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**ASYMMETRY IN RISK AND RETURN FLUCTUATIONS AS A
FACTOR DRIVING INTERNATIONAL PORTFOLIO
INVESTMENTS IN CRISIS PERIODS**

Abstract. The asymmetry between risk and return in developed, emerging and frontier market groups is discovered. Internal and structural asymmetry concepts are developed. A method of estimating structural asymmetry which comes down to calculating a standard deviation of marginal percentage returns in different market groups is developed. The higher the standard deviation the higher the structural asymmetry level is. Small standard deviations mean that the asymmetry level is relatively small. It is proved that structural asymmetry (symmetry) is a factor driving global portfolio flows in crisis periods as well as in periods of stability. Two patterns of structural asymmetry are identified. They are the crisis pattern and the stability pattern. Main features of these patterns are elaborated. The crisis pattern implies that in crisis periods relatively low levels of structural asymmetry bring about the increase in the share of developed markets in global portfolio liabilities while the share of emerging and frontier markets falls. The reverse is also true. The stability pattern implies that the share of developed markets decreases given relatively low structural asymmetry levels and vice versa. These patterns can be used to explain why in crisis periods the share of developed markets in global portfolio liabilities increases.

Keywords: international portfolio investments, global portfolio liabilities, developed markets, emerging markets, frontier markets, risk and return asymmetry, international investment position, pattern of risk and return structural asymmetry

Formulas: 0, fig.: 1, tabl.: 3, bibl.: 17

JEL Classification: F21, G11, G15

Introduction. The problem of global portfolio investing has always been and still remains an issue of the day. International portfolio investments unlike foreign direct investments are very mobile and sensitive to different changes and shocks in international markets as well as world economy in general. Responding to unexpected market dynamics, they quickly move from one market to another, from less to more favorable region or from risky to more safe securities. This ability of international portfolio investments is one of the most important of their features that significantly defines international capital flows.

On the other hand, an important issue is what particular factors drive these flows in certain situations. The general idea behind portfolio flows between markets grounds on trade-off between risk and return. It implies that the higher return an investor desires the higher risk he or she must accept or in other words the higher the risk the higher the return must be in order for the investment to take place. This statement also implies the readiness of an investor to accept risks. Depending on their risk tolerance investors either invest in risky

instruments and markets or explore moderate or conservative investing strategies. However, sudden or unexpected changes in risk-return trade-off often bring about sharp shifts in portfolio flows dynamics and structure. Sometimes these shifts are far from being proportional with the mentioned changes. Moreover, this kind of asymmetry is quite different in different periods of time and in different markets. It also differs significantly depending on the market type. For example, empirical observations show that in crisis periods developed markets can show much higher increase in risks while in emerging and frontier markets risks rise not so extremely. Moreover, in periods of increased volatility particularly in crisis periods the trade-off between risk and return changes in the opposite way – returns fall while risks increase. This is the particular issue we are interested in.

We can summarize thus that the mentioned trade-off appears to be valid in “all others equal” circumstances. However, the imbalances between risk and return dynamics often go beyond the stated rules and rational trade-offs. Little shifts in risks and returns in developed markets can result in much more significant changes in portfolio flows to these markets than more considerable drifts in risks and returns in emerging markets. The mentioned issues put forward new theoretical and empirical challenges and the necessity of respective research. Although these problems have been addressed to either theoretically or empirically, they are still timely and require attention.

Literature review and the problem statement. The motivation of international portfolio flows has been widely studied in contemporary scientific literature. Although the origin of the underlying theoretical paradigm goes back to [Markowitz 1952] portfolio theory, most research regarding international aspects of this problem has been carried out after the publication of the pioneering work by [Solnik 1974]. The basic idea of portfolio theory is that an investment portfolio of a rational investor must be efficient, e.g. it must have the highest return under the certain level of risk or the lowest risk under the certain level of return. Such a portfolio should be constructed using the following principle: returns of portfolio components must have the lowest possible but positive correlation. According to Markowitz such correlation reduces the portfolio overall risk.

