ISSN 1822-6515
ECONOMICS & MANAGEMENT: 2009. 14

PORTFOLIO CONSTRUCTION AND MANAGEMENT DURING THE PERIOD OF FINANCIAL CRISIS

Deimante Teresiene[1], Paulius Paskevicius[2]
Vilnius University, Lithuania, [1]deimadarbas@yahoo.com, [1]paskevicius.paulius@gmail.com

Abstract

Return-based style analysis provides a way of identifying the asset mix of the fund manager or an investor and comparing it with the asset mix of the performance benchmark. This enables the plan sponsor to understand the nature of the style and selection bets taken by an active manager. The correlation structure among the type of bets taken by different active managers provides a plan sponsor or an individual investor with valuable insights regarding the extent to which the bets cancel or reinforce each other.

The decomposition of a managed portfolio return into two components, style and selection, provides a natural distinction between "active" and "passive" managers. An "active" manager is looking for ways to improve performance by investing in asset classes as well as individual securities within each asset classes that she considers under priced.

Financial bubbles remain a challenge for economic theory. Bubbles occur not only in real-world markets, with their inherent uncertainty and noise, but also in highly controlled experimental markets, even when uncertainty is eliminated and calculating the expected returns should be a simple statistical exercise. Theoreticians have suggested that bubbles are rational, intrinsic, and contagious, but there is no widely accepted theory to explain their occurrence. So to predict them is quite difficult. But investors can minimise their looses using optimal portfolio theory and paying more attention to portfolio diversification.

Keywords: portfolio construction, management, financial bubbles, optimal portfolio

Introduction

Cyclical economical growth is natural and unavoidable phenomenon, at the same time the less amplitudes of economical cycles fluctuations are, the more attractive economy of a country is. Countries sustain ultimate difficulties when financial crises happen in a certain country. Latterly such crises mostly come into play as the prices bubble burst. The current financial crisis started from the crisis sub-prime mortgage crisis in the USA. After prices bubble burst it has spread worldwide and unavoidably claimed following victims: crashed two most famous underwriting banks of the world Lehman Brothers and Merrill Lynch, two biggest mortgage banks of the USA Fannie Mae and Freddie Mac, substantially fell down all stock indexes.

It is evident that the world realizes the extent of this problem and probable results because similar crises had place during XX century: Great Depression, the Asian-Russia financial crisis, 1997-1998; the 2001 dot-com bubble; and the recent sub-prime mortgage crisis. It's evidence that they have a strong impact on economical and political regional course. But modern economies of various countries are involved in more noticeable degree, so forthcoming consequences of this crisis will be rather heavier. It is interesting how in such circumstances banks and other financial institutions manage their assets in financial markets. Also the question is whether an object of the better property diversification wouldn't become the ground for a financial markets fall.

The aim of this article is to analyse investor's decisions during the time of financial bubbles. The tasks to reach the main point were formulated as follows: to introduce the main ideas of portfolio construction and management; to analyse the biggest financial bubbles of the world markets; to valuate different portfolios returns when the markets were going down using "mean-variance" analysis; to create an optimal portfolio for financial crisis periods. The object for analysis – financial markets.

For the research were used different models of statistics, mathematics, graphical analysis, and optimization. Under certain conditions an investor's choice of a portfolio can be reduced to balancing two dimensions—the expected return of the portfolio and its risk (measured by its variance). Thus Markowitz showed that the risk of an asset that really matters is not the risk of each asset in isolation but the contribution that each asset makes to the risk of the aggregate portfolio. With this insight Markowitz reduced the complicated and multidimensional problem of portfolio construction with respect to a large number of different assets, all with varying properties, to a conceptually simple two-dimensional problem known as "mean-variance" analysis.

ISSN 1822-6515
ECONOMICS & MANAGEMENT: 2009. 14

Financial bubbles

A financial bubble is a market aberration manufactured by government, finance, and industry, a shared speculative hallucination and then a crash, followed by depression. Bubbles were once very rare—one every hundred years or so was enough to motivate politicians, bearing the post-bubble ire of their newly destitute citizenry, to enact legislation that would prevent subsequent occurrences (Janszen, 2008). Today we barely stop between such bouts of madness. If we look from a same angle as it was early, the dot-com crash should have been followed by decades of bubble free time; instead, of that we have new bubble, and even bigger as it was before. To big faith in American long being expansion of home ownership, which can produce social harmony and stable economy growth was foundation for new mania to begin. Nowadays the great bull market is commemorated by millions of empty houses without anyone to buy them.

