**The Risk - Return Trade - off in Europe: Is There a Pro - cyclical Risk Aversion ?**

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# THE RISK-RETURN TRADE-OFF IN EUROPE: IS THERE A PRO-CYCLICAL RISK AVERSION?

***Abstract:*** *This paper analyzes the risk-return trade-off in European equities considering both temporal and cross-sectional dimensions. We introduce not only the market portfolio but also 15 industry portfolios comprising the entire market. The consideration of this pooled analysis (temporal and cross-sectional) let us obtain a positive and significant relationship between return and risk supporting the doctrine of the mainstream in the field. This result is even more evident when the estimation is conditioned on the main crises periods highlighting that the estimated risk-aversion parameter is higher in boom periods than in recession periods, reflecting a pro-cyclical risk aversion in the investor profile.*

***Keywords****: Equity risk premium, multivariate GARCH, cross-sectional analysis, ICAPM, pro-cyclical risk aversion.*

**JEL Classification: G01, G12, G15**

## 1. Introduction

In his seminal paper, Merton (1973) introduces the intertemporal capital asset pricing model (ICAPM) and shows that exists a positive relationship between the conditional mean on the wealth portfolio, $E_t\left[r_{M,t} - r_{f,t}\right]$,. to its conditional variance, $\sigma^2_{M,t}$ ,and its conditional covariance with the investment opportunity set $\sigma_{MF,t}$ .

$$E_t\left[r_{M,t}-r_{f,t}\right]=\left[\frac{-J_{WW}W}{J_W}\right]\sigma^2{}_{M,t}+\left[\frac{-J_{WF}}{J_W}\right]\sigma_{MF,t} \tag{1}$$

Where *J* is the indirect utility function depending on wealth *W(t)* (subscripts represents partial derivatives) and any variables *F(t)* denoting the stochastic investment opportunity set. The first term between brackets is related to the risk aversion coefficient, and the second term in brackets to the adjustment to the variables representing the stochastic opportunity set.

In a theoretical framework, all the parameters (the risk prices in brackets) and the variables (the sources of risk) are allowed to be time varying. However, to make this model empirically tractable one must make several assumptions; the most common is that of constant risk prices (Goyal and Santa-Clara (2003), Bali et al. (2005)). Another common assumption made in the empirical analysis of the risk–return trade-off is that of a set of investment opportunities constant over time, leaving the market risk as the only source of risk in the ICAPM (Baillie and De Gennaro (1990), Glosten et al. (1993)). Finally, the empirical model is established in a discrete time economy instead of the continuous time economy used in the equilibrium model of the theoretical approach.

Then, the most used approach in the empirical literature is the following univariate model:

$$E_t\left[r_{M,t}-r_{f,t}\right]=C+A\sigma^2_{M,t}+e_t \tag{2}$$

Where $E_t\left[r_{M,t}-r_{f,t}\right]$ is the proxy for the expected market returns, $\sigma^2_{M,t}$ represents the market variance and $e_t$ reflects the market innovations.

The general model reduces to this restricted version if one assumes that the investment opportunity set is time invariant or if the representative market participant has log utility. While both assumptions are likely extreme (particularly when focusing on time-varying volatility), Merton (1980) argues that the general intertemporal equilibrium risk return tradeoff can still be ‘‘reasonably approximated’’ by Eq. (2), and this is certainly the specification that much of the literature has employed (see Lundblad (2007) for a review).

Despite the important role of this trade-off in the financial literature, there is no clear consensus about its empirical evidence. These differences may be due to three different aspects: 1) wrong specifications modeling the dynamics of conditional second moments. The methodology used in most of the papers analyzing empirically the model in (2) is based in the GARCH-M framework developed by Engle et. al (1987). These studies propose different models to describe the volatility processes (linear GARCH family (e.g. Shin (2005), Guo and Neely (2008)), MIDAS regression (e.g.

