IMPORTANCE OF COUNTRY VERSUS INDUSTRY EFFECTS FOR DIVERSIFICTION STRATEGIES

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A thesis submitted in partial fulfilment of
the requirements for the degree of

Master of Arts in Economics

National University "Kyiv-Mohyla Academy"
Economics Education and Research Consortium

2006

Approved by _____
Ms. Serhiy Korablin (Head of the State Examination Committee)

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Program Authorized
to Offer Degree Master's Program in Economics, NaUKMA

Date _____

National University "Kyiv-Mohyla Academy"

Abstract

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This paper examines the importance of country and industry effects for diversification strategies. It researches the volatility of pure country and industry returns, because the higher volatility provides the source for shocks elimination and for explaining correlation structure of country and industry indices. The paper finds out that country factors are more volatile, and that country composition is the main source of low correlation between countries. Industry composition of country indices is less important in correlation structure. So, country diversification is better than industry one for the considered emerging market region .

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ACKNOWLEDGMENTS

The author wishes to thank Tom Coupe and all research workshop faculty for their useful advices.

INTRODUCTION

One of the classical themes of financial economics is how the investor can reduce its risk using diversification. The question is very important in the sense that over the last decade we have observed increasing economic integration among countries and globalization of business enterprises, so we can predict the increasing importance of industry diversification and diminishing importance of the country factor. The increasing amount of investments in the developing countries makes us to ask a question to what extent country and industry effects explain the returns on the securities in the transition markets .

A number of studies have tried to investigate the issue for developed and developing countries. With the world changing, the authors came to different results. Up to 1995, country factors have more power in the explaining the excess returns of the developed countries, but then, due to the world globalization, industry factors seems to be more important. The picture is much more different for the developing countries. The countries factors play greater role in the excess returns than the industry ones, which means that developing countries are less similar to each other (Phylaktis and Xia, 2004).

The studies for the emerging countries considered countries of Latin America, Asia Pacific, South Africa. In my study I am going to investigate transition countries of former communist regime. Transition countries of the communist regime should be different from the rest of the world, because historically such countries developed only certain industries, which were additional to the industries of another countries. So, country effect should dominate. But, from the other side, we see increasing globalization of transition markets with western companies. From this side, industry factors should prevail. So, there could be different evidence. Also, my study is interesting because of the increasing interest towards investment management in the transition countries, as number of investors rise each year.

I am going to make my research for the eight transition markets, namely, Croatia, Slovakia, Czech Republic, Estonia, Latvia, Romania, Ukraine, and Russia . This countries are among the Emerging capital markets according to Standard & Poor's Classification. The research will cover approximately 130 enterprises in these countries, which constitute to near 80% of the emerging markets capitalization. The enterprises will be divided into the 9 industries according to the ISI Emerging Markets classification, namely: mining; utilities; construction; manufacturing; retail trade; transportation and warehousing; information and IT; finance and insurance.

The novelty of the study is that nobody does the analyses for the region considered in the paper. Also, the study will generate the important conclusion for the investors, how it is better to diversify the risk: across countries or industries.

LITERATURE RIVIEW

The question of industry versus country diversification has a long history and different conclusions due to different time periods and different countries investigated. The first attempt in this investigation area was made by Solnik (1976). He took major European stock markets using over 300 European stocks. The estimates of the price variability or risk of the securities and portfolios were based on weekly price movements for the period 1966 – 1971. Seven countries were included: United Kingdom, Germany, France, Switzerland, Italy, Belgium and The Netherlands. The author has built the Sharpe diagram, which is the ratio of the portfolio variance to the variance of the common security , on the basis of picking securities across countries and across industries. In his work he came to the conclusion that international diversification is better than domestic, and also that country diversification is more important than industry diversification. (Solnik, 1974).

More recent research by Heston and Rowenhorst (1994) came to the same conclusion, that country effects, but not the industry structure, is responsible for low correlations of European equity markets. The authors used monthly data for the 829 firms that comprise the Morgan Stanley Capital International indices of 12 European countries. In order to separate country from industry performance Heston & Rouwenhorst run the dummy regression,

where the return of the particular country was decomposed into the component that is common to all countries, the average of the industry effects of the securities that make up country index, and a country-specific component. Similarly, the industry return was decomposed into the component that is common to all industries, the average of the country effects and industry specific component.

The main result of the excess index returns decomposition shows that the variance of excess country effects is explained mostly by the variance of pure country effect (24,18% squared), while the combined industry effects explain only 0,6% of the variance of the excess country returns. The variance of the excess industry returns is explained by pure industry effects on 5,43%, and the variance of combined country effects constitute to 1,08%. This means that the variance of pure country effects is bigger than the variance of pure industry effects, meaning that country diversification strategy is better as this country factor constitutes to greater risk in the excess returns.