Solnik B. H. [Solnik 1974] was one of the first who empirically proved that in international context different markets had lower correlations between themselves than individual assets within one market. The core implication of this idea in terms of portfolio theory is that an international portfolio is likely to be more efficient than a portfolio of an individual domestic market. This conclusion actually became the beginning of a so-called theory of international diversification that found strong support around a scientific society during the last couple of decades. For example, [Eun, Resnick 1994] proved the efficiency of international investing from the perspective of an American and Japanese investor. They showed that the benefits from international diversification were more substantial for American than for Japanese investors. The increase in efficiency for American investors was mostly due to the growth in returns rather than decrease in risks while for Japanese investors the case was opposite.

Karolyi G. A., Stulz R. M. [Karolyi, Stulz 1996] studied the linkages between American (US equities in US market) and Japanese (ADRs on Japanese equities in US market) markets. Among others, they concluded that international diversification did not allow substantially reducing the risks of considerable shocks for domestic market indices. This could be explained by the fact that

considerable shocks spread much faster in international market than insignificant ones. The interrelation between equity markets in the USA, the UK, France, Germany and Japan was explored by [Rezayat, Yavas 2006]. They discovered that the US market had the strongest impact on Japanese market and European markets had higher influence on the US markets than the US market did on European ones. The effect of Japanese market on US market was insignificant. It was proved that from an American investor perspective the portfolio efficiency could be increased via investing in Japan.

Baek, In-M. [Baek 2006] analyzed the significance of different factors influence on foreign portfolio investments export and import in Asian and Latin American countries. She proved that foreign portfolio flows to Asia were motivated by investors' willingness to accept higher risks (in order to get higher returns). Thus, such investment could be regarded as 'hot money', they poorly responded to such fundamental factors as favorable economic situation etc. This study essentially differs from the previous ones. The matter is that the research in the field of international portfolio investing can be distinctively divided into two classes. The research of the first class considers international portfolio investments from the point of view of the flows. The second type of research treats the investing process in terms of the portfolios rather than the flows. The core reason of investing is studied via portfolio international diversification advantages, particularly dependencies between the markets etc. The last mentioned study considers international portfolio flows uppermost while the previously mentioned papers concentrate mostly on portfolio diversification.

The study by [De Santis 2010] represents a sort of a combination of the two approaches. He found out that the provisions of international capital assets pricing model hold only partially, and that the global equity market was more integrated compared to the global debt market. The shares of individual countries in the global portfolio positively affected the flows of international portfolio investments to these countries. Among core causes of imbalances De Santis pointed out home bias, marginal and fixed transaction costs, information asymmetry, expectations heterogeneity, and a so called trend-chasing activity, particularly in bond markets.

The research conducted by [Sarno, Tsiakas, Ulloa 2016] focuses mainly on portfolio flows rather than on portfolios themselves. The authors study the factors driving the flows in terms of distinguishing between pull and push factors. Push factors are considered as common global factors that are external as to the recipient country. Pull factors should be treated as country specific and they are internal for the country receiving portfolio investments. The paper explores the influence of each group of factors on global equity and debt portfolio flows from the USA to 55 different countries. The basic conclusion is that more than 80 % of variation in the mentioned flows is due to push factors. The paper also found out that in crisis periods the role of push factors diminishes, and the contribution of pull factors to the variance of flows doubles. This idea is very relevant to main goals of our research.

Among other papers that have lately substantially contributed to the development of the explored matters are the works by [Feldman 2010], [Syriopoulos 2011], [Asgharian, Nossman 2011], [Raddatz, Schmukler 2012], [Aggarwal, Kearney, Lucey 2012], [Cakici, Fabozzi, Tan 2013], [Hanauer, Lingart 2015] and others.

Hypothesis, methodology and data. In our study we put forward the hypothesis that there is an asymmetry in risk and return dynamics in different

market groups and that this asymmetry if exists is a factor driving international portfolio investments in crisis periods. The difference in risk and return trade-off between different market groups is a factor of international portfolio flows even in periods of market stability. Thus, by driving we mean that in crisis periods the mentioned asymmetry is something that would not be the driver in periods of stability. Here we keep in mind that such periods of market dynamics do not imply such asymmetry or if it does exist, it is much smaller than during crises.

In order to prove or dispose this hypothesis we are going to pursue the following methodological procedure in our research.