Ghysels et. al (2005), Leon et. al (2007)) and Regime-Switching models (e.g. Whitelaw (2000), Mayfield (2004)); 2) to a misspecification of the empirical model for not considering the hedging component (Guo, 2002, Scruggs, 1998). 3) Lundblad (2007) demonstrates that the controversial empirical results are not due to misspecifications either of the empirical model or the volatility parameterization, but to the low explanatory power of volatility on returns when the sample size is small. So, another explanation for the controversial results obtained in the previous literature argues about the low statistical power of the empirical methodology caused by focusing narrowly the intertemporal risk-return relation on a single series of the market portfolio return (Bali, 2008).

A potential solution to improve the power of tests and methodologies on individual time series with relatively small sample sizes is based on pooling the temporal and the cross-sectional dimension for an investment portfolio set, Bali (2008) and Bali and Engle (2010). These authors suggest that the empirical tests on the Merton's model have been focused narrowly on the market index and they analyze this relationship considering not only the time series dimension but also by imposing a cross-sectional consistency[1] to a set of portfolios and equities representing the entire market. Using this methodology, these authors were able to confirm a positive risk-return relationship.

Besides the discussion about which one is the most appropriate empirical model for the risk-return trade-off estimation, during the last years it has emerged a new stream of literature (Lettau and Ludvigson (2003) and Kim and Lee (2008)) highlighting that the investor risk-aversion (parameter A in equation (2)) follows a pro-cyclical pattern. This means a decrease of the investor risk-aversion level during recession periods. The question opened here is if the relationship between return and volatility depends on where the state of the economy is (in a boom or in a crisis period) and if the no consideration of this issue could have effects on the results and conclusion reached by previous studies. One way to consider this issue consists in conditioning the empirical estimation to several regimes associated with boom or recession periods.

The contribution of our paper to the literature is twofold. First, we show that traditional empirical frameworks based narrowly on a single temporal series lead to non-significant estimations of the risk-return relationship due to the low explanatory power of volatility on returns (Lundblad, 2007). However, when we consider a properly wide portfolio set representing the whole market we do obtain a significant risk-return tradeoff (Bali, 2008). Second, and even more important, the results show that the trade-off between return and risk intensifies if we consider several regimes reflecting the economic cycles. These results are directly related with the evidence supporting a pro-cyclical behavior of the investor risk-aversion. The conclusions achieved are

[1] In order to get the Merton's ICAMP model internally consistent the relation between the expected returns for any asset and the conditional covariance with the market portfolio should be the same for any asset and portfolio.

robust for different covariance matrix modeling in the model proposed combining cross-sectional with temporal data. Using single data series on indexes, this fact of a pro-cyclical risk-aversion also seems to be reflected but the low explanatory power of this models lead to non-significant relationships.

The paper is structured as follows: section 2 describes the data and methodology. Section 3 discusses the main results obtained and section 4 provides a summary.

## 2. Data and methodology

The data of this study consists of 1130 weekly[2] excess returns from January 1988 to August 2009 for the whole European market and 15 industrial indexes. Excess returns for the market portfolio are calculated using the log-returns of the Eurostoxx index subtracting the proxy for the risk-free[3] investment. Furthermore we construct 15 portfolios based on indexes of the industries[4] comprising the whole European market. These industries are: Automobiles, Banks, Basic Resources, Chemicals, Construction, Energy, Financial Services, Food and Beverage, Health and Care, Industrial, Insurance, Media, Technology, Telecommunications and Utilities. We calculated excess industry returns in the same way that we did for the market portfolio. The index data are obtained from Datastream and the risk free rates from International Financial Statistics.

Following equation 2, we estimate the risk return relation using this equation system (Bali (2008) and Bali and Engle (2010)):

$$R_{i,t+1} = C_i + A\sigma_{im,t+1} + e_{i,t+1} \quad (3)$$

where $i = 1, 2, \ldots n$ are the industrial portfolios, $R_{i,t+1}$ are the returns of the $i^{th}$ portfolio, $e_{i,t+1}$ represents the disturbance of the $i^{th}$ equation and $\sigma_{im,t+1}$ represents the covariance between the market portfolio and the $i^{th}$ portfolio. Previously to estimate this equation system, we must obtain the covariances $\sigma_{im,t+1}$ for all portfolios. We use several bivariate GARCH specifications.

