CORPORATE GOVERNANCE AND RISK TAKING

SECTION 2

TESTING THE CAPITAL ASSET PRICING MODEL IN THE ITALIAN MARKET

Carmine De Chiara, Giovanni W. Puopolo***

Abstract

In this paper we provide an empirical investigation of the classic Capital Asset Pricing Model (CAPM) on all firms listed in the Italian stock exchange at the monthly frequency. We intend to show that the CAPM, despite the heavy critical comments, still holds in the Italian market when returns are measured at the monthly frequency. Most importantly, our evidence indicates that the market portfolio fully explains the cross section of stock returns and there is no need to appeal for additional determinants. Our results have very important implications for long term investors who can forecast the expected excess stock returns by simply determining the β of the stock and the expected excess market return.

Keywords: Capital Asset Pricing Model, Jensen's Alpha, Anomalies

JEL Code: G11, G12

** Bocconi University*

*** Corresponding author. Bocconi University, CSEF and P. Baffi Center for Regulation. Via Roentgen 1, Milan (Italy), +39 02 58362725*

1 Introduction

The Capital Asset Pricing Model (CAPM) is one of the most popular models employed by the finance community and although its theoretical building goes back to mid-1960s with the works of Sharpe ("Capital asset prices: a theory of market equilibrium under conditions of risk", 1964), Lintner ("The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets", 1965) and Mossin ("Equilibrium in a capital asset market", 1966), its importance has grown during the decades. In fact, nowadays, it is still widely used in several applications, such as estimating the cost of equity capital for firms and evaluating the benchmark performance of managed portfolios.

For several decades, many scholars have investigated its empirical validity, finding that, in addition to the market portfolio, other variables help explaining expected stock returns, in contrast to what the model predicts (i.e. the well-known CAPM anomalies). For example, Banz (1981) showed that size does explain the cross-sectional variation in average returns on a particular collection of assets better than beta. Fama and French (1992) found that market β does not explain firms' expected returns and that "two measured variables, size and book-to-market equity, provide a simple and powerful characterization of the cross-section of average stock returns for the 1963-1990 period", whereas, based on earlier works, Fama and French (1993) proposed the well-known Fama-French three factor model to explain the cross section of expected stock returns.

More recently, following the works of Fama and French (1992; 1993), an important part of the literature has focused its attention on alternative factor models, trying to identify additional factors in the pricing of the cross section of stock returns (Piazzesi

et al. 2007, Petkova 2006, Lustig and Van Nieuwerburgh 2005).

In this paper we provide an empirical investigation of the classic Capital Asset Pricing Model (i.e. the Sharpe-Lintner version) on all firms listed in the Italian stock exchange at the monthly frequency. We concentrate on this frequency because, differently from a huge part of the literature which focuses on shorter frequencies, such as daily and weekly ones, we intend to show that the CAPM, despite the heavy critical comments and its controversial evidence, still holds in the Italian market when (realized) returns are measured at the monthly frequency. Most importantly, our evidence indicates that the market portfolio fully explains the cross section of stock returns and there is no need to appeal for additional determinants.

Our results have very important implications for long term investors who typically adopt a buy-and-hold strategy aimed at exploiting the value generated by the firm during a long period of time. Such investors can forecast the expected excess stock returns by simply determining the β of the stock and the expected excess market return. Thus, rediscovering and reusing a model that presents the excess stock return in a really plain and intuitive way can simplify the investment decisions of long term investors and make their communication to retail investors easier.

The structure of the paper is as follows. Section 2 briefly summarizes the Capital Asset Pricing Model, whereas Section 3 describes the data. The empirical analysis and results are shown in Section 4. Finally, section 5 concludes.

2 The capital asset pricing model

According to Sharpe (1964), the Capital Asset Pricing Model is a "market equilibrium theory of asset prices under conditions of risk" that allows to identify, for all risky assets, a relationship between expected returns and risk.

The main hypotheses that lie at the bases of the model are:

-- all investors are risk averse and want to maximize their expected utility (which is function of the expected return and the standard deviation of their investments);

-- all investors plan to hold the assets for the same (single) period;

-- each investor can borrow or lend funds at a "common pure rate of interest";

-- investors' expectations about expected returns, variances and covariances are homogeneous;

-- there are no frictions or transaction costs in the financial market.