First, exploring the equity markets of different types. For this purpose, we consider the MSCI classification of equity markets. It implies the existence of three types of markets: developed, emerging and frontier. The developed group includes 23 markets of the following countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the UK and the USA. The markets of Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Qatar, Russia, South Africa, Taiwan, Thailand, Turkey and United Arab Emirates are among 23 emerging markets. The 22 frontier markets are Argentina, Bahrain, Bangladesh, Croatia, Estonia, Jordan, Kazakhstan, Kenya, Kuwait, Lebanon, Lithuania, Mauritius, Morocco, Nigeria, Oman, Pakistan, Romania, Serbia, Slovenia, Sri Lanka, Tunisia and Vietnam.

For the mentioned market groups MSCI calculate respective indices. They are "MSCI World Index" (World) for developed markets, "MSCI Emerging Markets Index" (EM), "MSCI Frontier Markets Index" (FM) and "MSCI ACWI + FM Index" – All Countries World Index that includes developed and emerging markets together with the frontier markets index (ACWIFM). We shall use these indices dynamics in order to define periods we consider the periods of instability or crisis as well as to estimate markets risks and returns. Actually, our purpose does not imply the exact identification of crisis and / or its type. We are rather going just to consider the periods of the global market declines. In order to do this we shall analyze the dynamics of just one – most general index – ACWIFM. Since the data on global portfolio flows is available on a yearly basis, we shall also explore the year-end index meanings for the dynamics analysis. All indices are standard in terms of different capitalization levels of included companies and imply gross reinvesting of dividends. All values are expressed in US dollars.

Second, the asymmetry between risk and return is to be estimated using the above mentioned indices. For each year in question we calculate all monthly returns and their average. The return calculation implies a standard procedure of dividing the difference between the index value for the current and for the previous month by its value for the previous month expressed in percent. Using the 12 monthly returns for each year, we then calculate their standard deviations.

The quantitative assessment of asymmetry can be carried out in different ways. Actually, it is the matter of a certain research or approach. We suggest estimating the asymmetry level using the relation of the percentage increase in return to the percentage increase in risk. This is basically the marginal percentage return that shows what the change in return will be when the risk changes by one percent. Being rather simple, this ratio can be a powerful characteristic reflecting the dynamics of return relative to the dynamics of risk

for a given period. So it could be used to evaluate the asymmetry we are investigating. Therein we must shed light on one important issue: what the normal value of this ratio should be. This estimate can be done either by comparing its crisis value to respective figures in periods of stability or by comparing values for different market groups in the same period.

Third, the flows of international portfolio investments will be analyzed using the IMF Coordinated Portfolio Investment Survey [IMF 2016]. Actually, the data provided by the IMF is not the data on flows but on an investment position. This is not of considerable meaning for our study since the flows define the position and conclusions can be drawn using either one or another type of data. Using liabilities rather than assets is important in this regard. Portfolio assets is that part of foreign investment position which shows 'what' a country invested throughout the world. The idea of our study implies considering the matter on 'what' a country attracted in terms of portfolio investments. Thus, we shall explore global portfolio liabilities only.

Research results. The global portfolio liabilities have been permanently increasing since 2001. However, in terms of their yearly dynamics there were three years of decline (fig. 1).