The mean equation is defined as:

[2] Following papers such as Capiello and Fearnley (2000) or Ghysels et al. (2007), we analyze this relationship using weekly data rather the monthly data used in other studies Even though there are slight differences in the parameter estimations using different data frequency, there is no particular reason that the conclusions in this study should be affected by the selection of data frequency. Some authors point out this fact in their studies (Lundblad 2007).

[3] Following Leon *et. al* (2007) we use an average of the monthly compounded market money rates in France, Spain, Germany, United Kingdom and Italy as proxy for the risk-free rate or return.

[4] The main reason of using portfolios instead of stocks is to reduce the dimensionality of the estimation. Moreover, the industrial indexes have a lower idiosyncratic risk than stocks.

$$R_{i,t+1} = a_{0,i} + a_{1,i} R_{i,t} + e_{i,t+1} \quad (4)$$

$$R_{m,t+1} = a_{0,m} + a_{1,m} R_{m,t} + e_{m,t+1} \quad (5)$$

$$\begin{pmatrix} e_{i,t+1} \\ e_{m,t+1} \end{pmatrix} = e_{t+1} \sim BN\left(0, H_{t+1}\right) \quad (6)$$

while we propose three different models for the variance equation. The first is the BEKK model of Baba et. al (1990)

$$H_{t+1} = \begin{pmatrix} \sigma^2_{i,t+1} & \sigma_{im,t+1} \\ \sigma_{im,t+1} & \sigma^2_{m,t+1} \end{pmatrix} = CC' + \alpha e_t e_t' \alpha + \beta H_t \beta \quad (7)$$

where $a_{0,i}$, $a_{0,m}$, $a_{1,i}$, $a_{1,m}$, are parameters and $C$, $\alpha$, $\beta$ are 2x2 matrixes of parameters to estimate.

In the second model we consider the asymmetric response of volatility to shocks of different sign using a bivariate GJR specification of Glosten et. al (1993).

$$H_{t+1} = \begin{pmatrix} \sigma^2_{i,t+1} & \sigma_{im,t+1} \\ \sigma_{im,t+1} & \sigma^2_{m,t+1} \end{pmatrix} = CC' + \alpha e_t e_t' \alpha + \beta H_t \beta + D\eta_t \eta_t D \quad (8)$$

where $D$ is a 2x2 matrix of parameters to estimate and $\eta_t = \min(0, e_t)$

The last specification uses the Dynamic Conditional Correlation (DCC) model of Engle (2002). In this case, the variance equation is defined as:

$$H_{t+1} = \begin{pmatrix} \sigma^2_{i,t+1} & \sigma_{im,t+1} \\ \sigma_{im,t+1} & \sigma^2_{m,t+1} \end{pmatrix} = D_t R_t D_t \quad where \quad D_t = \begin{pmatrix} \sqrt{\sigma^2_{i,t+1}} & 0 \\ 0 & \sqrt{\sigma^2_{m,t+1}} \end{pmatrix} \quad (9)$$

and

$$R_t = diag\left(Q_t^{-1}\right) Q_t diag\left(Q_t^{-1}\right) \quad and \quad Q_t = S\left(1-\alpha-\beta\right) + \alpha\left(e_{t-1}e_{t-1}\right) + \beta Q_{t-1} \quad (10)$$

being $S$ the unconditional correlation of the innovations, and $\sigma^2_{i,t}, \sigma^2_{M,t}$ are defined as univariate GARCH processes.

The parameters in all models are estimated by maximizing the quasi-maximum likelihood function of Bollerslev-Wooldridge (1992) under normality assumption[5].

$$L(\theta)=\sum_{t=1}^{T}\ln\left[f(r_t,\Omega_t;\theta)\right] \quad where \quad f(r_t,\Omega_t;\theta) = (2\pi)^{-1}\left|H_t\right|^{-\frac{1}{2}}\exp\left(-\frac{1}{2}\varepsilon_t^T H_t^{-1}\varepsilon_t\right) \qquad (11)$$

Table 1 shows the descriptive statistics for the estimated conditional covariances of excess market returns and excess industry returns[6].