Rational behaviour of financial market participants is a little bit doubtful thing, so as alternative for this theory is being created irrational bubble theory, which is based on irrational human side as follows: herd instinct, fashion, team pressure, short memory of investors and many other basically psychological factors. Charles P. Kindleberger (2005, p. 42) states that the relationship between rational individuals and an irrational group of individuals can be complex. A number of distinctions can be made. He points out sixs assumption: mob psychology; different individuals change their views about market developments at different stages as part of a continuing process; rationality differs among different groups of traders, investors; market participants succumb to the 'fallacy of composition'; failure of a market with rational expectations; investors and individuals choose the wrong model, or fail to consider a particular and crucial bit of information. A bubble on the price of any asset will usually affect the prices of other assets, even if they are not subject to bubbles. The increase in the price of the asset which is subject to a bubble leads initially to both an increase in the proportion of the portfolio held in that asset and an increase in total wealth.

In 1996 Alan Greenspan, chairman of the Federal Reserve Board in Washington used the term irrational exuberance to describe the behaviour of stock market investors. This phrase soon became most famous quote – to describe everyone who follows the market. It's easy to understand that bubble always comes from irrational exuberance, as new and new participant come to the action and help's to inflate the bubble. Theoreticians have suggested that bubbles are rational, intrinsic, and contagious, but there is no widely accepted theory to explain their occurrence. Speculative bubble can be described as an unsustainable increase in prices brought on by investors buying behaviour rather than by genuine, fundamental information about value (Shiller, 2001). Almost the same definition of the bubble gives Charles P. Kindleberger (2005), he says: ''that economists use the term bubble to mean any deviation in the price of an asset or a security or a commodity that cannot be explained in terms of the 'fundamentals.' Small price variations based on fundamentals are called 'noise.'". Virtually every mania is associated with a robust economic expansion, but only a few economic expansions are associated with a mania. Still the association between manias and economic expansions is sufficiently frequent and sufficiently uniform to merit renewed study.

From both definitions we foresee substantial word as: unsustainable increase, investors buying behaviour, fundamentals. According to that, how rational investors and speculators are, it can be identified two main reason to bubble formation process. One of the marginal views is that investors, who aimed to get profit, always aware about market situation: then prices goes up without any fundamental reason, investors leaves the market in the early bubble stage. Easy to understand why this view isn't popular nowadays. At the manias time media always says that: bankers, investors, brokers went to edge. So if we take this view as foundation, manias shouldn't happen at all. It come a question: Are bubbles a consequence of mad people attitude in the market? The answer is simple: not necessary. The insight provided by Blanchard and Watson in 1979 - 1982, was to formulate a bubble theory in a stochastic environment, and to assume that when the asset price is on an explosive bubble path, rational agents expect a future crash but do not know its exact timing. This analysis came to the conclusion that a bubble, defined as an explosive path of the asset price, is a theoretical possibility. Sure that rational theory has theoretical and empirical lack, weakest place is presumption that investors can process all possible information about the market in their brain.

If we deny one of rational hypothesis, this theory would become more plausible. New presumption should be made that market participants have limited access to information, because of different information interpretation they make separate investment decision. R. Kuodis (2008) call's it limited rationality model and says that this theory gives even bigger opportunity to "ride on a bubble back" for well informed market participants, such institutional investors.

The efficiency of financial markets is the principal motivation behind the interest in the survival of irrational traders. If irrational traders impact asset prices, then markets will not be efficient, either

ISSN 1822-6515
ECONOMICS & MANAGEMENT: 2009. 14

informational or allocation. Implicitly, the discussion on survival is based on the assumption that survival is a necessary condition for long-run price impact. It is thought that irrational traders have to control a significant amount of wealth in order to affect – or 'infect' – prices with their irrational beliefs. (Kogan, Ross, Wang, Westerfield, 2002). Irrationality looks attractive, but as all theories it has weakness, because many presumptions about human behaviour should be made. Because of complicated behaviour presumption, today this theory isn't widely used to describe bubble formation or financial crisis in the world. On the other hand, it gave a great push in understanding the link between economics, psychology, and sociology.