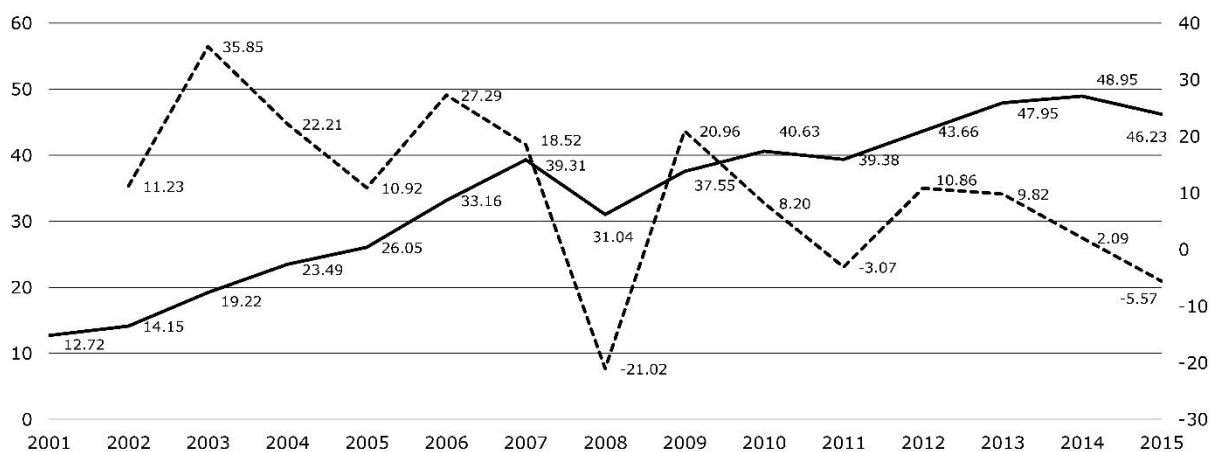


Figure 1 – Global Portfolio Liabilities Dynamics, USD trln. and %

Notes:

1. Calculated and composed by the author based on [IMF 2016].
2. The left part of X-axis is for the global portfolio liabilities volume and is in USD trln. It refers to the solid line graph.
3. The right part of X-axis is for the global portfolio liabilities growth rates and is in %. It refers to the dotted line graph.
4. The liabilities data is as of December 31 for each year.

From fig. 1 we can see that during the period in question there were three declines in global portfolio liabilities. The first one is explained by the global financial and economic crises in 2008. The second was in 2011 and could be accounted for European debt crisis together with the decrease in US credit rating and earthquake in Japan. In 2015 the decrease in global portfolio liabilities can be explained by the general situation in the global economy that can be characterized as a sort of stagnation accompanied by the global GDP decline from 78 to 73,5 trillion dollars¹. It resulted from such core factors as the decrease in oil prices, low inflation and respective central banks measures, China

¹ This decline is stated by the IMF while the World Bank and the UN declare just the sharp decline in growth rates but not the decline of the GDP.

financial crisis and high unemployment in Europe. Thus, we are going to study these three years mostly, and as it has been mentioned above, our goals do not imply the crises types identification or finding out their origins. We just consider these years as periods of declines and increased volatility in global markets².

The results on risk and returns calculations are presented in table 1.

Table 1 – Dynamics of risk and return in different market groups

Year	Risk, SD				Return, %			
	ACWIFM	World	EM	FM	ACWIFM	World	EM	FM
2001		5.03	8.51			-1.37	0.17	
2002		5.35	5.67	2.94		-1.65	-0.35	0.92
2003		3.41	4.18	3.14		2.51	3.88	3.11
2004		2.25	4.33	2.67		1.21	2.04	1.75
2005	2.39	2.27	5.42	7.27	0.94	0.82	2.65	4.91
2006		2.00	5.16	4.63		1.60	2.51	-0.66
2007		2.61	5.09	2.78		0.80	2.96	3.01
2008	6.94	6.59	10.36	7.99	-4.16	-3.98	-5.54	-5.92
2009	6.61	6.49	7.98	9.04	2.77	2.47	5.27	1.34
2010	5.66	5.66	5.83	4.71	1.20	1.13	1.64	1.94
2011	4.99	4.85	6.77	3.23	-0.47	-0.31	-1.43	-1.63
2012	3.73	3.56	5.43	2.34	1.37	1.35	1.58	0.77
2013	2.57	2.55	3.26	3.36	1.80	2.07	-0.14	2.02
2014	2.43	2.36	3.76	3.52	0.42	0.48	-0.08	0.64
2015	3.82	3.85	4.87	3.11	-0.09	0.05	-1.19	-1.21
2016	3.47	3.35	5.30	3.31	0.82	0.71	1.83	0.34

Notes:

1. Calculated and composed by the author based on [MSCI 2016].
2. Years of increased instability are marked with grey filling.
3. Data for ACWIFM index is not available for 2001, 2002, 2003, 2004, 2006 and 2007.
4. The 2016 data is calculated for 9 months only (up to September inclusive).

From table 1 data we can mostly observe a pattern where in crisis years risks substantially increase and returns substantially fall for all groups of markets and for the global market as a whole. There are just few exceptions: risks for developed and frontier markets in 2011 and risk for frontier markets in 2015³. Instead of increasing that is implied by the traditional pattern it actually falls. We shall statistically investigate this issue later but notwithstanding we can state that the depth of 2011 crisis was much less than in 2008 and the markets fell not so extremely.

