

Is Stock Always the Right Choice? Should Naive Investors Avoid Stock Markets?

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Abstract

The goal of this paper is to present an original and simple analysis aimed to understand why investing in capital markets can be very dangerous for “naive investors”. Stock markets display often exploding volatility. They are characterized by instability and subject to external shocks. If extraordinary periods are considered, the probability of making money on them can be very low. It can be shown that, in absence of any “wise” investment scheme, unpleasant results emerge. A simple empirical analysis shows that a riskless portfolio may perform better than a portfolio composed entirely by risky assets. In such circumstances, investors might make the wrong choice.

JEL classification numbers: G01, G10, G11, G15

Keywords: Asset Allocation, Investment Strategies, Stock Markets, Riskless Securities

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1 Introduction

Portfolio allocation strategies have always been subject to numerous studies, both empirical and theoretical. It is well known that many economists and practitioners in literature have attempted to describe asset allocation choices that might be good in any situation or in any state of the world. A famous pioneering work in Modern Portfolio Theory, written by Harry Max Markowitz in 1952 [8], studies the effects of asset risk, return, correlation and diversification on probable investment portfolio returns. Basically, Markowitz's contribution solves a linear constrained optimization problem where the goal is to minimize the risk of a portfolio given the portfolio expected return or maximize the portfolio expected return given a certain level of risk. Even if the model appeared to be reasonable from a theoretical point of view, several problems arise from its use in practice. In fact Markowitz's optimal portfolios tend to concentrate on a small subset of the available securities, and appear not to be well diversified. After that a considerable number of models have been developed, especially starting from the 80's. The Black-Litterman Model [1]², for example, incorporates investor's views in the optimization process, providing a new vectors of returns. Another well known optimization tool is named Robust Asset Allocation³. The latter provides a solution that has the best performance under the worst case. Even more, a large number of investment strategies have been implemented during the last couple of decades, such as stock picking, market timing and portable alpha. But, despite their practical success, mean-variance analysis and all the other tactical asset allocation strategies rely on the assumption that investors care only about the distribution of wealth one period ahead. This is highly unrealistic, in fact most

² See F. Black and R. Litterman, [1].

³ See R.H. Tütüncü and M. Koenig, [13].

investors are interested in the standard of living that their wealth can support over the longer term. Investors must form beliefs about the future and not just about average asset returns and risks, but about the dynamic processes that determine interest rates and risk premia. Merton [10] argue that these beliefs must be consistent with some reasonable view about the equilibrium of the economy and investors must calculate inter-temporal hedging demand for assets. Obviously it is hardly realistic to expect individuals to do all this by themselves. Even if a lot of tools have been implemented to exploit higher returns, both in the short-run and in the long run, financial markets often show to be very “dangerous” in terms of expected performances. High volatility, uncertainty and shock often tend to predominate. As a consequence, achieving high returns could be very hard and it often becomes a pure gamble, even for practitioners. In what follows we demonstrate how allocating resources in stock markets is not always profitable, especially for those investors who do not have sufficient skills to dynamically manage their own wealth or to select good stocks. We name this representative investor “naive”. To prove this result a specific investment game is constructed and developed, where I compare, over different time horizons, the performance of an equally weighted portfolio composed by ten different stocks to the performance of a riskless security. Stock are represented by specific country indices (e.g. S&P 500, FTSE 100, DAX etc.). A riskfree rate (i.e. short term interest rate) or related riskless proxies are also considered (e.g. TBILL 3M, 10Y Gov Bond, etc.). In line with the main purpose of this paper, stocks and riskfree performances are analyzed and compared across different periods.

2 A Simple Investment Game: Some Empirical Results

The investment game represents an ex-post empirical performance analysis between stock and riskless markets. The chosen investment time horizon starts in

June 2002 and ends in December 2009. The idea is that a representative investor deposits a certain amount of his/her savings in a bank account investing either in the stock market or in the risk-free market. In this game the stock market performances are captured by the following global stock indices time series: S&P 500, Euro Stoxx 50, CAC 40, DAX, IBEX 35, AEX, FTSE 100, SMI, SSE and Nikkei 225. As proxy for the risk-free securities, the short term interest rates are adopted. They are usually represented by either the three month interbank offer rate attaching to loans given and taken amongst banks for any excess or shortage of liquidity over several months or the rate associated with Treasury bills, Certificates of Deposit or comparable instruments, each of three month maturity. To get an overview of how investor's capital is performing, the initial capital invested in each stock index or risk-free security is compounded on monthly basis. To increase the value of the initial amount of capital through the investment process, the investor would like to invest a certain amount (in this game equal to \$1000) at time T_0 . The allocated amount will remain fixed until maturity, put in another way the portfolio will be not reallocated.