Then the country index returns were corrected to exclude the sources of return variation that are due to the industrial composition of the country indices, and industry index returns were corrected to exclude the sources of return variation that are due to the geographical composition of the industry indices. The results show that country correlation, corrected for industry composition, was almost the same as the raw correlation data, but the industry correlation, corrected for country effect, change more, meaning, that country effect constitute a larger proportion of the variance of

industry returns, than industry effects do of country returns. Heston and Rouwenhorst also built the Sharpe ratio and find that diversification across industries within a single country reduces portfolio variance to 38%, while the diversification across countries within a single industry reduces the portfolio variance to 20% (Heston, Rouwenhorst, 1994).

The further research came to the conclusion that industry factor is growing over time and up to now industry diversification is less risky. The study of Cavaglia, Brightman and Aked investigates the pure global industry and global county returns on the basis of FT/S&P index for 36 developed countries. The authors take the series of local total and excess returns to measure the performance of portfolios of securities belonging to the same industry within a country. Then they aggregate the country industry returns to obtain world industry returns. The authors estimated "pure" industry and "pure" country returns by running the regression for the return of security I that belongs to industry j in country k.

Based on the regression results, the authors built 52 week moving average of the country & industry mean absolute deviations using "pure" industry and "pure" country returns and capitalization weights for them. They concluded, that up to the year 1995 the country diversification reduces more risk, but now industry diversification has greater importance. The authors also computed capital weighted volatility for the universe of the securities and built Sharpe diagram for the country and industry returns, and came to the

conclusion, that for the years 1986 – 1994, country factors were more important, but for years 1995 – 1999 industry factors were more important in risk reduction (Cavaglia, Brightman and Aked, 2000).

But even in the periods prior 1995, there are studies that find different conclusions for the developed countries. One of the measure of the importance of the industry factors examined in the literature is the frequency, with which industry factors have been significant contributors to the excess return. Grinold (1989) reported that 32 of the 36 industries exhibited increasing significance of the industry factor in the 1986-1988. Beckers (1996) reported a decline in the average number of month for which industry factors were significant for the period 1986 to March 1990.

The approach by Heston and Rouwenhorst was used to estimate country and industry effects in emerging markets. Bruner, Conroy and Li (2004) took the International Finance Corporation Investable indices of 31 emerging market countries between January 1990 and January 2003. The authors has estimated mean and standard deviation for the monthly equal-weighted and value weighted pure countries and pure industries effects and built the correlation matrix of these coefficients. The article finds out that the variance of pure industry returns has reduced substantially , but the correlation increased, comparing to the raw data. The variance and correlation of pure country returns did not change compared to the raw data. These means that country effects play major role in the risk reduction for the developing countries. The methodology of

estimating variance of the pure country and industry effects separately for the developed, developing countries, and for the world as a whole was used in Phylaktis and Xia study also (2004). The results have shown that the shift between two effects varied across geographical regions. While the industry effects became more important in Europe and North America in recent years, they were still dominated in Asia Pacific and Latin America.

A completely different approach that was used for estimating country vs. industry diversification was made by Lilach Nachum (2004). He estimated the performance of the enterprises as the function of indexes of industrial and geographical diversification, which were constructed in the following way:

PDI = 1 - $\sum S^2 i$

GDI = 1 - $\sum S^2 m$, where $S^2 i$ is the value of the i^{th} product in the total value of sales of the firm, and $\sum S^2 m$ is the share of the firm in the market m. Industrial diversification yields greater benefits in South – east Asia and Latin America and explains most of the performance variation between the firms in these regions In Asia and Africa, geographical diversification is more beneficial than industrial one. Firms based in different region exhibit preferences for different diversification options, and these choices have consequences for the performance outcomes for the diversification strategies (Nachum, 2004).

We can conclude, that due to the globalization processes in the developed countries, industry effect became more important. That is

why it is better for the investor to construct the portfolio by picking as much industries as it is possible in the developed markets. But the country effect still dominates in the developing countries, meaning that these countries are not similar to each other, and the correlation among them is low, which gives the potential for diversification among developing countries, by forming portfolio from different country stocks.

Another conclusion is that many research was done for developed and emerging countries, but few for the transition ones.

METHODOLOGY

In my studies I am going to use the approach by Heston and Rouwenhorst. I will use the weighted least squares estimates to decompose "pure" country and "pure" industry returns. The weights are simply the market capitalization of the securities at the end of the month. The dummy regression is the following:

$$R_i(t) = \alpha(t) + \sum_{\substack{j=1 \\ \text{J=from1to9}}}^{c} \beta_j(t) I_{ij}(t) + \sum_{\substack{k=1 \\ \text{k=from1to8}}}^{m} \gamma_k(t) C_{ik}(t) + e_i(t) \qquad (1)$$

Where: R_i is the return on the particular security at time t. It is defined as the price at the end of the period divide by the price at the beginning of the period, minus 1, multiplied by 100 to obtain the percentage.

