Money and Finance*, 26(4), 2007, pp.606-630; **Mercado Jr**, R.V. Emerging Asia Equity Home Bias and Financial Integration. // *International Economic Journal*, 27(4), 2013, pp.497-524; **Kim**, B.J., Yun, Y.S., Cin, B.C., Kim, Y. Home bias in emerging bond and stock markets. // *Emerging Markets Finance and Trade*, 50(4), 2014, pp.95-124.

<sup>5</sup> **Gelos**, R. G., **WEI**, S. J. Transparency and international portfolio holdings. *The Journal of Finance*, 60(6), 2005, pp. 2987-3020

<sup>6</sup> See **Stulz**, R. M. The limits of financial globalization. // *Journal of Finance* 60, 2005, pp.1595-1638.

<sup>7</sup> See **Dahlquist**, M., Pinkowitz, L., Stulz, R.M., Williamson, R.,. Corporate governance and the home bias. *Journal of Financial and Quantitative Analysis*, 38(01), 2003, pp.87-110; **Kho**, B.C., Stulz, R.M., Warnock, F.E.,. Financial globalization, governance, and the evolution of the home bias. // *Journal of Accounting Research*, 47(2), 2009, pp.597-635.

<sup>8</sup> See **Black**, F. International capital market equilibrium with investment barriers. // *Journal of Financial Economics* 1, 1974, pp. 337-352; **Errunza**, V. and Losq, E. International asset pricing under mild segmentation: Theory and test. // *The Journal of Finance*, 40(1), 1985, pp.105-124.

<sup>9</sup> See **Stulz**, R.M. On the effects of barriers to international investment. // *The Journal of Finance*, 36(4), 1981, pp.923-934.

(higher spreads, commissions and fees) and asymmetric information are another logical set of factors, affecting portfolio decisions. The results of more recent studies<sup>10</sup> reject transaction costs as an explanation for the weak international diversification. The stability of the puzzle in a situation of liberalization of capital markets and unification of investment costs between countries makes researchers pay more attention to the accessibility and the quality of information used. A great number of authors support the hypothesis that the high weight of domestic stocks in investors' portfolios is due to the fact that they have significantly more accurate and extensive information on cash flows and the risk of domestic assets than on foreign.<sup>11</sup> Dziuda<sup>12</sup> and Mondria (2012) noted that this hypothesis applies to individual investors who mainly invest through various collective schemes, managed by professional portfolio managers. However, it is unrealistic to argue that these managers are affected by asymmetric information. According to Dziuda and Mondria (2012), the reason why home bias is observed with contractual funds is related to the preferences and evaluations of individual investors who create the best prerequisites for managers to specialize in investment in domestic market.

If exchange rates vary according to the proposals of purchasing power parity<sup>13</sup>, the currency risk should not affect the portfolio decisions because it could easily be hedged on the money market. According to Stulz (1981) and Adler and Dumas (1983) individual investors consume different set of goods (on national and international level). Therefore, they are exposed to different inflation risk. In order to hedge this risk, they construct diverse portfolios

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<sup>10</sup> See **Tesar**, L.L., Werner, I.M. Home bias and high turnover. // *Journal of international money and finance*, 14(4), 1995, pp.467-492; **Warnock**, F.E. Home bias and high turnover reconsidered. *Journal of international Money and finance*, 21(6), 2002, pp.795-805.

<sup>11</sup> See **Gehrig**, T. An information based explanation of the domestic bias in international equity investment. // *The Scandinavian Journal of Economics*, 1993, pp.97-109; **Kang**, J.K. Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan. // *Journal of Financial Economics*, 46(1), 1997, pp.3-28; **Barron**, J.M. Ni, J. Endogenous asymmetric information and international equity home bias: the effects of portfolio size and information costs. *Journal of International Money and Finance*, 27(4), 2008, pp.617-635; **Van Nieuwerburgh**, S. Veldkamp, L. Information immobility and the home bias puzzle. // *The Journal of Finance*, 64(3), 2009, pp.1187-1215.

<sup>12</sup> See **Dziuda**, W., Mondria, J. Asymmetric information, portfolio managers, and home bias. // *Review of Financial Studies*, 25(7), 2012, pp.2109-2154.