Table 1: Naive Investor's Portfolio Allocation

Cash Invested: \$1000			
Country	Global Stock Index	%	Portfolio
China	Shanghai Composit Index (SSE)	10%	\$100,00
Euro Area	Euro Stoxx 50	10%	\$100,00
France	CAC - 40	10%	\$100,00
Germany	DAX	10%	\$100,00
Japan	Nikkei-225 Stock Average	10%	\$100,00
Netherlands	AEX	10%	\$100,00
Spain	IBEX 35	10%	\$100,00
Switzerland	Swiss Market Index (SMI)	10%	\$100,00
United Kingdom	FTSE 100	10%	\$100,00
United States	S&P 500	10%	\$100,00
Global		100%	\$1000,00

As mentioned in the introduction of this paper, portfolio allocation strategies are meant to be built on the concept of diversification. My main assumption is that investor does not have enough knowledge and skills to built optimal portfolios. It is largely accepted that such knowledge consists of accurate information about the risks and the returns of individual stocks. Variance and covariance are hard to discover via graphical analysis. Basically my representative investor admit to know little about future risks and returns, thus resort to passively indexed portfolios. The investor is more attracted by the stock markets rather than the other one. Such a preference derives from the fact that he/she expects that stock markets will perform better than the risk-free markets.

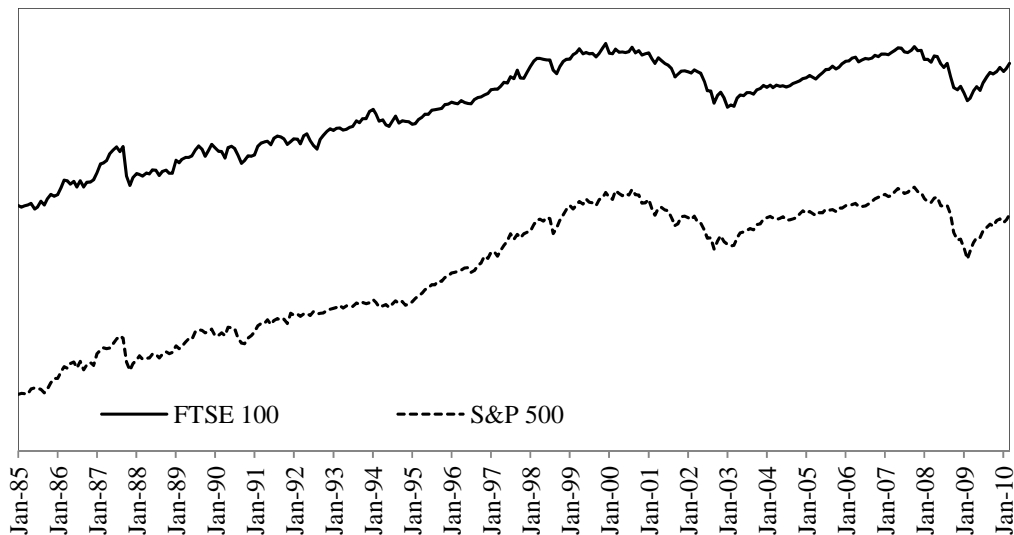


Figure 1: Historical Data on UK and US Stock Market. Source: Datastream

For instance, the origin of a naive investor's positive view on future stock markets performance can be easily retrieved by looking at Figure 1, which displays an increasing trend, both in the UK and US stock markets. But past literature provides to our investor only a partial support to his/her positive view on

future stock markets performance. Why should we not invest in those markets? Note also that literature largely supports the premium paid by the equity. McGrattan and Prescott [9] find that the market value of productive assets, including both tangible and intangible assets and assets used outside the country by U.S. subsidiaries, is currently about 1.8 times GNP, the same as the market value of equity. Thus they argue that the US stock market boomed, especially in the 90's. Seeking an answer to the following question: Is the current stock market value too high?, Glassman and Hassett [5] argue that it is not. Furthermore, they claim that the market is undervalued. They point to the historical evidence that stock returns over forty-year holding periods are less variable than returns on government securities. Thus, they argue that for long-term holding periods, equities produce returns higher yet no riskier than bonds.

On the contrary, others express concern that the market is, indeed, overvalued. Federal Reserve Chairman Alan Greenspan (1996), for example, has suggested that the recent high value of the market may reflect "irrational exuberance" among investors. Shiller [14] has reiterated this concern and said that a 50 percent drop in the value is plausible. For instance, a general concern about an overvalued market is fueled by the experience of Japan in the 1990s. The value of Japans corporate equity fell 60% in 1990, and its economy subsequently stagnated. In literature other empirical facts support the idea of our investor in preferring stock markets rather than risk-free markets. Historical data provide a wealth of evidence documenting that for more than a century, US stock returns have been considerably higher than returns for T-bills. R. Mehra and E. Prescott [10] show that the average annual real return (that is, the inflation-adjusted return) on the US stock market for the past 110 years has been about 7.9%. In the same period, the real rate of return on a relatively riskless security was a paltry 1.0%. The difference between these two returns, 6.9 percentage points (pps), is the well-known equity premium. Conflicting results on the exact measure of the equity premium still exist in financial literature.