**TABLE 1. Descriptive statistics of estimated covariances**

| Industry | Average | Median | Std | Min | Max |
|---|---|---|---|---|---|
| Automobiles | 8.25 | 5.27 | 8.92 | 1.92 | 62.84 |
| Banks | 7.73 | 4.36 | 10.85 | 1.33 | 104.15 |
| Basic Resources | 7.73 | 4.06 | 13.83 | -3.44 | 161.15 |
| Chemicals | 6.56 | 9.23 | 9.22 | -0.39 | 103.16 |
| Construction | 6.79 | 8.41 | 1.43 | 1.43 | 91.02 |
| Energy | 5.99 | 3.40 | 10.32 | -0.84 | 115.22 |
| Financial Services | 7.27 | 3.91 | 11.21 | -0.20 | 101.15 |
| Food and Beverage | 4.43 | 2.91 | 6.46 | -6.58 | 70.51 |
| Health and Care | 5.14 | 3.24 | 7.25 | 0.58 | 84.66 |
| Industrial | 6.99 | 4.47 | 8.06 | 1.59 | 80.74 |
| Insurance | 8.77 | 4.88 | 12.03 | 1.32 | 108.18 |
| Media | 6.60 | 4.01 | 7.68 | 1.11 | 80.06 |
| Technology | 8.86 | 5.07 | 8.84 | 1.57 | 68.42 |
| Telecommunications | 7.05 | 4.70 | 8.60 | 0.97 | 103.58 |
| Utilities | 5.63 | 3.49 | 8.48 | 1.16 | 89.99 |

This table reports the summary statistics (sample average, median, standard deviation, minimum and Maximum values) of the corresponding conditional covariances (multiplied by 10E4) between the excess weekly returns of the market portfolio and the 15 industry portfolios.

With these conditional covariances, we estimate in a second stage the 15 equations of the system defined in equation (2) simultaneously constraining the risk aversion

[5] The QML estimations are obtained using the BFGS optimization algorithm in the MATLAB optimization routines.
[6] For brevity, we only present the results for the BEKK specification. The results for the other specification vary slightly. Results are available upon request.

coefficient to be the same in all equations (Bali, 2008) for cross-sectional consistency[7]. This approach allows us expand the analysis of the intertemporal relation to a large cross section of stock portfolios and also expanding the cross-sectional analysis to each conditional time step based on bivariate-GARCH estimates. We estimate this system of equations using a Seemingly Unrelated Regression (SUR) method that allows us to place constraints on coefficients[8].

## 3. Empirical results

The main results of our study are presented in table 2. For the aim of considering the effects of potential regimes on the results obtained, we analyze not only the full sample period but also we control for the two major financial crises during the 1988-2009 period[9] using dummy variables for the financial crises periods. Panel A shows the results for the risk-return relationship focused exclusively on the European market portfolio represented by the Eurostoxx index. This GARCH-M methodology (Bollerslev *et. al* (1988)) fails to estimate a significant risk aversion parameter for all cases. These results are similar to those obtained by Baillie and De Gennaro (1990) and Glosten *et. al* (1993) using this methodology.

[7] Merton (1973) shows that the common slope coefficient represents the average relative risk aversion of market investors.

[8] The SUR estimations are obtained using the STATA econometrics software

[9] These include the subprime crisis of October 2007-2009 and the 2000-2002 crises following the bursting of the tech bubble. These two periods are the most important financial crises periods during the sample period according to the European Commission. Source: http://ec.europa.eu/economy_finance/publications/cycle_indicators/index_en.htm