Given these hypotheses, the investors' optimal portfolio choice consists in allocating part of their funds into a risky portfolio and the rest in the riskless security. It is straightforward to prove that such risky portfolio is efficient and is the same for all investors. In addition, market clearing conditions, i.e. total demand equal to total supply, guarantee that such portfolio coincides with the well-known *market portfolio,* which consists of all possible risky assets traded in the market (such as stocks, bonds, commodities, real estates, jewelry, stamp collections etc.); moreover, the proportion characterizing each security within the market portfolio is given by its market value over the total market capitalization.

According to the model, if portfolio *p* is efficient (i.e. non-dominated by any other portfolio), then it lies on the Capital Market Line (CML) and its expected return is given by:

$$E(r_p) = r_f + \frac{E(r_m)-r_f}{\sigma_m} * \sigma_p, \qquad (1)$$

where $E(r_p)$ = expected return on portfolio *p*, r_f = the risk-free rate, $E(r_m)$ = expected return on the market portfolio, σ_m = standard deviation of the market portfolio and σ_p = standard deviation of portfolio *p*.

Interestingly, the ratio

$$\frac{E(r_m) - r_f}{\sigma_m}$$

captures the expected excess return on the market portfolio for each unit of risk: thus, this ratio measures the *market price of risk.*

In other words, the fundamental equation of the Capital Market Line states that the expected return of any efficient portfolio is a function of the market price of risk and its level of risk, captured by the standard deviation of the return, σ_p.

More generally, the Capital Asset Pricing Model states that, in equilibrium, the expected return on any security *i* (both efficient and non-efficient) is given by:

$$E(r_i) = r_f + [E(r_{m)} - r_f] * \beta_i, \qquad (2)$$

where

$$\beta_i = \rho_{i,m} * \frac{\sigma_i}{\sigma_m}$$

and $\rho_{i,m}$ is the correlation coefficient between the security *i* and the market portfolio. Equation (2) is the well-known Security Market Line which shows that the expected return on each stock, in excess of the risk-free rate, is linearly proportional to its beta coefficient. In other words, the Security Market Line (SML) underlines that the market remunerates only the systematic risk, captured by the asset's β_i, and not the idiosyncratic risk because the latter can be eliminated by diversification.

3 The dataset

Our data is from DATASTREAM. Specifically, for all stocks traded in the Italian stock exchange, we collect the historical price series starting from January 1983 to May 2013,[13] and then compute the log return at the monthly frequency. Obviously, not all firms have the same number of observations, since they became public at different times. Moreover, consistently with the related literature, financial companies (i.e. banks, insurance firms, money funds, ...) are not considered in the analysis given the particular nature of their business and the specific structure of their balance sheets.

Next, as proxy for the risk-free rate r_f we use the Italian 3-month Treasury Bill "Buoni Ordinari del Tesoro (BOT)", whereas as proxy for the market return R_m, the price index "FTSE Italia Mib Storico", covering the entire Italian stock market, is used.

4 Empirical evidence

The empirical investigation of the Capital Asset Pricing Model in the Italian stock market, obviously, starts from historical data. Specifically, using realized returns at the monthly frequency and ordinary least squares approach, we estimate the parameters α_i and β_i of the following equation, in which excess returns are regressed on a constant and on the excess market return:

$$\hat{\mathrm{R}}_{it} - r_f = \alpha_i + \beta_i\left[\hat{\mathrm{R}}_{mt} - r_f\right] + \varepsilon, \qquad (3)$$

where $\hat{\mathrm{R}}_{it}$ = historical return of the stock i, α_i=Jensen's alpha, β_i = Beta of the security i, $\hat{\mathrm{R}}_{mt}$ = historical market return, r_f = observed risk-free rate and ε is pure noise.

In particular, the intercept α_i captures the value of the excess stock return $R_i - r_f$ when the excess market return is equal to zero. More importantly, according to the standard CAPM, such intercept should be zero. On the contrary, if the excess market return is equal to zero and the (average) excess stock return is statistically different from zero, i.e. $\alpha_i \neq 0$, there might be other factors (or regressors) influencing stock returns, thus leading to a violation of the CAPM.

Regarding the estimated β coefficient, the classic CAPM predicts that it should be significant. On the contrary, if the value of the estimated β coefficient is equal to 0, it means that the market portfolio does not explain the value of the dependent variable, i.e. the stock return. Moreover, it is important to stress that a negative value of the estimated β coefficient is also possible: in that case, the excess market return and the excess stock return are negatively correlated.