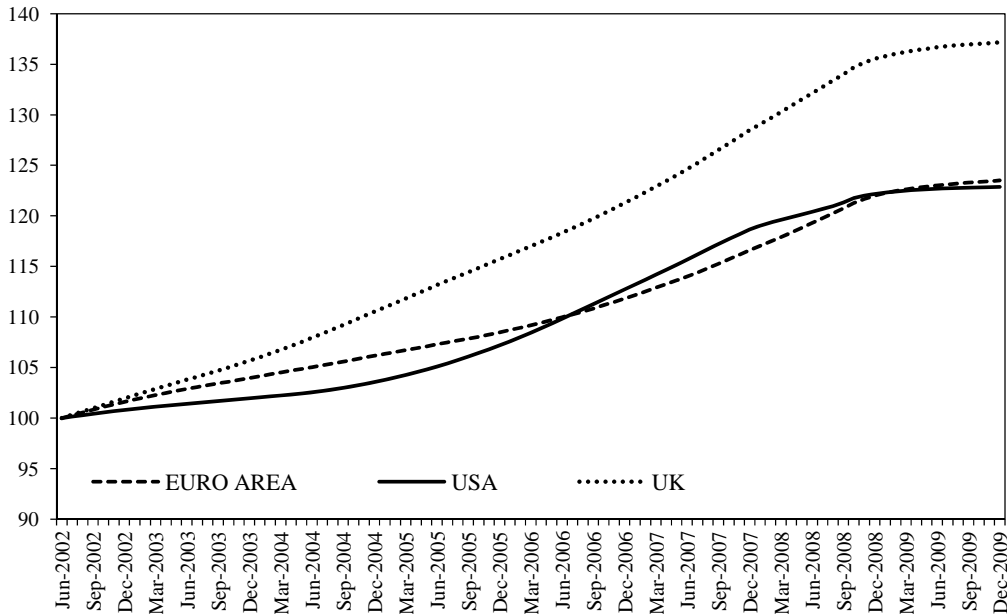


Figure 2: Global Short-Term Interest Rates Performances
(Sample: Jun 2000 – Dec 2009). Source: Datastream.

Jagannathan et al. [6] reveal that the US equity premium has declined significantly during the last three decades. They show that the premium averaged about 7 percentage points during 1926-1970 and only about 0.7 of a percentage point after that. They argue also that such result is shown to be reasonable by demonstrating the roughly equal returns that investments in stocks and consol bonds of the same duration would have earned between 1982 and 1999, years when the equity premium is estimated to have been zero. In any case the choice of a pure equity portfolio is in line with the behavior of a naive investor and with the purposes of our investment game. In fact within this game investor decides to build an equally weighted portfolio composed (see Table 1) by purchasing shares of the most important global stock indices. The diversification finds place in the fact that the investor allocates 1/10 of its wealth in ten different stock indices belonging to different geographic areas. Even if each index refers to a different geographical

area, the portfolio as a whole cannot be considered efficiently diversified. The lack of accurate information regarding future returns and risks, correlation coefficients, financial investment theories, specific investment strategies and international financial markets' integration push our naive investor also toward naive diversification. In general naive investors acknowledge that they have no useful information about stock markets' behavior. The lack of above needed knowledge and skills, jointly with the absence of proper caution within the investment process could result in heavy losses for our investor.

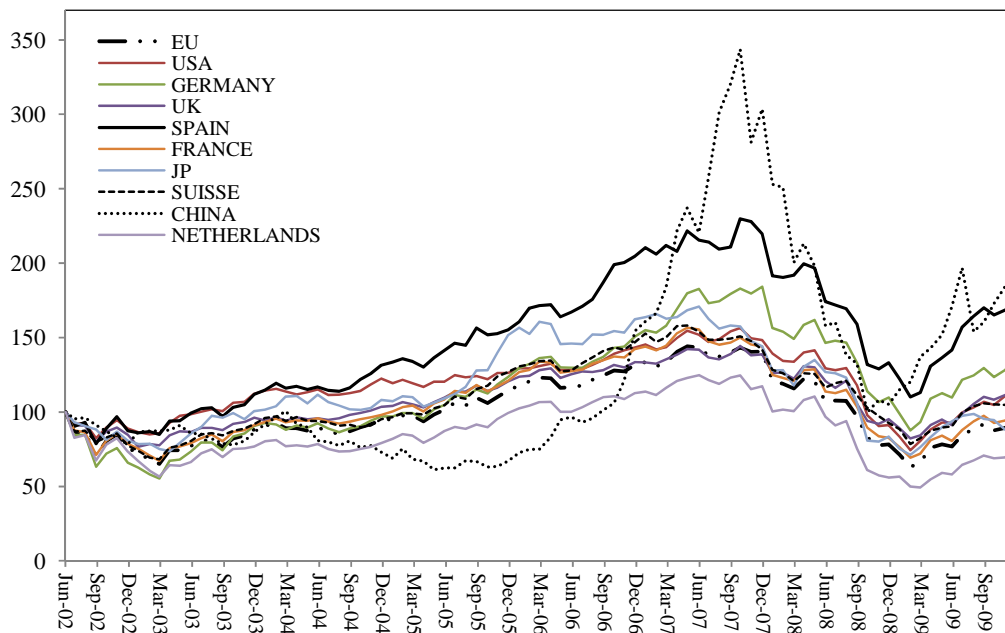


Figure 3: Global Stock Market Indices
(Sample: Jun 2000 – Dec 2009). Source: Datastream