Interesting paradox is that financial markets can function again if crisis lesson is partly forgotten. Financial transactions are a series of promises. You hand your money to a bank, which promises to pay you back when you ask; you invest in a company, which promises you are share of its future profits. Money itself is just a collective agreement that a piece of paper can always be exchanged for goods or services. Trust push financial markets forward (Carr, 2009).

Ground for recent financial crisis

Discussion about financial bubbles and their formation theories was necessary, if we want to understand, who lead to financial disaster like it is nowadays. Usually, as we know, asset bubbles lead to deep financial crisis. History doesn't lie: Tulipomania, Mississippi and South Sea company bubble, dot-com and recent housing bubble. In all cases asset prices, was based not on it fundamental value, but rather on to much optimistic view for future prices. Abhit Banerjee says: "a little irrationality goes long way. When reasonable, self-interested people trade with each other, optimism tends to breed optimism – until it subsides into corrosive pessimism" (Carr, 2009). When market collapse, everyone suffers: within 2 years the shock from American housing sector spread worldwide, sector by sector, economy by economy.

Now almost everyone agrees that housing bubble and dot-com have something in common. From the chart below we see, that it both cases FED reserve rates has been lowered, that made money easy to access for everyone. While reserve rate in 1995 – 2000 was around 5 percent everything seemed fine. But to say the truth, it wasn't: a combination of rapidly increasing stock prices, individual speculation in stocks, and widely available venture capital created an exuberant environment in which many of these businesses dismissed standard business models, focusing on increasing market share at the expense of the bottom line.

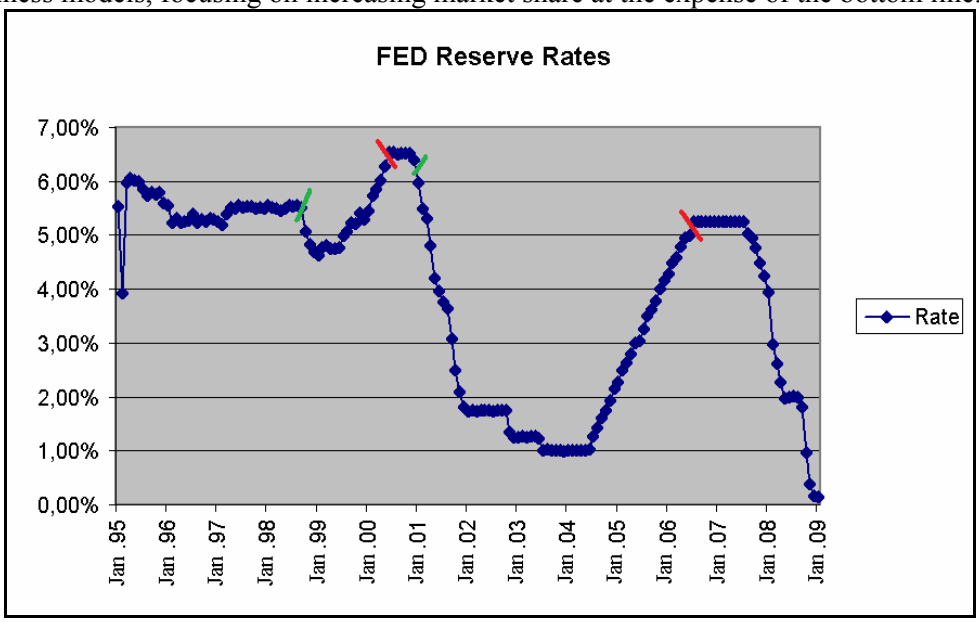

Figure 1. FED reserve rates

Dot-com companies' strategy at that time could be called "get big quickly", because they expected to build enough brand awareness to charge profitable rates for their services later. Time showed that it was horible mistake. Crisis become clear when FED rates during 1999 was rased 6 times, money became expensive, investors started to sell stocks, because the smell of iliquditity in the market become tangible.