In order to compare the extent to which risk and return trade-off alters, on the one hand, and changes in portfolio liabilities, on the other, we need to address the data on international portfolio liabilities of different market groups

² The declines can also be observed from the dynamics of the above-mentioned indices. In order not to overload the study with graphs, we do not present them here.

³ As to frontier markets our analysis in general. It should be stressed out that all exceptions regarding the above mentioned market group should be treated with particular attention. The matter is that the total share of international portfolio liabilities of frontier markets accounts for only less than 0.5 % of the global figure. It is a pretty small ratio, therefore in terms of their meaning all results on frontier markets are not significant for the global market as a whole. Thus, when talking about less developed markets we uppermost consider emerging markets and the group of other (not classified) markets.

(table 2). Besides the general decrease in global portfolio flows as has been previously mentioned, the decrease can be clearly observed for all market groups taken separately. All respective changes are negative and mostly substantial.

Table 2 – Dynamics of international portfolio liabilities in different market groups, in USD bln and % of share and growth rates

Panel A

Year	Global		Developed			Emerging		
	Liab-s	Chg., %	Liab-s	Chg., %	Share, %	Liab-s	Chg., %	Share, %
2001	12.719		10.298		80.96	0.560		4.40
2002	14.148	11.23	10.456	1.54	73.91	0.565	1.05	3.99
2003	19.220	35.85	15.326	46.57	79.74	0.955	68.93	4.97
2004	23.489	22.21	16.852	9.96	71.74	1.245	30.37	5.30
2005	26.054	10.92	20.257	20.21	77.75	1.681	35.06	6.45
2006	33.164	27.29	25.381	25.29	76.53	2.294	36.47	6.92
2007	39.307	18.52	29.274	15.34	74.47	3.155	37.54	8.03
2008	31.044	-21.02	24.102	-17.67	77.64	1.911	-39.45	6.15
2009	37.551	20.96	28.678	18.99	76.37	2.966	55.25	7.90
2010	40.629	8.20	30.125	5.04	74.15	3.585	20.84	8.82
2011	39.383	-3.07	29.418	-2.35	74.70	3.148	-12.19	7.99
2012	43.661	10.86	31.629	7.52	72.44	4.005	27.23	9.17
2013	47.949	9.82	35.073	10.89	73.15	4.069	1.62	8.49
2014	48.952	2.09	35.591	1.48	72.71	4.303	5.74	8.79
2015	46.226	-5.57	33.543	-5.76	72.56	3.707	-13.86	8.02

Panel B

Year	Frontier			Others		
	Liab-s	Chg., %	Share, %	Liab-s	Chg., %	Share, %
2001	0.409		0.32	1.821		14.32
2002	0.306	-25.34	0.22	3.096	69.98	21.88
2003	0.482	57.61	0.25	2.891	-6.62	15.04
2004	0.673	39.69	0.29	5.325	84.21	22.67
2005	0.708	5.21	0.27	4.045	-24.04	15.52
2006	0.108	52.18	0.32	5.382	33.05	16.23
2007	0.132	22.05	0.33	6.747	25.36	17.16
2008	0.834	-36.60	0.27	4.948	-26.66	15.94
2009	0.111	32.56	0.29	5.796	17.13	15.43
2010	0.147	32.73	0.36	6.773	16.86	16.67
2011	0.139	-4.97	0.35	6.678	-1.40	16.96
2012	0.165	18.18	0.38	7.862	17.73	18.01
2013	0.187	13.78	0.39	8.619	9.63	17.98
2014	0.234	24.94	0.48	8.824	2.37	18.03
2015	0.213	-9.16	0.46	8.764	-0.68	18.96

Notes:

1. Calculated and composed by the author based on [IMF 2016].
2. Years of increased instability are marked with grey filling.
3. 'Liab-s' – portfolio liabilities, 'Chg, %' – percentage change, 'Global' – all countries of the world participating in the survey, 'Share' – share of the total global international portfolio liabilities (column 'Global').
4. The group 'Others' includes 177 markets⁴ that were not classified into developed, emerging or frontier markets.

⁴ There are 243 markets in total and 2 additional positions that include liabilities of international organizations and 'Not Specified (including Confidential)'.