**TABLE 2. - Estimated parameters**

| **PanelA .- Risk return relation on the market index** | | |
|---|---|---|
| Sample period | $C$ | A |
| Full sample: Jan 1988-Aug 2009 | 6.19·10E-4 (0.80) | 1.69 (1.25) |
| Full sample: Jan 1988-Aug 2009 and controlling for crisis 2007-2009 | -9.24·10E-5 (0.945) | 2.11 (0.9935) |
| Full sample: Jan 1988-Aug 2009 and controlling for crises 2000-2002 and 2007-2009 | -8.43·10E-4 (0.5987) | 4.21 (1.6887) |
| **Panel B .- Risk return relation with cross-sectional consistency (BEKK)** | | |
| Sample period | $\bar{C}$ [10]. | A |
| Full sample: Jan 1988-Aug 2009 | -5.69·10E-4 (-0.52) | 0.86 (1.96) |
| Full sample: Jan 1988-Aug 2009 and controlling for crisis 2007-2009 | -7.76·10E-4 (-0.71) | 1.41 (2.08) |
| Full sample: Jan 1988-Aug 2009 and controlling for crises 2000-2002 and 2007-2009 | -1.18·10E-3 (-0.80) | 3.39 (3.11) |
| **Panel C .- Risk return relation with cross-sectional consistency (GJR-BEKK)** | | |
| Sample period | $\bar{C}$ | A |
| Full sample: Jan 1988-Aug 2009 | 3.26·10E-3 (0.30) | 0.94 (2.33) |
| Full sample: Jan 1988-Aug 2009 and controlling for crisis 2007-2009 | 3.71·10E-3 (0.27) | 3.76 (7.42) |
| Full sample: Jan 1988-Aug 2009 and controlling for crises 2000-2002 and 2007-2009 | 3.83E-3 (0.266) | 6.08 (10.85) |
| **Panel D .- Risk return relation with cross-sectional consistency (DCC)** | | |
| Sample period | $\bar{C}$ | A |
| Full sample: Jan 1988-Aug 2009 | -5.47·10E-3 (-0.54) | 0.89 (2.03) |
| Full sample: Jan 1988-Aug 2009 and controlling for crisis 2007-2009 | -5.8·10E-3 (-0.5761) | 3.57 (7.46) |
| Full sample: Jan 1988-Aug 2009 and controlling for crises 2000-2002 and 2007-2009 | -5.6·10E-3 (-0.561) | 5.28 (10.52) |

[10] The individual estimated parameters vary between the lowest value of -0.00205 obtained for the Insurance sector in the BEKK specification and the highest 0.00021 value for the Health and Care sector also in the BEKK covariance matrix, but there is not a significant parameter in any case analyzed. We just present the average parameter and t-stat (as in Bali (2008)) in order to save space.

This table shows the estimated coefficients for the models presented above (t-stats in parentheses). Panel A shows the results for a GARCH-M model which considered only the excess return for the European market portfolio (Eurostoxx index). Panel B shows the results for the model which consider the entire market through the 15 portfolios based on the industrial index (and constraining for cross-sectional consistency). For the sake of brevity, we only show the constant C average of all portfolios as the whole market constant C (and the average t-stat in parentheses

Panels B, C and D present the estimations for the alternative methodology proposed using the 15 portfolios representing the entire European market for each alternative covariance specification. For all GARCH specifications we obtain a significant positive risk aversion parameter. Moreover, after controlling for financial crisis periods we observe an increase in the risk aversion parameter obtaining similar values than other studies for US market (Bali (2008)).This last result could reflect an interesting fact reported in earlier studies such as Lettau and Ludvigson (2003) and Kim and Lee (2008). In these studies the risk return tradeoff is less pronounced during documented recessions, consistent with declining levels of risk aversion during recessions (reduction of parameter A). Therefore, after controlling for these well-documented recession periods, we do obtain an increase of the risk-aversion level. This result also could be viewed as further evidence supporting a pro-cyclical risk aversion phenomenon (Kim and Lee (2008)). The objective of the paper is not to find an explanation to this pro-cyclical risk-aversion behaviour obtained. However, we think that this result may be explained for a high speculative stream leading the markets during crises periods. The markets during these periods are more volatile and certainly speculative-based transactions are one of the main causes of this volatility increase. During crises periods, the traders operating in the markets show a less risk-averse profile than the traders operating during calm periods who leave the stock markets in these situations.