After the bust FED was aimed to stimulate the economics ir order to soften the uotcomes of dot-com bubble, and again lowered reserve rates. Aggressive strategy of the bank's let to borrow for everyone, allmost for free, some part of the time. Bust in IT sector let to uotflow some money from finacial to more

ISSN 1822-6515
ECONOMICS & MANAGEMENT: 2009. 14

natural housing sector. Huoses became investment tool. Even people with bad credit history there abble to get sub-prime credit. Again everything was fine, while interest rates was low, people there able to pay their mortgages. Rate raise from 1 % in 2004, to 4,29 % in 2006 led to housing bubble bust, as people begin default with their debts.

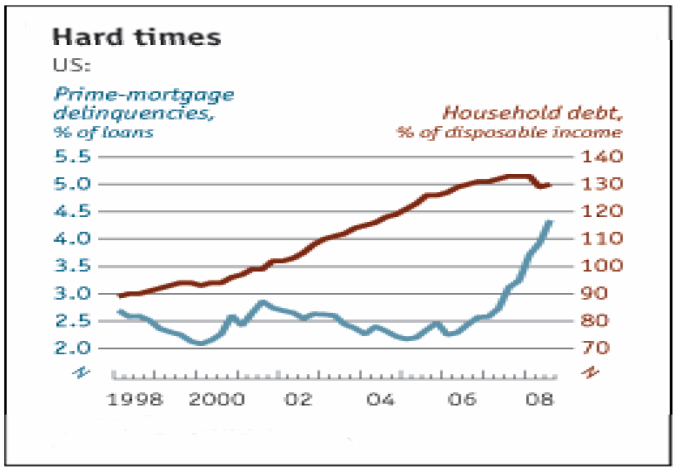

Figure 2. Link between household debt and mortgages

Consequences for household in the USA was horrible, because more than 70 percent (Bodie, 2001) of asset they hold as financial tools and if a market goes down, like in 2008 around 45 percent, household sector had lost nearly third of their assets. From the second chart visible that low mortgages was a cause of increased burden on households. Within 5 years it rose to more 130 percent of disposable income. Load was bearable while households appeared getting richer, thanks high house and stock prices, but now this fact makes a situation worse as it could be.

To identify one or two exact reasons why financial crisis occur is difficult, but these XXI century crises has showed some pillar points: 1) *innovations or inventions*, like sub-prime mortgages designed to provide home ownership opportunities to borrowers in the U.S. with a higher risk profile (such as borrowers with low incomes, bad credit histories or limited disposable income); 2) *„counterparty risk"*– which is growing with the volume of bets. Also „easy hand"which borrowed assets on the assumption that housing prices would continue to appreciate in value. However, money market rates increased, inciting foreclosures, as expected, but occurred at the same time the housing market and valuations cooled. This left the lending institutions with assets of significantly reduced, and in some case worthless, value; 3) *globalization* – thanks for financial innovation like MBS or CDO prime and sub-prime credits there bundled together, usually they got high investment grade that made them attractive for international investors (like European banks or pension funds) and was sold on the market.; 4) *liberalisation, deregulation* – it's clear that too much freedom in USA financial sector lead to flurry situation with derivative tools. Some CEO at conference „Campus of Finance"(2009) has said: „banks and rating agencies didn't have any reason to be aware about their calculations and derivatives value grading. Because they lived from various fees, but not from return of the financial instrument, they do not mind too much about quality of sub-prime credits. Meanwhile rating agencies placed miraculous letters AAA, even without any revision, because they didn't know how to do that." 5) *Problems in the banks* – now some banks agree that they had problems too (KPMG, 2008). They say that salary structure was bad, motivating to take risk. Management always was interested to gain bigger return, despite risk they take. Models with worst case scenario have tested scenario like this.