Analyzing the data in table 2, we should mention that in all three volatile periods we can observe the change in global portfolio liabilities structure. It evidently changes in favor of developed markets while the share of other market groups decreases. For example for 2008 crisis the share of developed market increased from 74.47 % to 77.64 % and the shares of emerging, frontier and other markets declined. It means that higher volatility brings about the escape of international portfolio investments from less developed to developed markets though all absolute figures fall. For 2011 the sweep is not so distinct but all in all supports the idea of developed markets priority during instability periods. The share of developed markets increased a little, while the shares of emerging and frontier markets fell. The share of other markets increased a little from 16.67 % to 16.96 %. The structure also alters in favor of developed markets.

In 2015 all shares except that of other markets group fell insignificantly. This issue can be better understood together with the previous one. Actually, we observe two increases in other markets share – in 2011 and in 2015. To our mind, the key explanation of this lies in the fact that particular markets constitute the other market group. We mean the fact that offshores like Panama, Virgin Islands and others are among them. As it is known, offshores attract capital since they have favorable regulatory and tax regimes. Thus, we can assume that in crisis periods the ability of offshore markets to attract investments increases. The second meaningful explanation lies in the field of international organizations activities. Their securities are considered to be absolutely safe and thus in crisis periods investors become more biased to buy such securities. Therefore, the share of international organizations and thus of the other markets groups can increase.

The results of the asymmetry level estimation compared to the global portfolio liabilities structure are presented in table 3.

Table 3 – Marginal percentage returns in different market groups and their shares in the total, %

Year	Marginal Percentage Return					Share, %			
	ACWIFM	World	EM	FM	σ	World	EM	FM	Other
2002		3.21	9.17			73.91	3.99	0.22	21.88
2003		6.95	45.99	34.99	16.4	79.74	4.97	0.25	15.04
2004		1.52	-13.22	2.92	7.3	71.74	5.30	0.29	22.67
2005		-36.26	1.19	1.05	17.6	77.75	6.45	0.27	15.52
2006		-8.00	1.10	3.12	4.8	76.53	6.92	0.32	16.23
2007		-1.64	-13.22	13.92	11.1	74.47	8.03	0.33	17.16
2008		-3.92	-2.77	-1.58	1.0	77.64	6.15	0.27	15.94
2009	35.03	106.80	8.49	-9.33	51.1	76.37	7.90	0.29	15.43
2010	3.94	4.24	2.56	-0.93	2.2	74.15	8.82	0.36	16.67
2011	11.76	8.90	-11.61	5.86	9.0	74.70	7.99	0.35	16.96
2012	15.50	20.13	10.63	5.34	6.1	72.44	9.17	0.38	18.01
2013	-1.01	-1.88	2.72	3.72	2.4	73.15	8.49	0.39	17.98
2014	14.07	10.31	-2.79	-14.35	10.1	72.71	8.79	0.48	18.03
2015	-2.12	-1.42	47.00	24.82	19.8	72.56	8.02	0.46	18.96

Notes:

1. Calculated and composed by the author.
2. Years of increased instability are marked with grey filling.
3. Standard deviations are calculated for three market groups only: World, EM and FM.

As we discussed before, the figures in table 3 represented the asymmetry level. This level however should be considered in two aspects. First, we should

examine an internal asymmetry. It is actually described by figures in table 3 as marginal percentage return. This type of asymmetry reflects the relative relationship between risk and return inside the market group. The existence of internal asymmetry is quite natural for any market or market group and is often described by traditional equilibrium models such as CAPM or APT. Its natural character can be explained by different equilibrium conditions in different markets that result in different relations between risk and return. Moreover, since this equilibrium conditions can differ substantially in different markets we expressed growth in risks and returns as percentages.

Second is an asymmetry between market groups. We call it a structural asymmetry. It reflects how different market groups differ in their marginal percentage returns. This is mostly the asymmetry type we are interested in. The easiest way to estimate it is to calculate the standard deviation of marginal percentage returns for three market groups under question for each year. The idea behind this is that the higher the standard deviation the higher the asymmetry level is. Relatively substantial standard deviation means that the difference between marginal percentage returns in different market groups is considerable. Small standard deviations mean that the pattern of changes in risks and returns in different market groups is rather proportional and thus the asymmetry level is relatively small. Calculated standard deviations are presented in table 3.