<sup>13</sup> For more information on the various methods of assessing the exchange rates see: **Zahariev**, A., Radkov, R. *Mezhdunarodni finansi*. Abagar, 2015; **Kostov**, D. Exchange rate policies in the conditions of economic crisis and economic reforms. // *Aktualni pitannya funktsionuvannya finansovogo rinku v umovah krizovih yavisht svitovoї ekonomiki: Mizhnarodna naukovo - praktichna internet - konferentsiya - Odesa, 15-16 kvitnya 2016*, Odeskiy natsionalnyi ekonomichniy universitet pp. 128-132.

which create the puzzle. However, the results that Cooper<sup>14</sup> and Kaplanis (1994) obtain indicate that the inflation risk cannot explain the preferences of investors to domestic market. In addition to price changes, investors should hedge consumption of non-traded goods, which according to Baxter<sup>15</sup> et al. (1998) is also not enough to recreate the puzzle. For example, human capital hedging is realized through short selling of domestic stocks, which actually deepens the problem<sup>16</sup>.

The unconvincing results of the entirely rational puzzle solving models cause increasingly strong interest in proposals within the scope of behavioural finance. French and Poterba (1991) assume that this phenomenon is caused by manifestation of over-optimism in investors' expectations regarding the development of domestic capital market. Based on surveys, Shiller<sup>17</sup> et al. (1996) and Strong<sup>18</sup> and Xu (2003) proved the presence of such a biased presentation of domestic assets to foreign. The suggestion made by Graham<sup>19</sup> et al. (2009) that investors are perceived as more confident (competent) in trading on the domestic capital market than on the foreign is associated with over-optimism. Kirabaeva<sup>20</sup> (2007) defined the psychological dependencies: avoidance of ambiguity (Ambiguity Aversion) and over-optimism combined with over-confidence of investors, and concluded that these factors contribute to the puzzle but do not explain it entirely; combining them with institutional factors and asymmetric information would be appropriate. Solnik<sup>21</sup> (2008) defined the optimal international portfolio allocation through another alternative to the classical theory of usefulness in times of uncertainty – the Regret Theory. It is assumed that investors consider foreign assets with rising poten-

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<sup>14</sup> See **Cooper**, I. Kaplanis, E. Home bias in equity portfolios, inflation hedging, and international capital market equilibrium. // *Review of Financial Studies*, 7(1), 1994, pp.45-60.

<sup>15</sup> See **Baxter**, M., Jermann, U.J., King, R.G. Nontraded goods, nontraded factors, and international non-diversification. *Journal of International Economics*, 44(2), 1998, pp.211-229.

<sup>16</sup> See **Baxter**, M. Jermann, U.J. The International Diversification Puzzle Is Worse Than You Think. *The American Economic Review*, 1997, pp.170-180.

<sup>17</sup> See **Shiller**, R.J., Kon-Ya, F. and Tsutsui, Y. Why did the Nikkei crash? Expanding the scope of expectations data collection. *The Review of Economics and Statistics*, 1996, pp.156-164.

<sup>18</sup> See **Strong**, N., Xu, X. Understanding the equity home bias: Evidence from survey data. *Review of Economics and Statistics*, 85(2), 2003, pp.307-312.

<sup>19</sup> See **Graham**, J.R., Harvey, C.R., Huang, H. Investor competence, trading frequency, and home bias. // *Management Science*, 55(7), 2009, pp.1094-1106.

<sup>20</sup> See **Kirabaeva**, K. Can Ambiguity Aversion explain the Equity Home Bias?. 2007.

<sup>21</sup> See **Solnik**, B. Equity home bias and regret: an international equilibrium model. Available at SSRN 828405. 2008.

tial, which, if perform worse than the domestic portfolio, provoke regret for the investment made, i.e. investors avoid risk as well as regret.

*b) The dividend puzzle and the "Dogs of the Dow" strategy*

According to the traditional theoretical framework<sup>22</sup>, shareholders' wealth could not be created or destroyed by the dividend policy, so investors should be indifferent to the decisions taken. This is so because dividends and capital gains are perfect substitutes for one another: 1) the share price should be reduced by the amount of dividend distributions; 2) shareholders can make money by selling part of their shares, and vice versa – if they don't want dividends, they can buy shares. Economic practice draws an entirely different picture – public companies generally follow a strict dividend policy, and investors are strongly attached to cash dividends, although in many countries, including Bulgaria, that income is taxed more heavily than capital gains.<sup>23</sup> Moreover, the dividend yield affects stock returns, which allows for the application of dividend strategies for the realization of hyper-profitability. Stocks with high dividend yield realize more risk-adjusted return than securities of companies with low dividend yield.<sup>24</sup> Another violation of market efficiency is the fact that future stock returns can be foreseen with the help of dividend yield.<sup>25</sup> On the Bulgarian stock exchange Pavlov<sup>26</sup> (2014) tested both actively and passively managed portfolios of ten stocks with equal weights having the highest dividend yield. For the period 2001-2014 both portfolios realized an

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<sup>22</sup> See **Gordon** M., Dividends, Earnings and Stock Prices. // Review of Economics and Statistics, 41, 1959, pp. 99-105; **Miller** M. and Modigliani F. Dividend Policy, Growth and the Valuation of Shares. // Journal of Business, 34, 1961, pp. 411-433.