As mentioned in this introduction, stock markets are subject to high volatility and uncertainty shocks. In periods of persistent uncertainty we cannot make money (i.e. generate earnings) easily and safely, by simply composing a pure equity portfolio and applying to its a passive investment strategy of the form: “wait and see”. The investors cannot wait until maturity, maybe watching his/her

TV on the coach, without monitoring the amount in his/her bank account. If you do that, as our naive investor does, according to this investment game, you might be wrong and suffer losses. In absence of any asset allocation skills, the probability of not achieving a predetermined portfolio expected return increases. Results show how investing an initial sum of money and compounding its until maturity either in the stock markets or in the risk-free market could generate “bizarre” final numbers. Suppose to keep fix the investment time horizon at maturity (i.e. December 2009). In some cases the riskfree portfolio's return is higher than the stock-market's portfolio return. According to the idea of this investment game, from the pure equity allocation the investor obtains a return on initial invested capital equal to 20.74% respect to a 21.12% that he/she could obtain in case of a pure risk-free allocation. Performances are illustrated respectively for stock and riskfree securities in Tables 2-3. The latter strongly confirms the risk involved investing within the stock market. To avoid underperformances a “wise” strategy is required. Theoretically, investors ask a premium for bearing the extra source of risk. But, in this example we have a premium for the riskfree investment. Results also suggest that investing in the stock market does not appear to be a simple game, but it requires skills. Stock markets' investment is a serious matter. They often seem to be like a “casino”. Given the high level of uncertainty, in the last decade this issue has become much more serious and important than in the past. In order to produce a “wise” portfolio aimed to hedging risk and obtaining high expected returns, we need to be skilled and well-informed on several issues, both theoretical and practical. Unfortunately, often we have no information about these issues and we think to be skilled enough. Table 2-3 show the overall performances of the two portfolio allocations. The first thing to note is the large difference in terms of risk. In fact the equally weighted portfolio composed by stock indices is much more risky than the equally weighted portfolio composed only by risk-free securities. Assuming that the risk (i.e. volatility) of the stock markets is measured by the standard deviation, we

recognize that the pure equity portfolio displays on average a standard deviation equal to 70% (on annual basis). On the other hand, the risk-free portfolio, from a theoretical point of view should display a standard deviation equal to zero. We use the conditional form “should” just because a proxy is used to get a riskfree financial instrument. Thus, even if theory suggests that the risk involved should be equal to zero, we measure for the riskfree portfolio a standard deviation equal to 1% (on annual basis). Figures 1-2 on stock and riskless markets’ performances, largely support the above numerical analysis.

Table 2: Global Stock Indices: Performance Measurements

COUNTRY	Stock Index	Mean	SD	T ₀	T ₁	Delta %
CHINA	SSE	1.14%	9.24%	100	189.13	89.13%
EU	Euro Stoxx 50	0.12%	5.87%	100	94.74	-5.26%
FRANCE	CAC 40	0.17%	5.56%	100	100.98	0.98%
GERMANY	DAX	0.59%	6.91%	100	135.93	35.93%
JAPAN	Nikkei 225	0.16%	5.80%	100	99.29	-0.71%
NETHERLANDS	AEX	-0.06%	6.80%	100	76.27	-23.73%
SPAIN	IBEX 35	0.77%	5.59%	100	172.72	72.72%
SWISS	SMI	0.20%	4.45%	100	109.47	9.47%
UK	FTSE 100	0.26%	4.38%	100	116.25	16.25%
USA	S&P 500	0.24%	4.51%	100	112.66	12.66%
PORTFOLIO	ALL	0.36%	5.91%	1000.00	1207.44	20.74%

It is also important to point out that during the chosen period the average return of each selected stock index is considerably low, more precisely numbers show a range which goes from a max of 1.14% (on monthly basis) gained by the Shanghai Stock Index to a min of -0.06% (on monthly basis) gained by the Amsterdam Exchange Index. Without doubt, such a scenario should not encourage people to allocate their savings in a portfolio composed only by risky assets. A careful reader might claim that our result leads to the fact that an “ad hoc” investment time horizon and a particular asset allocation are chosen. Thus, Do I

use an “ad hoc” investment scheme? The answer is yes. Such “ad hoc” scheme is in line with the goal of the paper, which requires to stress an investment process where the principal actor is a naïve investor with no sufficient skills to manage “wisely” his/her wealth. To enhance and deepen our understanding of the riskless-risky trade-off in the investment decision process, we decide to replicate this investment game using different data, geographic areas and floating investment time horizons.