Now we can interpret our calculations. During the 2008 crisis the asymmetry level was the lowest out of all observations. The respective standard deviation is 1.0 only. This brings us to the discussions of the following pattern. During crisis periods the asymmetry level falls extremely that brings about the increase in developed markets share in global portfolio liabilities. Though we do not analyze portfolio flows directly but rather an investment position, we can surely assert that portfolio flows affect and investment position per se and at least some part of them change the direction towards developed markets while the total volume is decreasing.

However, is this pattern valid for other crisis periods? In 2011, for example the asymmetry level was 9.0 in terms of standard deviation. This figure is much higher than 1.0 in 2008 but it is also much lower than 51.1 for 2009. The straightforward way to determine a benchmark is to use the average that equals 12.2 for this case. The 2011 figure is less than the average so we can consider it relatively small. For this year we also observe the increase in the share of developed markets. In 2015 the case is opposite. The asymmetry level is rather high and the share of developed markets decreases.

As to the periods of stable markets development, we can observe a completely reverse pattern. For relatively low asymmetry levels (lower than the average) the share of developed markets decreases. Besides the crisis periods, the low asymmetry levels are observed in 2004, 2006, 2007, 2010, 2012, 2013 and 2014. The share of developed markets decreased in six out of these seven cases and it rose in 2013 only. Relatively high asymmetry levels are in 2003, 2005 and 2009. In 2003 and 2005 the pattern in question can be confirmed – the share of developed markets increased and it fell only in 2009.

The reverse side of increase in the share of developed markets is the possible decrease in the shares of other market groups. We can acknowledge that the increase in the share of developed markets in 2008 was accompanied by decrease in the shares of all other market groups. In 2011 and 2015 there was a decrease in emerging and frontier markets shares but the share of other markets

rose. Moreover, in period of markets regular development for all above mentioned years when the share of developed markets fell, the share of other markets group always increased. Only in 2013 the situation was reverse. As to the other markets group this pattern is rather obvious but it cannot be confirmed by the statistical analysis of the asymmetry level since there is no data for this group.

The main economic explanation of the discovered patterns consists in the idea that in periods of stability risk-return profiles in different markets groups develop asymmetrically. This asymmetry clearly identifies different market groups making their risk-return profiles and the patterns of their development rather different. Thus, the asymmetry finally drives global portfolio flows and investment position according to the above-defined patterns. These patterns generally imply the trend of increasing the shares of emerging and frontier markets in global portfolio liabilities and decreasing the share of developed markets. They also assume that less developed markets such as emerging and frontier markets have much higher risks but attract investors by their high returns and the respective dynamics of risk-return trade-off. Developed markets have low risks and returns and attract conservative investors. However, as soon as the asymmetry level falls as it usually happens in crisis periods, less developed markets lose their attractive risk-return trade-off and its favorable dynamics. The latter becomes very similar to that of developed markets and they become more attractive for portfolio investors. Developed markets do not usually have political risks; have more stable and predictable regulatory environments; imply much lower exchange risks etc. Finally, asymmetry can be regarded as a significant factor of international portfolio investments in crisis periods. To be more precise, in our interpretation we mean rather symmetry than asymmetry, since the latter is typical for different markets in periods of stability.

Conclusions. The hypothesis put forward in our study has been confirmed. There is an asymmetry between risk and return dynamics in different market groups and this asymmetry is the factor driving global portfolio flows in crisis periods. We suggest estimating the level of internal asymmetry by calculating marginal percentage return that is a relation of the percentage increase in return to the percentage increase in risk for a given year. This type of asymmetry is natural for any market or market group and reflects the relative relationship between risk and return within the market group. The standard deviation of these ratios for three market groups in each year can be used as an index of structural asymmetry level: the higher the standard deviation the higher the structural asymmetry level is. Small standard deviations mean that the pattern of changes in risks and returns in different market groups is rather proportional and thus the asymmetry level is relatively small.

Two patterns of structural asymmetry can be identified. First is the crisis pattern. It implies that unlike the generally known idea that the increase in risks must bring about the respective increase in returns in crisis periods the dramatic falls in structural asymmetry level bring about the increase in developed markets share in global portfolio liabilities. In 2008 the level of structural asymmetry was the lowest – 1.0 and the share of developed markets grew from 74.47 to 77.64 %. The more general feature of this pattern implies the following. Relatively low levels of structural asymmetry (lower than the average) bring about the increase in the share of developed markets in global portfolio liabilities. Relatively high levels of structural asymmetry (higher than the average) result in developed markets share decrease. The crisis pattern is also characterized by the decrease

of the shares of emerging and frontier markets.