<sup>23</sup> **Loomis**, C., A case for dropping dividends, Fortune Magazine, 1968; **Miller**, M., Scholes, M. Dividends and taxes: Some empirical evidence, // Journal of Political Economy, 90(6), 1982, pp.1118-1141; **Brav** A., Graham J., Harvey C. and Michaely R. Payout Policy in the 21st Century, Journal of Financial Economics, 77, 2005, pp. 483-527.

<sup>24</sup> See **Rosenberg**, B. and V. Marathe,, Tests of capital asset pricing hypotheses, in: Haim Levy, ed., Research in finance, JAI Press, Greenwich, CT, 1979.; **Litzenberger**, R. and K. Ramaswamy, The effect of dividends on common stock prices, tax effects or information effects. // Journal of Finance 37, 1982, pp. 429-443; **Litzenberger**, R. and K. Ramaswamy, The effect of personal taxes and dividends on capital asset prices: Theory and empirical evidence, Journal of Financial Economics 7, 1979, pp. 163-195.

<sup>25</sup> See **Fama**, E. F., French, K. R. Dividend yields and expected stock returns. // Journal of financial economics, 22(1), 1988, pp. 3-25; **Hodrick**, R. J., Dividend Yields and Expected Stock Returns: Alternative Procedures for Inference Measurement. // Review of Financial Studies, Vol. 5, No. 3, 1992, pp. 357-386.

<sup>26</sup> See **Pavlov**, Ts. Dividend puzzle on Bulgarian stock exchange - Opportunity for abnormal risk-adjusted returns. // Yekonomichniy visnik Donbasu, copy 4 (38), Derzhavniy zaklad „Lugans'kiy natsional'niy universitet imeni Tarasa Shevchenka, 2014, pp. 121-125.

annual risk-adjusted hyper-profitability (alpha) of over 30%. The result is impressive, but low liquidity in most positions can be referred to as a drawback. In relation to this it is appropriate to test the puzzle through a strategy that takes into account liquidity positions. A good example is the easy for practical implementation "Dogs of the Dow" strategy, proposed by the financial analyst John Slatter and popularized in academic circles through the research work of O'Higgins<sup>27</sup> and Downes (1990). At the beginning of each year, of the 30 positions included in the Dow Jones Industrial Average (DJIA), the 10 companies with the highest dividend yield are selected and a portfolio with equal weights is constructed. The empirical study of the strategy carried out by Prather (2000) and O'Higgins and Downes (2000) for the period 1961-1998, show that it can realize higher absolute and risk-adjusted profitability compared to DJIA.<sup>28</sup> According to Hirschey<sup>29</sup> (2000) these results are the consequence of data mining and data errors; his empirical tests also found out a higher yield, but not hyper-profitability. At a later stage Prather<sup>30</sup> and Webb (2011) carried out new empirical studies conformable to the possibility of data mining and data errors. The results rejected the hypothesis of Hirschey (2000) and confirmed the validity of the strategy. The success of the "Dogs of the Dow" strategy is far from being limited to the US market. Satisfactory results were obtained in other developed markets, including the German, Canadian Australian and Swedish, and on the fast emerging capital markets in Poland, China, Argentina, Chile, Mexico and other Latin American countries.<sup>31</sup>

The dividend puzzle can be added to the group of market anomalies related to the value investing and just like EHB there is not a single and convincing explanation for its manifestation. Rational approaches focus on the information importance of the announcement of the amount of the dividend as an indicator for the future development of the company<sup>32</sup> and an instrument

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<sup>27</sup> See **O'Higgins**, M., Downes, J. *Beating the Dow*. Harper Collins, 1990.

<sup>28</sup> **Prather**, L.J. An Empirical Test of the Dow Dividend Theory. // *The Southern Business and Economic Journal*, 23(3), 2000, pp.170-184; **O'Higgins**, Michael B., Downes, J, *Beating the Dow*, HarperCollins, 2000.