α – the global factor return common to all securities,

I_{ij}– industry dummy variable defined as 1 if security i belongs to industry j and zero otherwise

C_{ik} – country dummy variables defined as 1 if security i belongs to country k and zero otherwise.

As the result of the estimation procedure we end up with the emerging market returns $\alpha(t)$, pure industry returns $\beta(t)$ and pure country returns $\gamma(t)$.

It is not possible to estimate directly the coefficients of above regression, because of the perfect multicollineariry problem. Because all country dummies and industry dummies add up to the unit vector across firms. So, there is not a unique way of identifying industry and

country dummies. Since every firm is in one industry and in one country, we can only measure cross-sectional differences between industries, and cross-sectional difference between countries. Country and industry effects can be measured relative to some benchmark. Since choosing an arbitrary country or industry as a benchmark, it is more natural to ask how each country or industry differs from the average firm in the sample. It is the same as measuring industry or country effects relative to the European value-weighted market (Heston and Rouwenhorst, 1994).

So, we use the following restrictions:

$$\sum_{j=1}^{9} w_j \beta_j = 0 \quad \text{and} \quad \sum_{k=1}^{8} v_k \gamma_k = 0 \qquad (2)$$

where w_j and v_k is the capitalization of particular industry or country in the Emerging markets universe.

Then, after obtaining "pure" country and industry returns I will build moving average of mean absolute deviation (MAD). Country and industry MADs can be written as following:

$$mad_{Ct} = \sum_{k=1}^{8} v_{kt} \left| \gamma_{kt} \right| \qquad mad_{mt} = \sum_{j=1}^{9} w_{jt} \left| \beta_{jt} \right| \qquad (3)$$

We decompose the price return into the components, which are due to the belonging of the company to the particular industry or country. After obtaining for each country and industry pure returns, we weight them and then sum for each month.

MADs are the measurement of relative importance of industry and country factors. MADs show how volatile each factor is. The interpretation of the MADs are the same as variance. The difference is in the fact, that variance estimation give more weights to the outliers. MADs, however, take absolute values of factors.

According to the APT model, both industrial and national factors play an important role in the explaining stock price variability. The higher the explanatory power of the factors in the price of the security suggests that prices vary, because either national or industrial factors are different, and the higher this difference, the higher the price returns change in different countries and industries.

Because of the possibility of the industry or country factors to influence in the different manner on the stock price change, we have the diversification opportunities. The country or industry specific shocks are likely to be eliminated by the opposite shock in another country or industry. This is the evidence of the low correlation among factors, if the factors vary in different way. If there is no much power of the factors to explain price changes, these factors are not important for the diversification.

Another method is to find variance of the pure factors. After obtaining pure country and industry returns by estimating regression (1), we will know $\hat{\alpha}$, $\hat{\beta}_j$, $\hat{\gamma}_k$. The estimated country return can be calculated as follows:

$$R_{kt} = \hat{\alpha} + \sum_{j=1}^{9} w_{k,j_t} \hat{\beta}_{j_t} I_{k,j} + \hat{\gamma}_{kt} \qquad (4)$$

where $w_{k,j}$ denotes the proportion of the total market capitalization of country *k* icomposed of *j*'s industries.

The estimated industry return, therefore, can be find as:

$$R_{jt} = \hat{\alpha} + \sum_{k=1}^{8} v_{k,jt} \hat{\gamma}_{kt} C_{k,j} + \hat{\beta}_{jt} \qquad (5)$$

where $v_{k,j}$ represents the proportion of the market capitalization of the industry *j* index composed of country *k*'s equities.

Actually, that country return decomposition shows that return of particular country may differ from the emerging value-weighted market for two reason. First reason is that industrial composition of this particular country is different from the industrial composition of the emerging value-weighted market. The second reason is that return of this particular country is different from the return of firms, which are located in the same industry, but in different countries.

By the same logic, return of particular industry is different from the return from the emerging value-weighed market, because country composition of this particular industry is different from the country composition of the emerging value-weighted market, and

because, return of this particular industry is different from the returns of firms, which are locared in the same country, but in different industries.

By estimation variance of pure country and industry returns , we, the same as in MADs method, answer the question, which factor is more important in explaining return variation, and, consequently, for the correlation structure of returns, and for the risk reduction.

DATA DESCRIPTION

For the Heston and Rowernhorst model I need the variable for prices and capitalization of the enterprises. The statistics is used for the most capitalized enterprises, which cover 70-90% of the market. I use the data for 130 enterprises of 8 countries (Croatia, Slovakia, Czech Republic, Estonia, Latvia, Romania , Ukraine, and Russia) and 9 industry groups (mining; utilities; construction; manufacturing; retail trade; transportation and warehousing; information and IT; finance and insurance, services.). The sample includes 130 observations for each time period. I use monthly statistics for the 2002-2004. The number of enterprises and data source can be found is described in the below table.