Second is the stability pattern that describes the natural state of markets development. This pattern implies that for relatively low asymmetry levels the share of developed markets decreases that was confirmed in six out of seven cases. For these six cases the share of other markets group increased. Relatively high asymmetry levels result in the increase of developed markets share and decrease in other markets share. This point however was confirmed in two out of three cases. This pattern also implies the general trend of increase in shares of emerging and frontier markets in global portfolio liabilities and decrease in shares of developed markets.

The financial sense behind these two patterns is that in periods of stability risk-return profiles in different markets develop asymmetrically thus pointing out investment differences between the market groups. In crisis periods structural asymmetry level falls and less developed markets become very similar to developed markets in terms of their risk-return dynamics. Since the latter do not usually have political risks, have more stable regulations and imply much lower exchange risks they become more attractive for foreign portfolio investors. Thus the share of developed markets in global portfolio liabilities in crisis periods rises.

References

- Aggarwal, R., Kearney, C., & Lucey, B. (2012). Gravity and Culture in Foreign Portfolio Investment. *Journal of Banking and Finance* 36(2), 525 – 538.
- Asgharian, H., & Nossman, M. (2011). Contagion among International Stock Markets. *Journal of International Money and Finance* 30(1), 22 – 38.
- Baek, In-M. (2006). Portfolio Investment Flows to Asia and Latin America: Pull, Push or Market Sentiment? *Journal of Asian Economics* 17(2), 363 – 373.
- Cakici, N., Fabozzi, F., & Tan, S. (2013). Size, Value, and Momentum in Emerging Market Stock Returns. *Emerging Market Review* 16(3), 46 – 65.
- De Santis, R. A. (2010). The Geography of International Portfolio Flows, International CAPM, and the Role of Monetary Policy Frameworks. *International Journal of Central Banking* 6(2), 147 – 197.
- Eun, C. S., & Resnick B. G. (1994). International Diversification of Investment Portfolios: U.S. and Japanese Perspectives. *Management Science* 40(1), 140 – 161.
- Feldman, T. (2010). Portfolio Manager Behavior and Global Financial Crises. *Journal of Economic Behavior & Organization* 75(2), 192 – 202.
- Hanauer, M., & Lingart, M. (2015). Size, Value, and Momentum in Emerging Market Stock Returns: Integrated or Segmented Pricing. *Asia-Pacific Journal of Financial Studies* 44(2), 175 – 214.
- IMF Coordinated Portfolio Investment Survey. – *International Monetary Fund*, 2016. Retrieved from <http://www.imf.org/external/np/sta/pi/cpis.htm>.
- Karolyi, G. A., & Stulz, R. M. (1996). Why Do Markets Move Together? An Investigation of U.S.-Japan Stock Return Comovements. *The Journal of Finance* 51(3), 951 – 986.
- Markowitz, H. M. (1952). Portfolio Selection. *The Journal of Finance* 7(1), 77 – 91.
- MSCI Index Performance. – *Morgan Stanley Capital International*, 2016. Retrieved from <https://www.msci.com/end-of-day-data-search>.
- Raddatz, C., & Schmukler, S. (2012). On the International Transmission of Shocks: Micro-Evidence from Mutual Fund Portfolios. *Journal of International Economics* 88(2), 357 – 374.

- Rezayat, F., & Yavas, B. (2006). International Portfolio Diversification: A Study of Linkages among the U.S., European and Japanese Markets. *Journal of Multinational Financial Management* 16(4), 440 – 458.
- Solnik, B. H. (1974). Why Not Diversify Internationally Rather than Domestically. *Financial Analysts Journal* 30(4), 48 – 54.
- Sarno, L., Tsiakas, I., & Ulloa, B. (2016). What Drives International Portfolio Flows? *Journal of International Money and Finance* 60(C), 53 – 72.
- Syriopoulos, T. (2011). Financial Integration and Portfolio Investments to Emerging Balkan Equity Markets. *Journal of Multinational Financial Management* 21(1), 40 – 54.

Data przesłania artykułu do Redakcji: 10.01.2017
Data akceptacji artykułu przez Redakcję: 21.01.2017