<sup>29</sup> See **Hirschey**, M., 2000. The "dogs of the Dow" myth. // *Financial Review*, 35(2), pp.1-16.

<sup>30</sup>See **Prather**, L. J., Webb, G. L. Window dressing, data mining, or data errors: A re-examination of the Dogs of the Dow Theory.// *Journal of Applied Business Research (JABR)*, 18(2), 2011.

<sup>31</sup> For an extensive review of theoretical and empirical research, studying the success of the 'Dogs of the Dow' strategy, see **Clemens**, M. *Dividend Investing: Strategy for Long-Term Outperformance*. Available at SSRN 2056317, 2012.

<sup>32</sup> See **Hakansson**, N. To pay or not to pay dividends. // *Journal of Finance* 37, 1982, pp. 415-428

for resolving the conflicts between the management and shareholders<sup>33</sup>, especially in situations when companies possess large amounts of cash. Behavioral finance focuses on the theory of self-control and the prospect theory as a possible explanation of the puzzle. The main focus in both formulations is that from investors' point of view, dividends and capital gains are not interchangeable. Dividends provide some balance between the current and future consumption without the need for self-control as it is with the individual decision to redeem part of the capital gain. Moreover, when selling shares, investors should take a decision which they might regret in the future (e.g. in case of a strong price increase). Important postulates of the prospect theory read that investors accept losses more heavily than gains (loss aversion) and evaluate the usefulness in terms of potential profits and loss. This makes dividends particularly attractive, given their historical distribution.

## 2. Methodology of the study

### a) Equity home bias (EHB)

In order to establish the presence of EHB in the portfolio of a country  $i$ , it is typical to calculate the relative difference between the empirical (EW) and theoretical (TW) weight of foreign assets (Baele *et al.*, 2007; Mercado, 2013):

$$(1) \quad EHB_{i,t} = 1 - \frac{EW_{i,t}}{TW_{i,t}}.$$

When (1) is close to one, investors' equity home bias is stronger in country  $i$ . If  $EHB = 0$ , the distribution is optimal and we cannot speak of a puzzle. The value of the actual weight of foreign assets in a portfolio of securities of country  $i$  is worked out by:

$$(2) \quad EW_{i,t} = \frac{AI_i}{AI_i + C_i - FI_i},$$

where:

$AI_i$  is the value of the investments of country  $i$  in foreign stocks and mutual funds;  $C_i$  – the market capitalization of the capital market in country  $i$ ;  $FI_i$  – the value of domestic securities held by foreigners.

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<sup>33</sup> See **Borges**, M. R. Is the Dividend Puzzle Solved?. Available at SSRN 1343782, 2009.



As already mentioned, according to ICAPM, the theoretical level of foreign assets in the portfolio (TW) depends on the share of country  $i$  in the global capitalization ( $w_i = 1 - C_i / \sum_j C_j$ ). An alternative approach for calculating the TW is provided by the classical model of Markowitz<sup>34</sup> (1952) of portfolio optimization. This method will rather be used to evaluate potential positives (through the risk-return prism) of an increase in international diversification. The return on the portfolio is a weighted by the expected return on individual assets arithmetic mean, as the optimum weight of the foreign asset is worked out by:<sup>35</sup>

$$(3) \quad TW_{i,t} = \frac{\sum \mu_e}{i' \sum^{-1} \mu_e},$$

where:

$\mu_e$  is a vector of the expected return;  $i'$  – vector-pillar parameter;  $\sum$  – variance-covariance matrix (VCM),  $\sum(VCM) = \begin{bmatrix} \delta_{1,t}^2 & cov_{12,t} \\ cov_{21,t} & \delta_{2,t}^2 \end{bmatrix}$ .

*b) The dividend puzzle and the "Dogs of the Dow" strategy*

Three steps are necessary for the implementation of the "Dogs of the Dow" strategy: (1) based on the last price for the year and the dividend yield of the thirty stocks, included in the DJIA, ten of them with the highest dividend yield are selected; (2) an investment portfolio with equal weights is constructed from these ten issues (equal amount is invested in each share); (3) the procedure is repeated at the beginning of the next year. Under conditions of the Bulgarian capital market the strategy is tested on the basis of the BGTR30 index. It is chosen because it includes thirty companies (just like DJIA), the exchange liquidity is one of the criteria for selection of the constituent emissions and is the only Bulgarian index whose calculation includes distributed dividends. In addition, the presented concept is tested in a narrower version as

<sup>34</sup> See **Markowitz**, H. Portfolio selection. // The journal of finance, 7(1), 1952, pp.77-91.