Table 1 Data discriprion

Country	Number of companies	Capitalization (data on December 2004)	Source
Croatia	20	42722.1m HRK (75%)	Monthly reports www.zse.hr
Slovakia	20	102510,7 m SKK (73%)	Fact books, monthly reports www.bsse.sk
Czech Republic	19	975977 m CZK (90%)	Monthly reports http.ftp.pse.cz http://www.pse.cz/vysledky/kurz_listek
Estonia	7	3422,78 m EUR (97%)	Monthly bulletins http.bulletins.ee.omxgroup.com
Latvia	4	763,22 m EUR (75,03%)	

Country	Number of companies	Capitalization (data on December 2004)	Source
Romania	20	284484233,9 mln ROL(95%)	Monthly reports www.bvb.ro
Ukraine	20	56253,57 mln UAH(90,11%)	Annual reports www.pfts.com Capitalization & prices www.sokrat.kiev.ua
Russia	20, mainly those of RTS index	124122014673$ (83% of RTS index)	www. rts..ru

So, the statistics on prices and capitalization was taken from the local Stock exchanges sites. The capitalization of each country and indudtry is between 75 and 97 %.

To transform prices and capitalization to one currency U.S. dollar, the historical exchange rate was used. The time series of the exchange rates were taken from the sites of the National Bank of the corresponding country.

The possible disadvantage of my data is that the results will be skewed towards the big companies. But, because of weighting, general picture will not be destroyed.

There are some enterprises, which do not have complete return history, because these enterprises stopped to be listed, or vice versa, began to be listed . They are: Latvijas Kugnieciba, SAF Tehnika

in Latvia; Erste Bank, Česka Sporitelna in Czech Republic; Zaporizhkoks, Krasitel and Ukrtelecom in Ukraine; Slovakopharma and VSZ in Slovakia; Terapia Cluj in Romania. Also, there is no data for capitalization of Ukrainian enterprises for each month, only for the end of the year. As, weights of enterprises do not change much during the year, I assign the capitalization for December of particular year for each month of that year.

As it can be expected, Russia constitutes to 61% of capitalization, the next comes Czech Republic, which is 19 %. All other countries have low capitalization.

Also, such industries as transportation, service, information, construction, and retail trade have not many enterprises among the most capitalized. The most capitalized, however, is manufacturing, finance, mining, utilities.

Table 2 Countries and industries capitalization weights (12.2004)

Country	Weight	Industry	Weight
Croatia	0.038	Manufacturing	0.143
Russia	0.614	Finance	0.197
Estonia	0.029	Transportation	0.017
Latvia	0.006	Service	0.003
Chech republic	0.194	Mining	0.417
Ukraine	0.053	Utilities	0.146
Romania	0.048	Information	0.073
Slovakia	0.018	Retail	0.003
		Construction	0.002

Also the distribution of the enterprises is not uniform, meaning some industries, such as manufacturing, finance, utility, are present almost in all countries, while others are concentrated mostly in one particular country.

Table 3 Distribution of enterprises across countries and industries

Country	Manufac-turing	Finance	Transport	Mining	Const-ruction	Utilities	Retail	Infor-mation & IT	Services	Total
Croatia	8	6	1	0	0	0	0	0	5	20
Russia	4	1	1	8	0	2	0	3	0	20
Estonia	3	1	0	0	1	0	1	1	0	7
Latvia	0	0	1	0	0	1	2	0	0	4
Czech Republic	2	4	0	1	0	9	0	3	0	19
Ukraine	10	0	0	1	0	8	0	1	0	20
Romania	10	7	0	2	1	0	0	0	0	20
Slovakia	11	5	1	1	1	2	0	0	0	20
Total	48	24	4	13	3	22	3	8	5	130

So, the highest number of enterprises is in manufacturing, average number – in finance, mining and utilities, and few enterprises are in transportation, construction, retail, information & IT, and services. In Estonia and Latvia there are few enterprises, which have 90% capitalization of the market. In another countries, first 20 enterprises constitutes for 75-95% of the market capitalization.

The descriptive statistics represents the mean, variance and correlation matrix of the country and industry value weighted indices. The value weighted indices were constructed by summing the weighted returns for each particular months.