For each stock in our sample we report the estimated values of the intercept α and the sensitivity β (together with the corresponding p-values) in the table below. To simplify the reading, all significant α and non-significant β (at 5%) are denoted in bold.

As shown in the table, we find that, out of 181 companies, only 7 exhibit a non-significant β coefficient, thus supporting the prediction of the Capital Asset Pricing Model. Moreover, we find that several securities are characterized by a beta larger that the market beta, i.e. 1, and that no company exhibits a negative correlation with the market portfolio.

More importantly, in order to support the model, we also need that the estimated value of the intercept α is not significant. In fact, in this case, there would be no excess premium left unexplained and the excess market return would be the only determinant of the excess stock return.

Interestingly, the table above shows that just few intercepts α are significant: specifically, 19 companies out of 181 firms (i.e. 10.05%). On the contrary, the largest majority of firms exhibits a non-significant intercept α. The latter result, together with the explanatory power of the coefficient β shown above, contributes to support the validity of the CAPM when returns are measured at a longer horizon, such as the monthly frequency.

5 Conclusions

In this paper we investigate the validity of the classic Capital Asset Pricing Model in the Italian stock market. We find that, when returns are measured at a longer horizon, such as the monthly frequency, the market portfolio fully explains the cross-section of expected stock returns, thus supporting the CAPM.

Our results have important implications from a practical point of view, especially for long term investors who can usefully exploit the main message of the model when taking their investment's decisions. Retail and institutional investors that do not care about short-term fluctuations of the stock market are deeply focused on long term investments and accumulation plans. Therefore, the Capital Asset Pricing Model, through its simple message, can easily help them reaching all their long-term investment targets.

[13] We disregard all firms listed after July 2008 since, to be included in our sample, we require at least 60 observations. In this case, the poor number of observations might severely affect the statistical properties of the model.

Table 1. Empirical results

Company	Estimated Alfa	p-value alfa	Estimated Beta	p-value beta
A2A	0.000	98.97%	1.04	0.0%
ACEA	-0.002	70.49%	0.83	0.0%
ACOTEL GROUP	-0.006	54.93%	1.21	0.0%
ACQUE POTABILI	-0.002	66.12%	0.60	0.0%
ACSM-AGAM	-0.006	38.01%	0.92	0.0%
AEFFE	-0.014	34.19%	1.20	0.0%
AEROPORTO DI FIRENZE	-0.003	55.47%	0.51	0.0%
ALERION CLEAN POWER	-0.005	56.88%	0.92	0.0%
AMPLIFON	0.007	46.04%	0.96	0.0%
ANSALDO STS	0.005	53.43%	0.35	0.5%
ANTICHI PELLETTIERI	**-0.045**	**0.74%**	0.73	0.5%
ARENA	**-0.034**	**0.39%**	1.23	0.0%
ARNOLDO MONDADORI EDI.	-0.005	39.76%	0.93	0.0%
AS ROMA	-0.011	37.95%	0.73	0.1%
ASCOPIAVE	-0.002	80.89%	0.51	0.1%
ASTALDI	0.008	22.98%	1.05	0.0%
ASTM	0.005	22.80%	0.79	0.0%
ATLANTIA	0.009	6.71%	0.75	0.0%
AUTOGRILL	0.007	16.34%	0.98	0.0%
AUTOSTRADE MERIDIONALI	0.006	31.29%	0.63	0.0%
B&C SPEAKERS	0.004	68.08%	0.69	0.0%
BASICNET	-0.003	72.24%	0.75	0.0%
BASTOGI	0.000	99.94%	1.13	0.0%
BEE TEAM	**-0.023**	**4.27%**	1.12	0.0%
BEGHELLI	-0.009	21.16%	1.16	0.0%
BEST UNION	-0.016	21.25%	0.47	0.8%
BIALETTI INDUSTRIE	-0.019	25.65%	1.38	0.0%
BIANCAMANO	-0.016	9.77%	0.71	0.0%
BIESSE	-0.001	87.74%	1.24	0.0%
BIOERA	-0.126	28.92%	**3.31**	**8.8%**
BOERO BARTOLOMEO	0.002	63.23%	0.30	0.0%
BOLZONI	0.002	82.21%	0.58	0.0%
BONIFICHE FERRARESI	-0.002	61.70%	0.40	0.0%
BORGOSESIA RSP	-0.004	76.90%	**0.19**	**40.3%**
BUZZI UNICEM VINCOLI	-0.001	85.43%	0.99	0.0%
CAD IT	-0.010	12.95%	0.67	0.0%
CAIRO COMMUNICATION	0.001	85.38%	1.15	0.0%
CALEFFI	-0.003	67.19%	0.40	0.1%
CALTAGIRONE	-0.004	42.83%	0.94	0.0%
CALTAGIRONE EDITORE	**-0.016**	**0.15%**	0.76	0.0%
CARRARO	-0.003	65.59%	0.98	0.0%