<sup>35</sup> **Mercado Jr**, R.V. Emerging Asia Equity Home Bias and Financial Integration. // International Economic Journal, 27(4), 2013, p.501; For more information on the specifics of optimization tasks see **Patev**, P. Upravlenie na portfeyla. Abagar, 2015.

well – the portfolio (Small Dogs), including the 5 stocks with the highest dividend yield of the ten selected.

The return on the portfolio ( $R_{p,t}$ ) is calculated using the standard methodology:

$$(4) R_{p,t} = \sum_{i=1}^N \frac{D_{i,t} + M_{i,t} + P_{i,t} - P_{i,t-1}}{P_{i,t-1}} \Big/ N,$$

where:

$P_{i,t}$  ( $P_{i,t-1}$ ) is the closing price of share  $i$  at time  $t$  ( $t-1$ );  $D_{i,t}$  – distributed dividend from security  $i$  during period  $t$ ;  $M_{i,t}$  – value of the stocks, resulting from the stock split increase.

To confirm the presence of a dividend puzzle it is necessary to prove that the realized return on the portfolio is higher than the rational compensation for the risk taken assumes. In this regard, the popular model of Jensen<sup>36</sup> (1968) for risk-adjusted return will be applied, according to which we can speak of hyper-profitability when  $a > 0$ :

$$(5) R_{p,t} - R_{f,t} = a + \beta_p (R_{m,t} - R_{f,t}) + \varepsilon_{p,t},$$

where:

$R_{p,t}$  is the return on the analyzed portfolio;  $R_{f,t}$  – return on the risk-free asset;  $a$  – risk-adjusted over-profitability;  $\beta_p$  – systematic risk of the portfolio;  $R_{m,t}$  – return on the market portfolio;  $\varepsilon_{p,t}$  – random variation at time  $t$ .

## 2. Data sources

In order to achieve a comparative assessment of the degree of international diversification of Bulgarian investors, 5 markets are analyzed – Romania, Hungary, Poland, Ukraine, and the Baltic capital market, integrating the regional markets in Estonia, Latvia and Lithuania. Data for investment in foreign stocks and mutual funds of individual countries and the value of their domestic securities, held by foreigners, is obtained from the IMF – the "Coordinated portfolio investment survey" (CPIS)<sup>37</sup> database. The period of the sample is from 2001 to June 2015. The annual values of the global market

<sup>36</sup> See **Jensen**, M.C. The performance of mutual funds in the period 1945–1964. // The Journal of finance, 23(2), 1968, pp. 389-416.

<sup>37</sup> <http://www.imf.org/> > data > Coordinated Direct Investment Survey (CDIS) – Tables 1,8 (last accessed on 10.05.2016).

capitalization are derived from studies of the World Federation of Exchanges (WFE), while those of individual countries – from indexmundi.com and the websites of the exchanges.<sup>38</sup> The conversion of local currencies into dollars was made at the end of the corresponding period at exchange rates from the European Central Bank (ecb.europa.eu) and bloomberg.com. The leading index of the Bulgarian Stock Exchange (SOFIX) is used as a proxy for the market activity in the country; data on its historical dynamics is obtained from S&P Capital IQ<sup>39</sup> and infostock.bg. MSCI WORLD<sup>40</sup> indexes are considered the epitome of the global portfolio.

The information on the structure of SOFIX and BGTR30 indexes and the distributed dividends by respective positions during the analyzed period was obtained from bse-sofia.bg and infostock.bg. Pavlov's methodology<sup>41</sup> (2015), taking into account the structure of the index, the free-float and the weight factor of individual issues during the respective periods, was used to derive the SOFIX dividend yield. The domestic risk-free rate of return is calculated as the cumulative annual return on three-month government securities (if such an issue lacks, the return on the issued government securities with the shortest maturity is applied) at the time of their issue, based on data of the Ministry of Finance (minfin.bg). The data on price dynamics of variables is also obtained from S&P Capital IQ and infostock.bg, and the period of study is from the creation of BGTR30 (2007) to 2015.

## 4. Results

### *a) Equity home bias*

For the six analyzed countries, a significant geometric mean growth of investments abroad is observed – from 12.5% to 78.8% per year (see Table. 1). The highest rate is in Bulgaria, as the trend has hastened after 2008. The

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<sup>38</sup> <http://www.world-exchanges.org/> > WFE RESEARCH; indexmundi.com >Countries> Financial Sector > Capital markets> Market capitalization of listed companies; bse-sofia.bg, basemarket.bg; nasdaqbaltic.com; bvb.ro; bse.hu; gpw.pl; pfts.ua, ux.ua; (last accessed on 10.05.2016).