Table 3: Global Riskless Securities: Performance Measurements⁴

COUNTRY	Riskfree	Mean	SD	T ₀	T ₁	Delta %
CHINA	S.T.I.R.	0.22%	0.08%	100	121.59	21.59%
EU	S.T.I.R.	0.23%	0.09%	100	123.51	23.51%
FRANCE	S.T.I.R.	0.23%	0.09%	100	123.51	23.51%
GERMANY	S.T.I.R.	0.23%	0.09%	100	123.51	23.51%
JAPAN	S.T.I.R.	0.03%	0.03%	100	102.83	2.83%
NETH.	S.T.I.R.	0.23%	0.09%	100	123.51	23.51%
SPAIN	S.T.I.R.	0.23%	0.09%	100	123.51	23.51%
SWISS	S.T.I.R.	0.10%	0.08%	100	109.29	9.29%
UK	S.T.I.R.	0.35%	0.12%	100	137.15	37.15%
USA	S.T.I.R.	0.23%	0.14%	100	122.85	22.85%
PORTFOLIO	ALL	0.21%	0.09%	1000.00	1211.25	21.12%

Table 4: EURO AREA: Riskless Securities and Stock Market – Performance Analysis (a)

Period	5Y EMU GOV.	EURIBOR 3M	MSCI EMU TRI
Jan 99 – Jan 04	17.11%	19.15%	-10.40%
Jan 00 – Jan 05	24.25%	18.12%	-26.70%
Jan 01 – Jan 06	22.58%	15.51%	-5.41%
Jan 02 – Jan 07	21.84%	14.12%	40.48%
Jan 03 – Jan 08	16.97%	15.24%	128.90%
Jan 04 – Jan 09	17.48%	17.97%	6.24%
Jan 05 – Jan 10	14.94%	16.91%	19.60%

⁴ S. T. I. R. = Short Term Interest Rate.

We basically restrict our analysis on two main macro-areas: the US and the Euro Zone. The goal is still to compare the returns gained in case of “riskless” investment to those gained by investing only in stocks. The considered intermediate-term horizon is still 5 years. The choice is done at the beginning of the period, there is not rebalancing in the period in-between. Then, performances are compared. In this example we do not account for diversification. In contrast to the beliefs of our naïve investor, we only aim to show that equity investment does not always outperform riskless investments in an intermediate-term horizon. In the Euro area case study the naïve investor can invest in three different assets: 5-year European bond, short term interest rate (i.e. Euribor 3 months) or Morgan Stanley EMU Total Return Index. There are seven 5-year periods, as reported in Table 4. Choosing a 5-year bond, the investor locks the return over the investment horizon (i.e. we considered the yield to maturity), thus he/she gets certainly such payoff at the end of the 5 years. Investing in the Euribor rate the volatility is quite small and the return depends mainly on the macroeconomic environment, in particular to the ECB Main Refinancing Rate (see Figure A.2 in the appendix). As soon as the naïve investor decides to invest all her/his money in the equity index (MSCI EMU Total Return), she/he believes to earn more than investing in riskless assets over 5 years. Is he/she right? The answer is simply: “she/he might be right”. In three out of seven cases the investor’s belief is realized. In particular in the period Jan 2003 - Jan 2008 a positive 128.9% is registered. On the contrary, in some sub-periods she/he gets negative return, that is, she/he loses money. Choosing riskless investment the return is quite stable during the investment horizon, around 15-20%. Definitely, she/he wouldn't become rich, but she/he would earn in every period for sure. Replicating this last analysis on the US markets we are allowed to extend the number of 5-year periods analyzed from seven to seventeen. For the US case, investment game’s results become more interesting. In most of the case the MSCI TRI USA performs better than the riskless investment (i.e. 11 out of 17). But focusing on the last nine periods, MSCI TRI USA performs better only twice,

whereas the investment in the 5-year government bond allows to get the best performance in five periods. US stock market' performances of the 90's probably attracted a lot of investments. Years later such outstanding performances collapsed. This points out why investing in capital markets can be very dangerous for naive investors. For example, for those investors who do not leave the stock market in the right moment.

Table 5: United States: Riskless Securities and Stock Market – Performance Analysis (a)

Period	5Y GOV.	TBILL 3M	MSCI US TRI
Dec 88 - Dec 93	45.70%	32.05%	97.22%
Dec 89 - Dec 94	39.30%	26.99%	55.00%
Dec 90 - Dec 95	38.85%	24.44%	124.84%
Dec 91 - Dec 96	29.70%	23.95%	134.64%
Dec 92 - Dec 97	29.93%	26.00%	157.07%
Dec 93 - Dec 98	25.83%	28.29%	192.89%
Dec 94 - Dec 99	39.14%	28.81%	243.75%
Dec 95 - Dec 00	27.01%	29.25%	132.75%
Dec 96 - Dec 01	30.44%	27.16%	63.89%
Dec 97 - Dec 02	28.88%	22.79%	-3.52%
Dec 98 - Dec 03	22.71%	18.19%	-0.67%
Dec 99 - Dec 04	31.37%	14.34%	-8.94%
Dec 00 - Dec 05	25.41%	11.28%	2.75%
Dec 01 - Dec 06	22.23%	12.74%	33.11%
Dec 02 - Dec 07	13.53%	15.92%	86.17%
Dec 03 - Dec 08	16.12%	16.38%	-11.15%
Dec 04 - Dec 09	18.18%	14.95%	4.23%