Table 4 Descriptive statistics for value weighed country indices

	Correlation matrix: average correlation between countries is 0.14									
Country	Mean	Variance	Croatia	Russia	Estonia	Czech Republic	Latvia	Ukraine	Romania	Slovakia
Croatia	2.63	67.12	1.00	0.19	0.21	0.16	0.22	0.03	-0.49	0.16
Russia	3.13	83.77		1.00	0.42	0.28	0.26	0.08	0.04	-0.03
Estonia	3.58	96.97			1.00	0.43	0.36	0.13	0.22	0.21
Czech Republic	3.34	17.93				1.00	0.29	0.09	0.13	0.29
Latvia	1.70	33.11					1.00	0.06	-0.11	0.24
Ukraine	30.68	4478.82						1.00	0.17	0.02
Romania	8.98	520.27							1.00	-0.07
Slovakia	6.03	94.33								1.00
Mean Value	7.51	674.04								

Table 5 Descriptive statistics for value weighted industry indices

	Correlation matrix: average correlation between industries is 0.21										
	Mean	Variance	Manufac-turing	Finance	Trans-port	Service	Mining	Utilities	Inform	Retail	Const-raction
Manuf-turing	7.96	103.44	1.00	0.32	-0.06	0.28	0.38	0.40	0.13	0.39	-0.12
Finance	5.03	78.21		1.00	0.17	0.25	0.53	0.20	0.28	0.39	0.36
Trans-port	4.51	52.18			1.00	0.23	-0.18	0.04	0.47	0.25	0.13
Service	4.51	50.28				1.00	0.02	-0.01	0.00	-0.09	-0.08
Mining	3.66	105.40					1.00	0.54	0.41	0.28	0.14
Utilities	3.37	106.35						1.00	0.52	0.35	-0.03
Inform	3.25	63.21							1.00	0.36	0.18
Retail	3.75	59.17								1.00	0.36
Const-raction	6.62	128.08									1.00
Mean Value	4.74	82.92									

From the descriptive statistics we can say, that on average country value weighted indexes have higher returns and higher variance, than the industry value weighted indexes. Ukraine and Romania have the highest mean and variance values, which influence much the overall performance of country indexes.

Average correlation between countries was lower than average correlation between industries, which were 0.14 and 0.21 reslectively. The highest correlation was between Czech Republic and Estonia 0.43, and the lowest between Croatia and Romania-0.49. Mining and utilities exhibit the highest correlation 0.54, mining and transport, however, have the lowest one -0.18.

ESTIMATION RESULTS

The results of the estimation procedure using Heston and Rowenhorst approach allows us to decompose returns into country and industry parts (Appendix 1, 2) . Large country or industry specific variability of returns mean that there is a country or industry specific shocks, which makes markets imperfectly correlated. The higher the variability of this country or industry specific factors, the higher probability, that industry or country shocks eliminate each other. If there is a huge variability in pure country or industry returns, you can diversify. If there is no variability, a shock effects all countries, and can not be diversify away, meaning you can not eliminate risks.

From the estimated pure country and industry returns we see, that such industries as manufacturing, mining and utilities and such countries as Russia, Czech Republic, Ukraine and Romania were driving returns in emerging markets. But we can see that pure country effects are more volatile, because of the volatility in Ukraine and Romania mostly, which means that this countries have high country specific shocks.

We conduct the mean absolute deviations (MADs) estimation in our analyses to find out the changing roles over time of country and industry effects. The below shown graph of twelve month moving averages of MADs states that it was a high variability of both pure country and industry effects. Moreover, both lines of country and industry effects are moving together, and it is not

possible to say what effect is more important from the graph. However, we see, that in the years 2002 and 2004 country effects were larger, and industry effects were higher only in the year 2003. It means, that variability of returns were explained by country factors in two years out of three.