<sup>39</sup> The access to the database was possible in connection to the implementation of the infrastructure project №17-2016 'Advanced studies in investment, finance and portfolio management through professional base of economic data' under the Institute for Scientific Research at D.A Tsenov Academy of Economics – Svishtov.

<sup>40</sup> Data source <https://www.msci.com/end-of-day-data-search> (last accessed on 10.05.2016).

<sup>41</sup> See **Pavlov**, Ts. Prilozhenie na povedencheskite finansi pri modelirane na balgarskata riskova premiya na aktsiite. // Business Management Journal, XXV, issue 2, Tsenov, 2015, pp. 96-130.

structure of preferred by Bulgarians investment destinations for the past seven years has also changed – the US share increased more than twice to 25.1%, mainly at the expense of Luxembourg whose share in Q2/ 2015 reached 22.4%, followed by Germany (16.2%), France (12.8%) and Ireland (6.6%).

**Table 1. Descriptive statistics of portfolio investments abroad ( $AI_i$ ), the value of domestic securities, held by foreigners ( $FI_i$ ), and market capitalization ( $C_i$ ) by countries for the period 2001-2015 (Q2)**

*(in million \$)*

State Indicator	Bulgaria	The Baltic States	Romania	Hungary	Poland	Ukraine
<b><math>AI_i</math></b>						
Geomean	78.8%	48.5%	45.3%	27.7%	42.9%	12.5%
Max	1489.48 (2015/Q2)	7790.48 (2015/Q2)	1200.43 (2012)	10640.08 (2010)	16989.77 (2015/Q2)	80.01 (2014)
Min	0.43 (2001)	30.84 (2001)	5.72 (2001)	237.8 (2001)	115.1 (2001)	12 (2012)
Stdev ( $\sigma$ )	346.8%	87.6%	150.5%	71.3%	83.1%	134.6%
<b><math>FI_i</math></b>						
Geomean	12.4%	13.1%	18.1%	4.3%	16.5%	11.4%
Max	1481.19 (2007)	3455.25 (2007)	3200.62 (2007)	20637.13 (2006)	36472.66 (2013)	1981.19 (2007)
Min	4.36 (2002)	224.35 (2001)	117.26 (2002)	4022.81 (2001)	3445.93 (2001)	71.35 (2003)
Stdev ( $\sigma$ )	155.9%	56.0%	72.5%	41.5%	36.7%	92.1%
<b><math>C_i</math></b>						
Geomean	17.6%	11.7%	17.5%	3.6%	13.9%	11.0%
Max	21513.82 (2007)	19278.18 (2007)	44925.26 (2007)	47651.14 (2007)	208878.6 (2007)	111757 (2007)
Min	504.79 (2001)	1467.8 (2001)	2124.01 (2001)	10366.87 (2001)	26063.54 (2001)	1364.93 (2001)
Stdev ( $\sigma$ )	59.4%	57.2%	52.5%	34.1%	38.7%	87.8%

Foreign portfolio investments have lower growth rate close to that of domestic market capitalizations. In absolute value their peak was reached before the financial crisis of 2008 (except for Poland). Then their rate of change becomes higher than the reduction of the relevant markets. Therefore, we cannot say that on these markets there is a priority withdrawal of foreign in-

vestors, for example, because of non-transparent corporate and state governance. Rather, during that period, foreign investments (such as shares in companies) remain at the same levels. With the exception of Hungary, the analyzed markets are characterized by higher growth than the global capitalization which rose on average by 7.64% annually in the period 2001-2015 (Q2). However, this is due to the period before 2008 as the recovery of these markets is significantly slower than the world average, whose market valuation is 22.4% higher than in 2007.

Investors from the selected countries in Central and Eastern Europe show strong equity home bias (EHB) (see Table 2). At the beginning of the sample, EHB is near its extreme value of one, but in most countries the fixed outstripping growth of investments abroad leads to its gradual reduction in recent years. By mid-2015, EHB is the lowest in the Baltic States (0.42), Hungary (0.57) and Bulgaria (0.74).