Table 5 explains a bit of stock market movements in the US during the 90's. This paper does not analyze properly the “Roaring Nineties”, but it is important to mention that it was a particular decade of economic growth thanks to the reduction of US federal budget deficit, the decrease of interest rates (above all in the long part of the curve), the process of deregulation,. Unfortunately, as we all know, it degenerated with the burst of the bubble in 2001. Therefore, past performances

can mislead a naive investor. The idea behind our investment games, where a naive investor should sometimes avoid investments in stocks, can be strengthened by using other variables and investment horizons. In the appendix we collect other results where we use as proxies for the riskless securities the JPM EMU GOVERNMENT ALL MATS. and the EURIBOR 3 MONTH (for the EURO AREA) and the US BENCHMARK 10/30 YEAR DS GOVT. INDEX and the US TREASURY BILL 2nd MARKET 3 MONTH (for the US).⁶ The stock market is then represented by the MSCI EMU and by the MSCI US Total Return Indices.⁵ What is depicted in this simple analysis is a stressed scenario where the choice to invest in risky (i.e. stock) markets can lead to severe dissatisfaction. According to that we briefly introduce the role of the financial institutions such as banks, insurance companies, financial advisors and consulting companies. On this issue, we want ask to ourselves if such big players, which often induce investors to enter into the stock markets, via thousand of financial products, take into account particular scenario like the one drawn by our analysis (i.e. the last decade). If so, do they advise our “naive investors” in a fair manner?

3 Conclusions

The analysis makes clear that in specific time intervals the asset allocation of a naive investor can lead to unpleasant payoffs. According to our empirical results it is quite easy to recognize that over specific sub-periods (i.e. “ad hoc” investment horizons) the investor may face huge capital losses rather than capital gains. This partially leads to the fact that investor does not take into account a

⁵ Morgan Stanley Capital International (MSCI) represent market capitalization weighted indices maintained by MSCI respectively for the EURO AREA and for the US. MSCI Indices are available also for a large number of emerging markets. For our specific dataset they are used to measures the performance of stocks based in the European Economic and Monetary Union (EMU) and in the United States of America.

series of general and predetermined rules in building up an optimal portfolio. Such rules need to be considered at the beginning of the investment process. More specifically they refer to “wise” portfolio management strategies. With the term wise we mean a portfolio allocation strategy where the investor is able to implement at least a market timing strategy which does not require specific quantitative and professional skills. A market timing strategy requires the ability to time the market, more specifically to predict the future direction of the market. Some investors and also the academia, often believe that it is impossible to time the market. In contrast practitioners, particularly active traders, believe strongly in market timing. What I have shown with certainty, in our simple investment game, is that it's very difficult to be successful at market timing continuously over the long-run. To make profits, stock is not always the right choice. In addition, based on theoretical and empirical asset allocation models, an investor who does not have the time (or desire) to watch the market on a daily, weekly or monthly basis, should definitely avoid stock markets.

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Appendix

United States

Table A.1: United States: Riskless Securities and Stock Market – Performance Analysis (b)

Year	MSCI US TRI	TBILL 3M	10Y GOV.	30Y GOV.
1989	31.36%	8.55%	12.81%	20.19%
1990	-4.74%	7.88%	8.68%	4.34%
1991	21.15%	5.65%	15.47%	17.31%
1992	18.32%	3.55%	7.16%	7.53%
1993	9.95%	3.09%	9.83%	18.29%
1994	3.24%	4.38%	-4.10%	-12.00%
1995	38.19%	5.71%	16.64%	33.73%
1996	26.42%	5.23%	3.01%	-3.56%
1997	29.63%	5.26%	7.89%	13.11%
1998	25.27%	4.96%	9.93%	17.44%
1999	21.17%	4.81%	-2.12%	-14.44%
2000	-6.43%	6.07%	11.30%	19.84%
2001	-10.98%	3.53%	7.13%	2.35%
2002	-23.68%	1.65%	13.13%	18.37%
2003	28.96%	1.03%	1.88%	0.57%
2004	11.08%	1.39%	2.33%	8.35%
2005	5.58%	3.23%	0.24%	9.68%
2006	15.32%	4.89%	2.61%	-1.46%
2007	6.74%	4.51%	9.84%	9.12%
2008	-38.45%	1.43%	15.05%	45.65%
2009	30.31%	0.15%	-1.85%	-26.79%

Table A.1: United States: Riskless Securities and Stock Market – Performance Analysis (c)

Period	MSCI US TRI	TBILL 3M	10Y GOV.	30Y GOV.
Dec 88 - Dec 93	97.22%	32.05%	66.62%	87.12%
Dec 89 - Dec 94	55.00%	26.99%	41.64%	37.02%
Dec 90 - Dec 95	124.84%	24.44%	52.02%	75.61%
Dec 91 - Dec 96	134.64%	23.95%	35.62%	44.35%
Dec 92 - Dec 97	157.07%	26.00%	36.54%	51.84%
Dec 93 - Dec 98	192.89%	28.29%	36.67%	50.76%
Dec 94 - Dec 99	243.75%	28.81%	39.48%	46.57%
Dec 95 - Dec 00	132.75%	29.25%	33.09%	31.35%
Dec 96 - Dec 01	63.89%	27.16%	38.42%	39.42%
Dec 97 - Dec 02	-3.52%	22.79%	45.14%	45.90%
Dec 98 - Dec 03	-0.67%	18.19%	34.51%	24.94%
Dec 99 - Dec 04	-8.94%	14.34%	40.63%	58.21%
Dec 00 - Dec 05	2.75%	11.28%	26.65%	44.80%
Dec 01 - Dec 06	33.11%	12.74%	21.30%	39.39%
Dec 02 - Dec 07	86.17%	15.92%	17.78%	28.51%
Dec 03 - Dec 08	-11.15%	16.38%	33.00%	86.11%
Dec 04 - Dec 09	4.23%	14.95%	27.56%	25.75%
1989 - 1999	599.93%	77.56%	122.87%	141.37%
2000 - 2009	-5.09%	31.44%	79.39%	98.95%
1999 - 2009	15.00%	37.76%	75.58%	70.23%