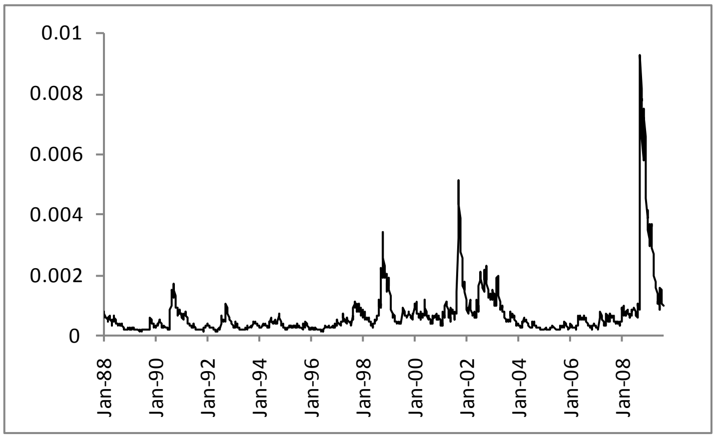
The results in this section allow us to conclude that by extending the risk return relationship along both time series and cross-sectional dimensions can lead to significant positive trade-off. However, this result is more evident when the models are conditioned to the existence of several regimes associated with expansion and recession economic cycles. Despite the different GARCH specification used in the covariance matrix, we can obtain a positive and significant risk-return trade-off.

Finally, we show in Figure 1 the risk premium evolution during the last two decades in Europe[11]. The periods coinciding with the crisis periods considered above (dot-com bubble and last global financial crisis) are the periods with a higher risk premium demanded by European investors due basically with the extremely increase of the non-diversifiable risk. This huge increase of the non-divesifiable risk during crises periods

[11] For the sake of brevity we only show the risk Premium for the BEKK specification. The differences between specifications are negligible. Results are available upon request.

compensates the decrease of the risk-aversion level derived of the pro-cyclical risk-aversion behavior obtained. The average of the weekly risk premiums series shows that over the past 20 years the risk premium in Europe has remained at approximately 3,5% per annum, varying slightly with the model specification.

**FIGURE 1 - Risk premium evolution in Europe**




*This figure represents the weekly risk premium evolution in Europe from 1 January 1988 to 31 August 2009*

## 4. Conclusion

This paper analyzes the risk return trade-off in European equity markets using a methodology that allows us to consider both temporal and cross-sectional dimensions. We are able to estimate a positive and significant relationship between return and risk using this methodology but we obtain no favorable evidence when we use a single portfolio; so, this methodology let us overcome the disappointing results when we focus narrowly in a single portfolio. The considerations of the main financial crises in the sample reinforce the existence of a positive and significant risk-return relationship adding further evidence to the thesis of a pro-cyclical risk aversion in the investor's profile. The results obtained are robust to several specifications of the covariance matrix.

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## REFERENCES


**[1] Baba Y., Engle R. F., Kraft D. F. and Kroner K. F. (1990),** ***Multivariate Simultaneous Generalized ARCH***. *Unpublished Working Paper, MIMEO*, University of California at San Diego;

**[2]Baillie R. T. and De Gennaro R.P. (1990),** ***Stock Returns and Volatility*****.** *Journal of Financial and Quantitative Analysis*, 25(2): 203-214;

**[3] Bali T. G. (2008),** ***The Intertemporal Relation between Expected return and Risk***. *Journal of Financial Economics*, 87(1): 101-131;

**[4] Bali T.G., Cakici N., Yan X. and Zhang Z. (2005),** ***Does Idiosyncratic Risk really Matter?*** *Journal of Finance*. 60(2): 905–929;

**[5] Bali T. G., Engle R. F. (2010)*****, The Intertemporal Capital Asset Pricing Model with Dynamic Conditional Correlations***. *Journal of Monetary Economics*, 57(4), 377-390;