*Table 2. EHB dynamics for the period 2001-2015, Q2*

State Year	Bulgaria	The Bal- tic States	Romania	Hungary	Poland	Ukraine
2001	0.999	0.976	0.997	0.964	0.995	0.990
2002	0.999	0.986	0.996	0.971	0.993	0.995
2003	0.999	0.971	0.998	0.967	0.993	0.997
2004	0.994	0.958	0.997	0.937	0.988	0.998
2005	0.995	0.922	0.991	0.906	0.979	0.998
2006	0.983	0.882	0.981	0.818	0.961	0.999
2007	0.980	0.820	0.978	0.780	0.937	0.999
2008	0.979	0.781	0.960	0.657	0.945	0.999
2009	0.942	0.678	0.980	0.633	0.946	0.997
2010	0.897	0.593	0.975	0.603	0.936	0.999
2011	0.936	0.459	0.951	0.631	0.936	0.999
2012	0.909	0.492	0.919	0.661	0.936	0.999
2013	0.878	0.458	0.948	0.606	0.935	0.996
2014	0.815	0.451	0.950	0.518	0.914	0.992
2015, Q2	0.741	0.420	0.944	0.572	0.886	0.987

The results cannot be bound up with the risk and return characteristics of individual markets. In efficient markets, EHB in Ukraine and Bulgaria should be the lowest because domestic investors would diversify more in geographical principle, due to higher unsystematic risk of their markets.

Of course, the discussed EHB values are based on the assumption that ICAPM is valid. Specifically for Bulgaria, the study of the model was carried

out by regression of the monthly SOFIX logarithmic returns (denominated in dollars) to the return on the global portfolio – MSCI ACWI. Of 180 observations, the  $\alpha$  coefficient is not statistically different from zero (P-value = 0.29), while the  $\beta$  coefficient of 1.24 is valid at 99% confidence interval. This gives grounds to state that the presence of EHB in Bulgaria is proven and the optimal level of the domestic asset (according to ICAPM) is equal to the weight of the BSE in the global capitalization – 0.007% towards Q2/ 2015.

A weakness of the alternative risk and return approach to derive the theoretical optimum between domestic and foreign assets is the need in its standard application to use average historical values as a forecast for the future. In relation to this, the extremes in the behavior of our native market require the sample to be reduced (from 2009 to 2015), thus bringing to normal the yield and the risk. The obtained results, compared to MSCI ACWI, MSCI ACWI ALL CAP and the regional MSCI EURO suggest that the weight of our domestic market should be equal to zero, which actually does not differ significantly from the ICAPM assumption. Optimizations were carried out by the "minimum risk" criterion as well as for the maximum yield-risk ratio.

#### *b) "Dogs of the Dow" dividend strategy*

The constructed portfolios, according to the tested dividend strategy, realize significantly higher return at lower or comparable annual variability towards SOFIX and BGTR30 benchmarks (see Table. 3). From a psychological point of view (perspective utility), the main advantage of this strategy is the small number of years with negative returns at a time when the index from which the companies are selected, realizes losses in five out of the eight years of the sample. As expected, the portfolio of five stocks (Small Dogs) has a higher volatility than the standard portfolio (Dogs of BGTR30), which is not fully compensated by the yield, i.e. yield-risk ratio is lower.

The easy for practical implementation "Dogs of the Dow" strategy manages to achieve statistically significant high levels of alpha in the Bulgarian capital market –  $\alpha_{\text{SOFIX}} = 11.18\%$ ,  $\alpha_{\text{BGTR30}} = 12.59\%$ . Similar risk-adjusted hyper-profitability could not be eliminated by adding the transaction costs to the analysis.<sup>42</sup> This gives grounds to say that the dividend puzzle is also valid with relatively more liquid companies on the BSE.

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<sup>42</sup> On average less than half of the companies change their portfolio each year. With a standard commission of 0.5%, the annual costs would be below 0.5% of the portfolio value. Of course, such an analysis should also include the cost of the index fund at regular rebalancing of indexes, which reduces the relative cost of the implementation of the strategy.

*Table 3. The "Dogs of the Dow" strategy investment performance*

Year \ Portfolio	Dogs of BGTR30	Small Dogs	SOFIX	BGTR30
2008	-71.75%	-76.50%	-79.35%	-75.14%
2009	32.00%	37.65%	19.39%	22.73%
2010	13.35%	9.29%	-14.35%	-9.36%
2011	3.02%	9.11%	-9.68%	-12.85%
2012	32.22%	54.86%	12.53%	-2.51%
2013	39.62%	36.54%	49.02%	35.35%
2014	22.95%	8.27%	9.58%	17.09%
2015	-1.73%	4.23%	-10.21%	-6.05%
<b>2009-2015</b>				
Geomean	19.29%	21.54%	6.20%	5.00%
Stdev ( $\sigma$ )	15.77%	19.85%	22.28%	18.59%
Geomean / Stdev ( $\sigma$ )	1.2236	1.0852	0.2784	0.2691
<b>2008-2015</b>				
Geomean	-0,37%	-1.03%	-13.46%	-12.30%
$\alpha_{\text{SOFIX}}$	11.18%*	13.13%		
$\alpha_{\text{BGTR30}}$	12.59%*	14.34%		
$\beta_{\text{SOFIX}}$	0.9182**	0.9632**		
$\beta_{\text{BGTR30}}$	1.0059**	1.0109**		