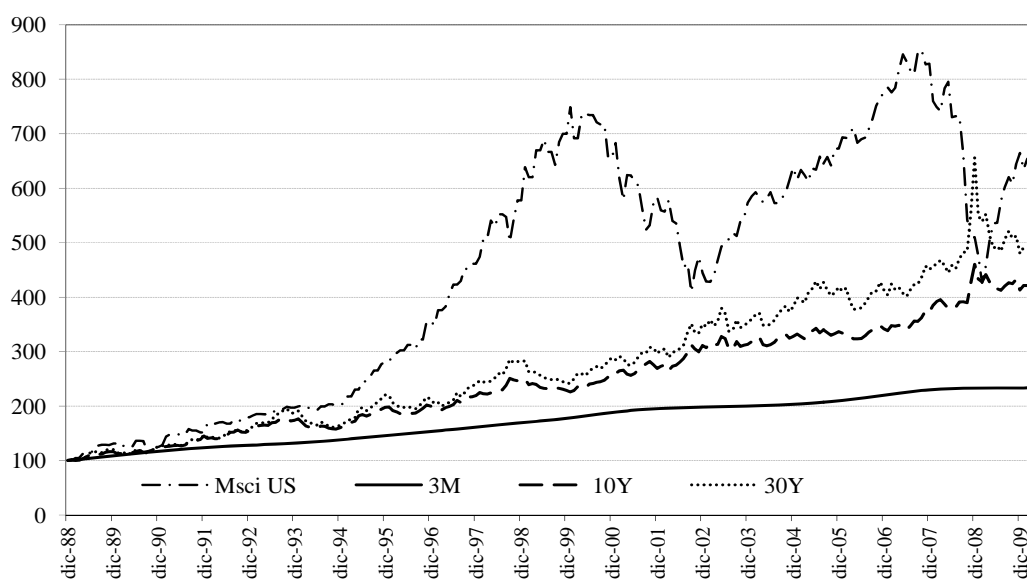


Figure A.1: US Stock & Riskfree Markets: Performance Analysis.
Source: Datastream

Euro Area

Table A.3: EURO AREA: Riskless Securities and Stock Market – Performance
Analysis (b)

Year	5Y EMU GOV.	EURIBOR 3M	MSCI EMU TRI
1999	-7.42%	3.07%	39.70%
2000	9.31%	4.55%	-2.19%
2001	4.46%	4.41%	-17.90%
2002	10.31%	3.42%	-33.39%
2003	3.89%	2.39%	19.91%
2004	10.41%	2.18%	14.28%
2005	6.43%	2.23%	26.21%
2006	-1.33%	3.17%	21.93%
2007	1.67%	4.43%	8.54%
2008	16.30%	4.82%	-44.35%
2009	0.46%	1.25%	28.66%

Table A.4: EURO AREA: Riskless Securities and Stock Market – Performance
Analysis (c)

Period	5Y EMU GOV.	EURIBOR 3M	MSCI EMU TRI
Jan 99 - Jan 04	21.15%	19.15%	-10.40%
Jan 00 - Jan 05	44.48%	18.12%	-26.70%
Jan 01 - Jan 06	40.67%	15.51%	-5.41%
Jan 02 - Jan 07	32.87%	14.12%	40.48%
Jan 03 - Jan 08	22.47%	15.24%	128.90%
Jan 04 - Jan 09	37.10%	17.97%	6.24%
Jan 05 - Jan 10	24.74%	16.91%	19.60%