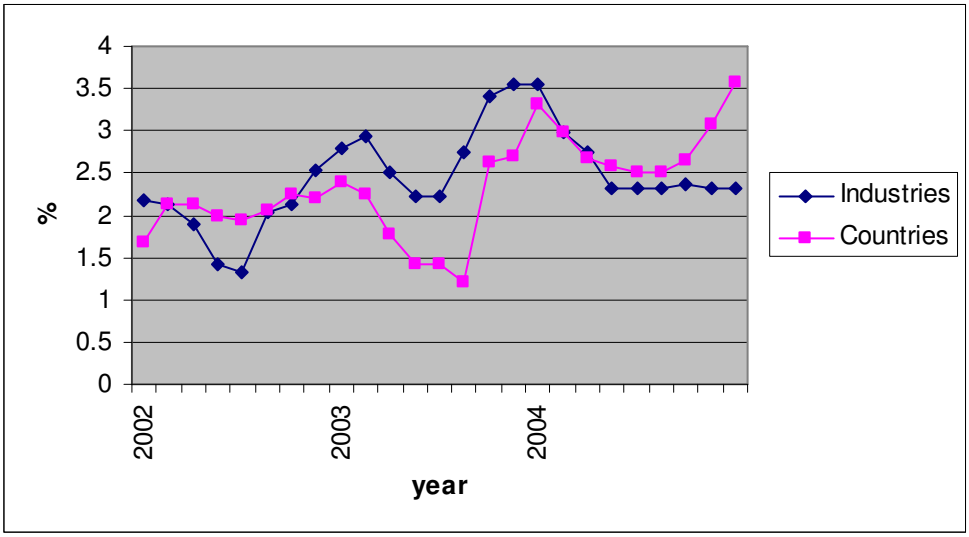

Figure 1 Twelve months moving average of MADs

The next approach of our estimation is to compute the variance of pure country and industry effects. This approach shows the volatility of factors better, because it takes to the account the variability of factors over the whole period, and insignificant coefficients are taken to the account also. The results are different from the result of MADs , because in the latter, the pure industry returns for the most capitalised industries (manufacturing, mining and utilities), and pure country returns for the most capitalised countries (Russia, Czech Republic) do not vary much. Romania and Ukraine,

which pure country and industry effects vary mostly, have small impact on MADs, because they constitutes up to two percents in the total capitalization.

According to Heston and Rowenhorst, the pure country effect measures the average return of firms in a country relative to the firms which are in the same industry, but located in a different countries. The pure industry effect measures the average return of firms in an industry relative to the firm, which are located in the same country, but belong to a different industry. So, we can conclude, the higher difference in pure country or industry effects, the higher possibility for diversification.

Table 6 Variance of pure country and industry effects

Industries	2002-2004	2002	2003	2004
Manufacturing	31.57	39.64	30.67	17.20
Finance	5.89	4.74	6.34	6.29
Transport	13.31	37.65	0.00	0.00
Service	0.00	0.00	0.00	0.00
Mining	19.09	19.17	7.58	21.95
Utilities	38.99	62.69	41.17	7.68
Information	27.64	54.37	16.51	9.63
Retail	0.00	0.00	0.00	0.00
Construction	64.31	181.92	0.00	0.00
Mean	22.31	44.46	11.36	6.97
Countries	2002-2004	2002	2003	2004
Croatia	11.92	11.31	23.34	0.00
Russia	8.77	1.88	1.38	18.28
Estonia	29.57	0.00	0.00	83.61
Czech Republic	29.31	39.58	27.34	18.40
Latvia	16.67	28.54	2.41	14.90
Ukraine	1135.71	237.23	102.23	2579.38
Romania	425.99	1132.90	16.67	51.36
Slovakia	0.00	0.00	0.00	0.00
Mean	207.25	181.43	21.69	345.75

From the Table, we can see, that Ukraine and Romania have the highest country effects, 1135.7% and 426% respectively. Russia, however, has the lowest country effect (9%). The most volatile were such industries as construction (64%) and utilities (39%). Finance was the less volatile (5%). Such grate variability of pure country returns is explained by the fact, that pure country returns for Ukraine varies from 0% to 187.76%, anf for Romania from 0% to 117.2%. Average of variances of country effects are higher, that average of industry effects. The ratio of country to industry effects are 9.2 for the year 2002-2004, and this ratio were 4, 1.9, 50 for the years 2002, 2003, 2004 respectively. The high ratio in 2004 is explained mainly by the highly variable prices of Ukrainian enterprises.

The next Table represents the variability of pure country returns if the outliers for Romania and Ukraine are excluded. I excluded the highest pure country return for Romania 117.2% in May 2002, and the highest pure country return for Ukraine 187.78% in February 2004.

Table 7 Variance of pure country effects (outliers excluded)

Countries	2002-2004	2002	2003	2004
Croatia	11.92	11.31	23.34	0.00
Russia	8.78	1.88	1.39	18.28
Estonia	29.57	0.00	0.00	83.64
Czech Republic	29.31	39.59	27.34	18.41
Latvia	16.68	28.54	2.41	14.91
Ukraine	222.62	237.23	102.23	228.10
Romania	54.65	95.19	16.77	51.37
Slovakia	0.00	0.00	0.00	0.00
Mean	46.69	51.72	21.69	51.84

After the exclusion of the outliers, we see that Ukraine and Romania remain the most volatile, and mean of volatility of pure country effects are still higher than mean of pure industry effects. The ratio of mean of pure country effects to the mean of pure industry effects were 2.09, 1.16, and 7.44 in the years 2002, 2003, 2004 respectively.

The next part of the analyses is done in order to estimate how the correlation between value weighted country and industry returns can be reduced after excluding the variation of industrial composition of particular country. Also, we are interested in the reduction of correlation between value weighted industry returns after excluding the source of variation of country composition of industry index. The variance on average should decrease, because we exclude particular source of variation between returns.