Portfolio formation process

Return-based style analysis provides a way of identifying the asset mix of the fund manager or an investor and comparing it with the asset mix of the performance benchmark. This enables the plan sponsor to understand the nature of the style and selection bets taken by an active manager. The correlation structure among the type of bets taken by different active managers provides a plan sponsor or an individual investor with valuable insights regarding the extent to which the bets cancel or reinforce each other.

Nowadays for portfolio construction can be used one of the four portfolio theories: Markowitz, capital assets pricing theory, arbitrage pricing theory and factorial model, commonly know as improved APT. Modern portfolio theory focuses on the techniques and implications of *efficient diversification,* and we devote considerable attention to the effect of diversification on portfolio risk as well as the implications of efficient diversification for the proper measurement of risk and the risk–return relationship (Bodie, 2001).

ISSN 1822-6515

Markowitz portfolio theory can generalize the construction problem to the case of many risky securities and a risk-free asset. As in the two risky assets example, the problem has three parts (Bodie, 2001). First, we identify the risk-return combinations available from the set of risky assets. Next, we identify the optimal portfolio of risky assets by finding the portfolio weights that result in the steepest CAL. Finally, we choose an appropriate complete portfolio by mixing the riskfree asset with the optimal risky portfolio. Before describing the process in detail, let us first present an overview.

Christina Brentani (2004) states that risk versus return are the reason why investors invest in portfolios. The ideal goal in portfolio management is to create an optimal portfolio derived from the best risk–return opportunities available given a particular set of risk constraints. To be able to make decisions, it must be possible to quantify the degree of risk in a particular opportunity. The most common method is to use the standard deviation of the expected returns (Brown, 2002). This method measures spreads, and it is the possible returns of these spreads that provide the measure of risk.

There are several different factors that cause risk or lead to variability in returns on an individual investment. Factors that may influence risk in any given investment vehicle include uncertainty of income, interest rates, inflation, exchange rates, tax rates, the state of the economy, default risk and liquidity risk.

The goal is to hold a group of investments or securities within a portfolio potentially to reduce the risk level suffered without reducing the level of return. To measure the success of a potentially diversified portfolio, covariance and correlation are considered. Covariance measures to what degree the returns of two risky assets move in tandem. A positive covariance means that the returns of the two assets move together, whilst a negative covariance means that they move in inverse directions.

Correlation is vital for successful portfolio diversification, because it shows two securities movement direction. If correlation is positive, securities prices moves same direction and diversification isn't efficient. So we came to conclusion that diversification is beneficial then securities prices are uncorrelated or negative correlated, then one security price move opposite direction to other. Brentani (2004) foreground that when correlation coefficient between two securities is 0, it may or may not create a diversification effect. However, it still better to be in this position than in a perfect positive correlation situation. The extended concept of H. Markowitz mean-variance concept, often called Sharpe ratio measure. Extending this concept to investment strategies, you could look at the payoff to each unit of risk taken by dividing the return earned using the strategy by the standard deviation of return.

The Sharpe ratio is a versatile measure that has endured the test of time. Its focus on the standard deviation as the measure of risk does bias it against portfolios that are not diversified widely across the market. A sector-specific mutual fund (such as a bio-tech or health care fund) will tend to do poorly on a Sharpe ratio basis because its standard deviation will be higher because of the presence of sector-specific risk. Since investors in these funds can diversity away that risk by holding multiple funds, it does seem unfair to penalize these funds for them (Damodoran, 2003).

According to various portfolio formation techniques during financial crisis investor should allocate his investment portfolio during different classes of asset. Especially in a such investment period the main attention should be paid to fixed income securities or commodities. From the other side of view the best time to invest is when the prices of stocks are quite low. But during crisis it is a very risk strategy because we can't know were is the bottom of the prices. So if the price seems to be quite low today it doesn't matter that it won't be lower the next day. When economic variables is very low and prognosis is not good for some year (it depends on the exact region) the best way is to invest continiously – it can be named as diversification of time. To invest in gold or other commodities is good disicion but only when the stock markets are going down. But during financial crisis we have some periods when stocks are growing and the price of gold than is decreasing. So the main conclusion can be done that the best way during financial crisis is to take long investment horizont and always monitor portfolio positions.