Table 1. Empirical results (continued)

Company	Estimated Alfa	p-value alfa	Estimated Beta	p-value beta
CDC	**-0.020**	**1.48%**	1.46	0.0%
CEMBRE	0.004	46.71%	0.52	0.0%
CEMENTIR HOLDING	0.001	81.36%	1.16	0.0%
CENTRALE DEL LATTE DI TRO.	-0.004	51.02%	0.87	0.0%
CENTRO HL DISTRIBUZIONE	**-0.027**	**1.54%**	1.62	0.0%
CICCOLELLA	-0.008	21.10%	0.80	0.0%
CIR CIE.INDI.RIUN.	-0.002	61.09%	1.37	0.0%
CLASS EDITORI	-0.009	39.49%	1.54	0.0%
COBRA AUTOMOTIVE TECHS.	-0.019	26.72%	1.62	0.0%
COFIDE GRUPPO DE BENEDET	-0.004	47.57%	1.33	0.0%
CSP INTERNATIONAL	-0.011	9.40%	0.73	0.0%
DADA	-0.005	55.41%	1.52	0.0%
DAMIANI	-0.009	54.81%	0.99	0.0%
DANIELI	0.004	40.21%	0.97	0.0%
DATALOGIC	0.003	54.36%	0.56	0.0%
DAVIDE CAMPARI MILANO	0.009	6.26%	0.32	0.0%
DE LONGHI	0.012	13.67%	0.79	0.0%
DIASORIN	0.014	11.45%	**0.19**	**14.1%**
DIGITAL BROS	-0.012	15.94%	1.16	0.0%
DMAIL GROUP	-0.013	33.58%	1.31	0.0%
EDISON RSP	-0.001	88.85%	0.85	0.0%
EEMS ITALIA	-0.023	18.66%	1.99	0.0%
EI TOWERS	0.009	52.82%	1.55	0.0%
EL EN	0.001	84.60%	0.82	0.0%
ELICA	-0.007	57.41%	1.35	0.0%
EMAK	-0.002	71.71%	0.54	0.0%
ENEL	-0.004	27.10%	0.69	0.0%
ENGR.INGEGNERIA INFORMA	0.002	80.57%	0.81	0.0%
ENI	0.003	29.44%	0.62	0.0%
ERG	0.003	56.31%	0.64	0.0%
ERGYCAPITAL	-0.004	87.75%	1.25	0.3%
ESPRINET	0.011	27.97%	1.02	0.0%
EUKEDOS	-0.064	7.28%	**0.12**	**83.0%**
EUROTECH	-0.007	55.66%	1.15	0.0%
EXPRIVIA	-0.012	20.89%	1.27	0.0%
FALCK RENEWABLES	0.004	77.95%	1.03	0.0%
FEDON (PAR)	-0.012	8.82%	0.30	0.7%
FIAT	0.001	80.86%	1.23	0.0%
FIDIA	-0.006	45.70%	1.01	0.0%
FIERA MILANO	-0.003	60.71%	0.76	0.0%
FINMECCANICA	-0.003	55.56%	1.16	0.0%

Table 1. Empirical results (continued)