Table 8 Country indices adjusted for industry effects

	Correlation matrix: average correlation between countries is 0.44									
Country	Mean	Variance	Croatia	Russia	Estonia	Czech Republic	Latvia	Ukraine	Romania	Slovakia
Croatia	3.27	52.02	1.000	0.718	0.757	0.775	0.860	0.503	0.262	0.835
Russia	3.12	58.86		1.000	0.855	0.490	0.582	0.198	0.254	0.923
Estonia	2.79	109.14			1.000	0.496	0.697	0.325	0.274	0.878
Czech Republic	3.28	42.31				1.000	0.818	0.559	0.260	0.670
Latvia	3.25	58.51					1.000	0.491	0.257	0.763
Ukraine	13.48	1304.65						1.000	0.132	0.517
Romania	6.90	463.60							1.000	0.288
Slovakia	3.71	49.56								1.000
Mean Value	3.27	267.33								

Table 9 Industry indices adjusted for country effects

	Correlation matrix: average correlation between industries is 0.75										
	Mean	Variance	Manufac-turing	Finance	Trans-port	Service	Mining	Utilities	Inform	Retail	Const-raction
Manuf-turing	4.83	60.18	1.000	0.721	0.617	0.716	0.590	0.454	0.628	0.716	0.598
Finance	3.91	53.05		1.000	0.831	0.943	0.826	0.803	0.825	0.943	0.647
Trans-port	4.32	60.64			1.000	0.884	0.798	0.717	0.902	0.884	0.613
Service	3.71	49.55				1.000	0.934	0.749	0.834	1.000	0.682
Mining	3.54	83.27					1.000	0.614	0.701	0.934	0.628
Utilities	4.20	92.63						1.000	0.823	0.749	0.517
Inform	3.73	83.96							1.000	0.834	0.686
Retail	3.71	49.55								1.000	0.682
Const-raction	2.35	119.79									1.000
Mean Value	4.83	72.52									

So, we are interested in the change of correlation structure between the pure country returns corrected for industry composition $\hat{\alpha} + \hat{\gamma}_k$, and for pure industry returns corrected for country effects $\hat{\alpha} + \hat{\beta}_j$.

From the tables we see that after exclusion of industry effects from the country returns and country effects from industry returns the variance between indices decrease, because particular source of indices variation was excluded, and correlation rises between the indices. But if we compare the results with the raw data in the Tables 4 and 5, we see that correlation increase from 0.14 to 0.45 between the country indices after exclusion of industry return decomposition, and from 0.21 to 0.75 after exclusion of country

return composition. It means that country diversification is more important source of risk reduction, because it reduces correlation between indices substantially. Industry composition is not so important, because it reduces the correlation among countries to less extent.

The most important conclusion from the analyses is that pure country effects are on average much more volatile than pure industry effects. The high variance of country effects states that country shocks influence differently on returns, and this is the source of diversification. As shocks in one country is likely to be overweight by shocks in another, it is better to diversify in countries than in the industries. Also, more volatile country specific returns mean they are more important in explaining cross-country correlations. Industrial composition of countries reduce country correlation less than country composition reduce the correlation between industries.

CONCLUSIONS

This study investigates the importance of country and industry effects for diversification strategies. As world is changing due to globalization, the industry effect is increasing , especially in the last decade for the developed countries. Emerging markets of former communist regime were separated from the rest of the world for a long time, but from the other side, we see increasing economic integration of these countries with the rest of the world. Also, investors from all over the world are very interested in emerging markets investing. Moreover, there is no study that investigates this particular region of emerging markets, which I study.

In this paper we investigate the variability of pure country and industry effects, because we predict that this variability is important for the correlation between country and industry indices and for elimination of shocks influence on country and industry returns. We use the approach of Heston and Rowenhorst for decomposing the returns of emerging markets enterprises in pure country and industry parts. Then we build twelve month moving average of mean absolute deviation of pure country and industry returns in order to find out the changing role of industry and country factors and their variability. After that, we compute variance of pure country and industry returns. Also, we build the correlation matrix of estimated country returns corrected for industry composition and for industry returns corrected for country composition.

We find out that pure country returns are much more volatile than industry returns. This high variance of country effects states that shocks are influence differently on returns, and this is the source for diversification. High volatility of country factor is important for changing correlation structure between countries. Country composition reduce industry correlation to greater extent than industry composition reduce correlation among countries. So, we conclude that country diversification is more important than industry diversification.

The conclusions of this study do not contradict to the findings of another studies for developing countries, which find that country effects dominate in explaining variation in returns, and it is better to diversify across countries than industries. So, it is the evidence, that developing markets are not so globalize as the developed ones.

The findings offer two implications for practitioners. First, for investor, seeking diversification benefits, country diversification is more important than industry diversification. Second, country peculiarities are more important for investors. Given the importance of country factors in explaining variability of returns, understanding the legal, institutional and regulatory frameworks in a given country is more important for valuing securities traded in that country.