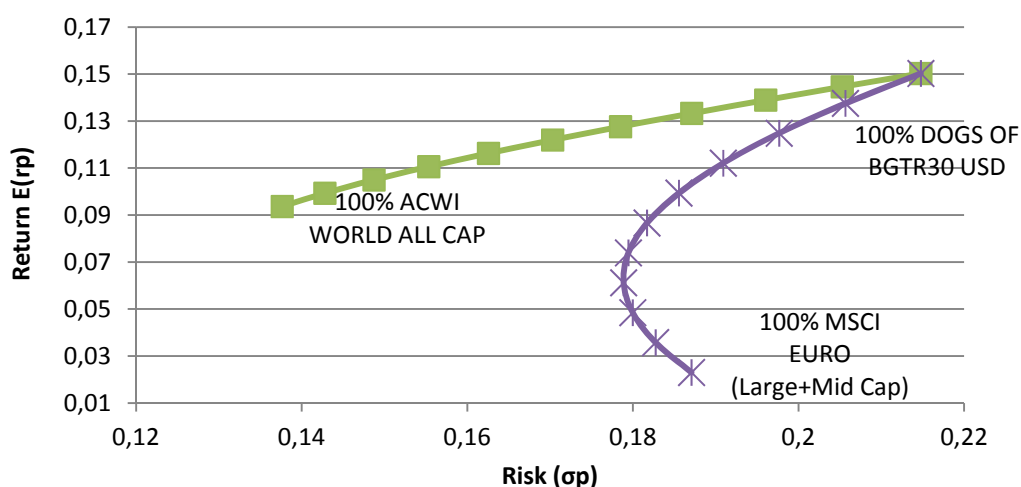
\* Statistically significant value at 97% confidence interval

\*\* Statistically significant value at 99% confidence interval

*c) A combination between EHB and the "Dogs of the Dow"*

The above mentioned gives grounds to recommend that Bulgarian investors significantly increase the share of overseas assets as lovers of value investing have full grounds to redirect capital into dividend strategies on the BSE. Figure 1 clearly highlights the positives that would be received by investors following this recommendation. Assuming that past performance will be maintained in the future, the maximum yield per unit of risk is obtained with 48.5% invested in Dogs of BGTR30 and the rest in the global portfolio. For those who wish to minimize currency risk, a good combination would be with regional indexes of companies within the Euro area. For example in MSCI EURO – aiming to limit the risk of the portfolio, a ratio of 68.4% in it and 31.6% in the Dogs of BGTR30 is optimal.

Figure 1. Risk and return of possible asset combinations



The presented combinations for international diversification are far from abstract. The opportunities for investment in such indexes (and their variants) are becoming more accessible to the general investor through foreign mutual funds entering our market and the access provided by the platforms of the financial intermediaries to multiple ETF.

## Conclusion

The analysis carried out, and the results obtained allow us to draw out the following main conclusions:

**First.** Bulgarian investors show strong equity home bias – just over 74% of their portfolios are invested on the Bulgarian Stock Exchange (BSE). According to the International capital asset pricing model (ICAPM), whose validity for the country was proven, the optimal weight of the domestic asset is equal to only 0.007%. Through the risk-return prism, the current portfolio allocation of investors is irrational.

**Second.** A dividend puzzle exists on the BSE – investors receive too much premium for holding shares with a high dividend yield. For the period 2008-2015, the "Dogs of the Dow" strategy under the BGTR30 index generated an annual risk-adjusted hyper-profitability of 11.18% with  $\beta_{\text{SOFIX}} = 0.9182$ .

**Third.** A good opportunity for small investors to improve their investment performance is the combination of priority investments in global (regional) ETF and moderate investments in divided strategies on the domes-



tic market. This combination of active and passive profiling promises to become a successful and extremely easy to use strategy that does not require significant capital, expertise, access to information or high-tech infrastructure with complex algorithms.

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