Portofolio formation in practice

Investors always want to get as much as possible return from their investments – that is natural, but then crises take place very often come a question: how to create a portfolio that is least risky and gives some return. Most simple answer would be to place a deposit account in the bank. On the other hand investments into portfolio helps to reduce unsystemic risk, that comes form the bank. Thanks to diversification effect country risk also is divided into separate parts, which make investment less risky.

Nowadays is really hard to choose effective investment tools, but our sectorial analysis has showed that during financial crisis time the price of gold is rising. Price increase could be explained be human behaviour, because then the market has some uncertainty peoples instead of financial asset wants to have

ISSN 1822-6515
ECONOMICS & MANAGEMENT: 2009. 14

something more material like gold or other commodities. In post bubble cycles stock market return as we know almost always becomes negative, because investors retreat to bond market. In recession time companies and even governments a forced to beg: companies can't promise a share of its future profits, government's wants to stimulate economics, because of borrowing demand increase, the level of return gets higher. So as an outcome of these facts, we constructed two different portfolios, based on commodity and bond prices: first was divided into three parts: half to gold, quarter to Direxion 10 Year Note Bull 2.5X Inv and rest to the Federated U.S. Govt: 2-5 Yr Instl. mutual funds; ½ gold, ¼ platinum and rest of assets to Federated U.S. Govt: 2-5 Yr Instl. mutual fund. We made the presumption that portfolios were created in the beginning of 2008, within base value of portfolio 1000.

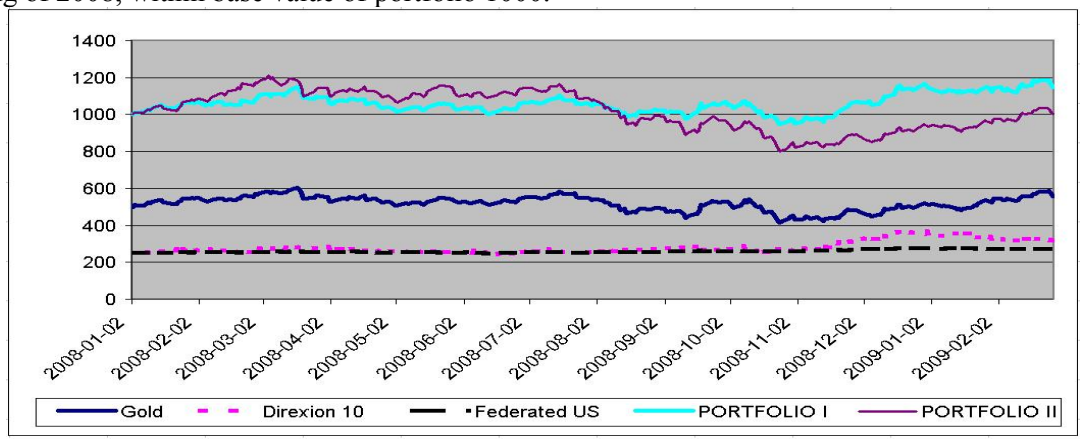

Figure 3. Portfolios historical value

Values of constructed portfolios (figure 3) have varied during the time: first portfolio almost all the time was profitable, while second regain its beginning value only on the end of the period. It's clear that second portfolio were more affected by platinum prices changes in commodity market, standard deviation of around 81 from the index average 243 value, is a main source for second portfolio instability. Because first portfolio is more profitable we analyze it in detail.

Table 1. Portfolio risk and return

	Return	**Average return**	**Standard deviation**	**Covariance between Portfolio and Nasdaq**
Gold	11,50%	3,76%	7,83%	-0,367003802
Direxion 10	27,08%	12,76%	13,11%	
Federated US	8,58%	4,07%	3,16%	
PORTFOLIO I	14,66%	6,09%	5,09%	

Table 1 characterizes each portfolio part individually by average return and standard deviation. Mutual fund Direxion 10 risk was highest, because standard deviation more then 13 percent from average, meanwhile gold Federated US mutual fund only 4,07 percent, because of great amount of risk a Direxion 10 return premium was the highest 27,08 percent. Chart shows that portfolio overall was most effected by gold price changes that proves almost identical shape of portfolio and gold curve during investment period. To be sure about performance of our virtual investment we calculated correlation between it and NASDAQ index. Average negative reliance from NASDAQ mean's that our portfolio has opposite trend in the market. To say the truth negative correlation is helpful for diversification, when we want to protect portfolio from market changes.