**[6] Bollerslev T., Engle R.F., Wooldridge J.M. (1988),** ***A Capital Asset Pricing Model with Time-varying Covariances****.* *Journal of Political Economy*, 96(1): 116–131;

**[7] Bollerslev T., Wooldridge J. (1992),** ***Quasi-maximum Likelihood Estimation and Inference in Dynamic Models with Time-varying Covariances***. *Econometric Reviews*, 11(2): 143–172;

**[8] Capiello L. and Fearnley T.A. (2000),** ***International CAPM with Regime-Switching Parameters***. *FAME Research Paper Series*, pp.17, International Center for Financial Asset Management and Engineering;

**[9] Engle R. (2002),** ***Dynamic Conditional Correlation: A Simple Class of Multivariate Generalized Autoregressive Conditional Heteroskedasticity Models***. *Journal of Business & Economic Statistics*, 20(3): 339-350;

**[10] Engle R. F., Lilien D. M. and Robins R. P. (1987),** ***Estimating Time Varying Risk Premia in the Term Structure: The Arch-M Model***. *Econometrica*, 55(2): 391-407;

**[11] Ghysels E., Santa-Clara P., Valkanov R. (2005)*****, There is a Risk–return Trade-off after all***. *Journal of Financial Economics*, 76(3): 509–548;

**[12] Ghysels E., Sinko A., Valkanov R. (2007)*****, MIDAS Regressions: Further Results and New Directions***. *Econometric Reviews*, 26(1): 53–90;

**[13] Glosten, L. R., Jagannathan, R. and Runkle D. E. (1993),** ***On the Relation between the Expected Value and the Variance of the Nominal Excess Return on Stocks.*** *Journal of Finance*, 48(5): 1779-1801;

**[14] Goyal A., Santa-Clara P. (2003),** ***Idiosyncratic Risk Matters*****!** *Journal of Finance*, 58(3): 975–1008;

**[15] Guo, H., (2002),** ***Understanding the Risk-return Tradeoff in the Stock Market***, *Unpublished Working Paper, MIMEO*, Federal Reserve Bank of St. Louis;

**[16] Guo, H., Neely, C. J. (2008),** ***Investigating the Intertemporal Risk-return Relation in the International Stock Markets with the Component GARCH Model.*** *Economics Letters*, 99(2): 371-374;
**[17] Kim, S. W. and Lee, B. S. (2008),** ***Stock Returns, Asymmetric Volatility, Risk Aversion, and Business Cycle: Some New Evidence***. *Economic Inquiry*, 46(2): 131-148;
**[18] León A., Nave J. and Rubio, G. (2007),** ***The Relationship between Risk and expected Return in Europe***. *Journal of Banking and Finance*, 31(2): 495-512;
**[19] Lettau M. and Ludvigson S. (2003),** ***Measuring and Modeling Variation in the Risk Return Trade-off***. *Working paper*, New York University;
**[20] Lundblad C. (2007),** ***The Risk-return Trade-off in the Long Run: 1836-2003.*** *Journal of Financial Economics*, 85(1): 123-150;
**[21] Mayfield E. S. (2004),** ***Estimating the Market Risk Premium***. *Journal of Financial Economics*, 73(3): 867-887;
**[22] Merton R. C. (1973),** ***An Intertemporal Asset Pricing Model***. *Econometrica*, 41(5): 867-888;
**[23] Merton R.C. (1980),** ***On Estimating the Expected Return on the Market: An Exploratory Investigation***. *Journal of Financial Economics*, 8(4): 323-361;
**[24] Scruggs, J. T. (1998),** ***Resolving the Puzzling Intertemporal Relation between the Market Risk Premium and Conditional Market Variance: A Two-factor Approach***. *Journal of Finance*, 53, 575–603;
**[25] Shin, J. (2005),** ***Stock Returns and Volatility in Emerging Stock Markets.*** *International Journal of Business and Economics*, 4(1), 31–43;
**[26] Whitelaw, R. (2000),** ***Stock Market Risk and Return: An Equilibrium Approach***. *Review of Financial Studies*, 13, 521–547.