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Appendix 1 Pure country effects

Countries	2002.01	2002.02	2002.03	2002.04	2002.05	2002.06	2002.07	2002.08	2002.09	2002.10	2002.11	2002.12
Croatia	0	0	0	0	0	0	0	0	0	-12.17	0	0
Russia	0	0	2.198	0	0	0	-1.0417	0	-1.5	3.94	0	0
Estonia	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	13.35	0	0	0	-17.266	0	0
Latvia	0	0	0	0	0	0	0	0	0	-19.33	0	0
Ukraine	0	0	0	50.717	0	0	-12.37	0	13.32	-9.579	0	0
Romania	0	0	0	0	117.2	0	11.44	0	23.679	-8.431	-19.59	0
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0
Countries	2003.01	2003.02	2003.03	2003.04	2003.05	2003.06	2003.07	2003.08	2003.09	2003.10	2003.11	2003.12
Croatia	0	0	0	0	-17.48	0	0	0	0	0	0	0
Russia	0	0	0	0	2.88	2.65	-1.13	1.8	0	0	0	0
Estonia	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	7.03	0	0	0	-9.82	-13.91	0	-5.44	0	0	0	0
Latvia	0	0	0	0	0	0	5.62	0	0	0	0	0
Ukraine	-32.34	0	0	0	0	0	-9.86	0	11.77	0	-8.42	0
Romania	0	0	0	0	0	0	7.51	-12.11	0	0	0	0
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0
Countries	2004.01	2004.02	2004.03	2004.04	2004.05	2004.06	2004.07	2004.08	2004.09	2004.10	2004.11	2004.12
Croatia	0	0	0	0	0	0	0	0	0	0	0	0
Russia	2.4	-12.88	0	-4.54	0	0	0	1.8	0	-1.14	-7.41	-5.4
Estonia	0	0	0	-33.09	0	0	0	0	0	0	0	0
Czech Republic	-7.98	0	0	12.61	0	0	0	0	0	0	0	0
Latvia	0	0	0	0	0	0	0	0	0	0	13.97	0
Ukraine	0	187.76	15.64	35.85	0	0	0	0	11.77	6.98	13.04	47.76
Romania	-11.14	0	0	0	0	0	0	-12.11	0	18.64	0	0
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 2 Pure industry effects

Industries	2002.01	2002.02	2002.03	2002.04	2002.05	2002.06	2002.07	2002.08	2002.09	2002.10	2002.11	2002.12
Manufacturing	-7.604	17.656	-8.919	0	0	0	0	0	-5.29	0	0	0
Finance	0	0	0	0	0	0	0	0	0	7.88	0	0
Transport	0	0	0	0	0	0	0	0	0	0	22.2	0
Service	0	0	0	0	0	0	0	0	0	0	0	0
Mining	3.722	0	5.03	0	0	1.562	0	0	0	15.04	7.05	0
Utilities	-6.365	-10.131	11.68	-12.47	0	-6.448	0	0	0	15.04	7.05	0
Information	0	0	0	0	0	-12.474	8.116	0	-8.8	0	18.876	0
Retail	0	0	0	0	0	0	0	0	0	0	0	0
Construction	0	0	0	0	0	0	0	0	-48.8	0	0	0
Industries	2003.01	2003.02	2003.03	2003.04	2003.05	2003.06	2003.07	2003.08	2003.09	2003.10	2003.11	2003.12
Manufacturing	12.43	0	0	0	0	8.02	11.33	-5.81	10.33	0	2.93	0
Finance	0	0	0	0	6.01	0	0	-6.32	0	0	0	0
Transport	0	0	0	0	0	0	0	0	0	0	0	0
Service	0	0	0	0	0	0	0	0	0	0	0	0
Mining	-3.3	0	0	0	-7.67	-2.46	-5.22	3.13	-1.71	0	0	0
Utilities	0	0	0	0	21.12	4.35	7.23	0	-4.03	0	-3.6	0
Information	0	0	0	0	14.7	0	0	0	0	0	0	0
Retail	0	0	0	0	0	0	0	0	0	0	0	0
Construction	0	0	0	0	0	0	0	0	0	0	0	0
Industries	2004.01	2004.02	2004.03	2004.04	2004.05	2004.06	2004.07	2004.08	2004.09	2004.10	2004.11	2004.12
Manufacturing	6.18	0	0	0	0	0	0	-5.81	10.47	-5.24	0	0
Finance	5.96	0	0	0	0	0	0	-6.32	0	0	0	0
Transport	0	0	0	0	0	0	0	0	0	0	0	0
Service	0	0	0	0	0	0	0	0	0	0	0	0
Mining	-3.7	15.14	0	0	-3.88	0	0	3.14	-1.58	0	0	0
Utilities	0	0	-9.6	0	0	0	0	0	-3.89	0	0	0
Information	0	0	-11.23	0	0	0	0	0	0	0	0	0
Retail	0	0	0	0	0	0	0	0	0	0	0	0
Construction	0	0	0	0	0	0	0	0	0	0	0	0