If return from Direxion 10 is bigger then from other part's of portfolio, maybe we need to change investment proportion. So we have calculated an effective edge which shows most effective combination of our portfolio.

ISSN 1822-6515
ECONOMICS & MANAGEMENT: 2009. 14

Table 2. Portfolio risk and return

	Max Return	Min Return	Max Risk	Min Risk
	26,74%	8,79%	12,87%	2,69%
Composition				
Gold	1	1	1	21
Direxion 10	98	1	98	1
Federated US	1	98	1	78
	12,87%	3,20%	26,74%	9,37%
	Risk		**Return**	

From table 2 is easy to see that the biggest return are almost 27 percent with a risk of 12,87 percent. Portfolios with a minimum return and minimum risk also shown in the table below, interesting fact that least risky portfolio gives more than 9 percent return. Our portfolio would have been most effective if we have invested 1 percent into the gold, 98 to Direxion 10 and rest to Federated US. So according to the nowadays economical situation of all regions for a period of about one year the best investments were to fixed income securities and commodities. The authors think that despite the crisis deep there always are any profitable investments but also the main attention should be paid to investors goals and monitoring of his portfolio. When stocks' prices decrease and GDP is showing bad signs investors must look through their portfolios in order to increase the part of safe instruments as government's bonds and for the period of crisis – commodities.

Conclusions

The process of managing an investment portfolio never stops. The main attention should be paid to portfolio monitoring and updating the status of instruments and investor's needs. The authors of this artcle think that the main point of portfolio management during financial crisis is monitoring. Constructions of different portfolios and calculations of maximum returns and risk have showed that the best investment for a one year period was investing in gold and commodities. But such a portfolio is not suitable for a long time and especially when the situation of stock markets will be getting better. So the key of profit form investing is a good monitoring of economics and the region markets psychology.

Extraneous events may well influence the price, if believed by other participants to do so, it means that crowd psychology becomes an important determinant of prices. Crowd psychology is very important in nowadays when the biggest stock markets dictate the rulles for the rest ones. There are many reasons for nowadays financial crisis. Usually analysts exclude such as derivatives, excessive pay for bank officers, poor government regulation and a lack of transparency about investments so that risk was not correctly assessed.

References

1. Janszen, E. (2008). The next bubble taking stock of our irrational exuberance. Harper's, February, 39-45.
2. Shiller, R.J. (2001). Irrational Exuberance. USA: Princeton University Press.
3. Kindleberger, C. P., & Aliber, R. Z. (2005). Manias, Panic, and Crashes: A History of the Financial Crises. USA: John Wiley & Sons.
4. Kuodis, R. (2008). Burbulai: kodėl jie pučiasi ir ką su jais daryti?. Valstybė, 11, 24 - 29.
5. De Grauwe, P., & Grimaldi, M. (2004). The theory of bubbles and Crashes. CESifo Working Paper, 1194.
6. Kogan, L., Ross, S., Wang, J., & Westerfield, M. (2002). The Price Impact and Survival of Irrational Traders. *MIT LFE Working Paper*, LFE-1047-02.
7. Carr, E. (2009) A special report on the future of finance. The economist, 8615, 3-22.
8. Bodie, Z., Kane, A., Marcus, A. J. (2001). Investments (5th ed). USA: McGraw-Hill.
9. Brentani, C. (2004). Portfolio Management in Practice. UK: Elsevier Butterworth-Heinemann.
10. Brown, K, C., & Reilly, F. K. (2002) Investment Analysis and Portfolio Management. USA: South-Western College Pub.
11. Damodaran, A. (2003). Investment Philosophies. USA: John Wiley & Sons.
12. KPMG. (2008). Banks urged to grasp the nettle of risk management to avert repeat crisis: <http://www.kpmg.lt/dbfetch/52616e646f6d49 56e4a2f4af8fb5de10b2ab7442af3393de/press_release_lt.pdf>