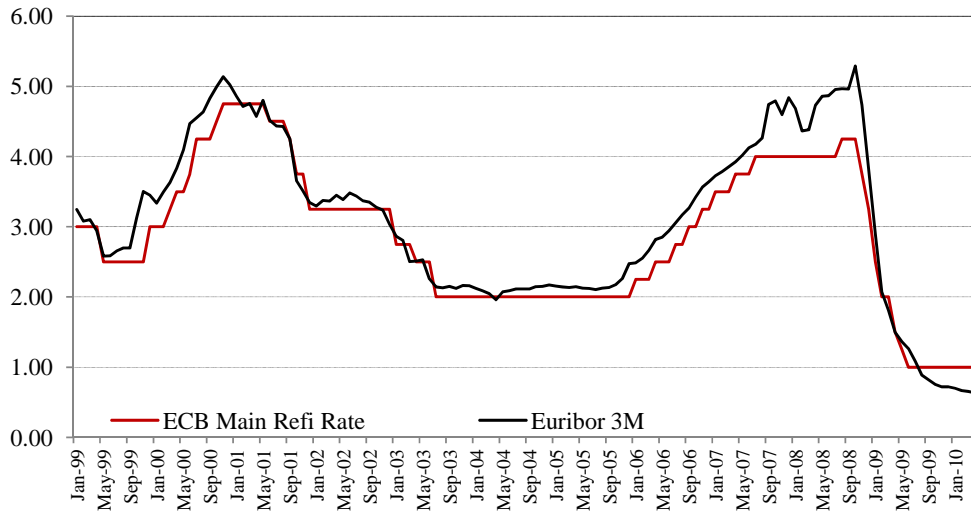


Figure A.2: EURO AREA Reference Rates. Source: Datastream

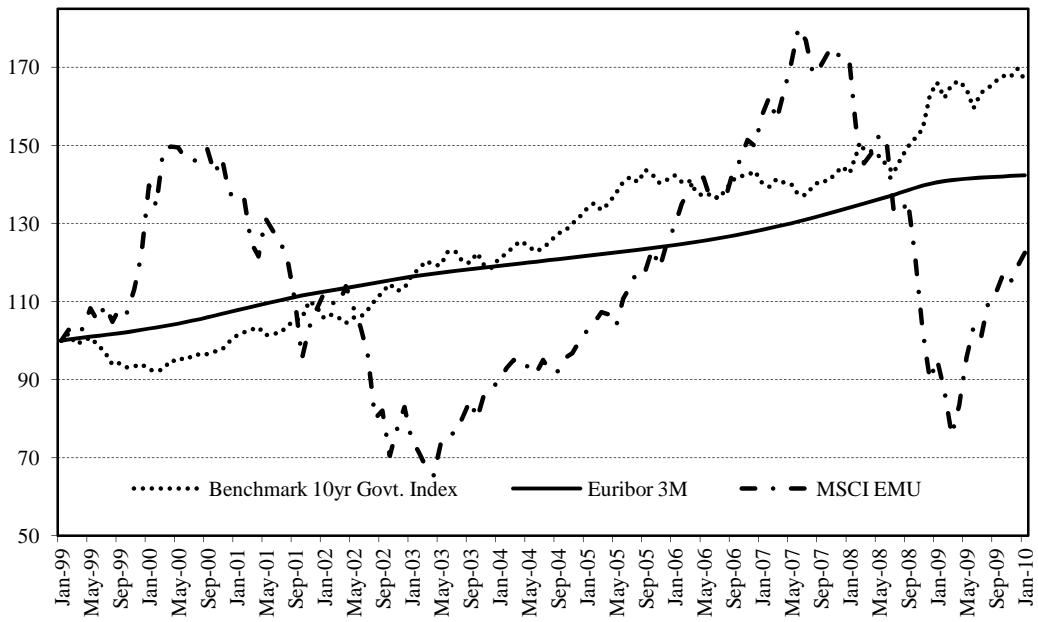


Figure A.3: EURO AREA Stock & Riskfree Markets: Performance Analysis.

Source: Datastream

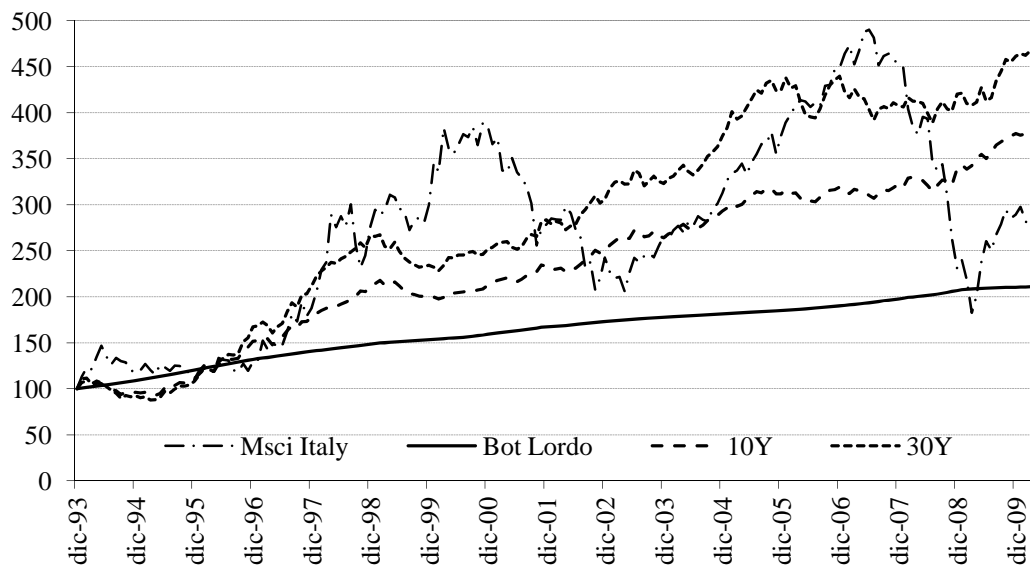


Figure A.4: EURO AREA Stock & Riskfree Markets: Performance Analysis.

Source: Datastream

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