Company	Estimated Alfa	p-value alfa	Estimated Beta	p-value beta
FNM	-0.003	73.79%	0.89	0.0%
FRENI BREMBO	0.004	41.96%	0.91	0.0%
FULLSIX	-0.016	12.67%	0.91	0.0%
GAS PLUS	-0.005	70.44%	0.44	3.1%
GEFRAN	-0.003	57.80%	0.69	0.0%
GEMINA	0.002	64.20%	1.29	0.0%
GEOX	-0.004	65.19%	1.31	0.0%
GIOVANNI CRESPI	**-0.022**	**0.01%**	0.91	0.0%
GRANDI VIAGGI	-0.005	48.93%	0.91	0.0%
GRUPPO CERAMICHE RICCHET	**-0.017**	**0.55%**	0.73	0.0%
GRUPPO EDIT.L'ESPRESSO	0.002	76.95%	1.16	0.0%
HERA	0.002	68.02%	0.67	0.0%
IL SOLE 24 ORE	**-0.025**	**1.85%**	1.10	0.0%
IMA INDUA.MACCHINE	0.004	35.98%	0.28	0.0%
IMMSI	-0.005	48.01%	0.92	0.0%
IMPREGILO	-0.003	57.08%	1.03	0.0%
INDESIT COMPANY	0.005	36.36%	0.88	0.0%
INTEK GROUP	**-0.010**	**3.36%**	0.96	0.0%
INTERPUMP GROUP	0.005	31.55%	0.63	0.0%
IRCE	-0.008	9.66%	0.68	0.0%
IREN	-0.001	88.08%	1.24	0.0%
ISAGRO	-0.002	87.97%	1.08	0.0%
IT WAY	-0.014	5.13%	0.68	0.0%
ITALCEMENTI FABBRICHE RIUNITE	0.000	90.27%	0.92	0.0%
ITALMOBILIARE	-0.002	64.10%	1.12	0.0%
JUVENTUS FOOTBALL CLUB	-0.013	25.91%	0.51	0.9%
K R ENERGY	**-0.036**	**0.44%**	1.12	0.0%
KINEXIA	-0.011	38.85%	0.57	0.3%
LA DORIA	-0.003	55.28%	0.47	0.0%
LANDI RENZO	-0.010	48.14%	0.71	0.1%
LUXOTTICA	0.009	7.55%	0.75	0.0%
MAIRE TECNIMONT	-0.010	66.38%	1.34	0.0%
MARR	0.005	33.55%	0.46	0.0%
MEDIACONTECH	**-0.021**	**1.82%**	1.33	0.0%
MEDIASET	-0.004	47.74%	1.17	0.0%
MOLMED	-0.008	69.54%	0.76	0.9%
MONDO TV	-0.015	13.26%	1.15	0.0%
MONRIF	-0.005	30.95%	0.76	0.0%
MONTEFIBRE	-0.011	5.62%	0.92	0.0%
MOVIEMAX	-0.017	42.43%	1.97	0.0%
NEWRON PHARMACEUTICALS	-0.019	41.13%	**0.58**	**10.5%**

Table 1. Empirical results (continued)

Company	Estimated Alfa	p-value alfa	Estimated Beta	p-value beta
NICE	-0.007	42.94%	0.65	0.0%
NOEMALIFE	-0.010	10.75%	0.21	4.1%
OLIDATA	-0.012	23.01%	1.10	0.0%
PANARIA GP.INDUSTR.CRMH.	-0.013	12.05%	0.65	0.0%
PARMALAT	0.003	70.46%	0.51	0.0%
PIAGGIO	0.001	88.79%	0.66	0.0%
PIERREL	-0.016	25.23%	0.77	0.1%
PININFARINA	-0.006	30.46%	0.97	0.0%
PIQUADRO	0.003	81.29%	0.82	0.0%
PIRELLI	-0.001	77.50%	1.16	0.0%
POLIGRAFICA S F	-0.012	22.11%	0.83	0.0%
POLIGRAFICI EDITORIALE	-0.008	11.08%	0.64	0.0%
POLTRONA FRAU	0.000	96.58%	1.13	0.0%
PRAMAC	-0.036	5.19%	0.75	0.6%
PREMUDA	-0.001	84.57%	0.53	0.0%
PRIMA INDUSTRIE	0.006	51.64%	1.11	0.0%
PRYSMIAN	0.014	16.74%	1.31	0.0%
RATTI	**-0.012**	**2.82%**	0.77	0.0%
RDB	**-0.054**	**1.32%**	0.92	0.4%
RECORDATI INDUA.CHIMICA	0.006	18.92%	0.73	0.0%
RENO DE MEDICI	**-0.011**	**0.62%**	0.82	0.0%
REPLY	0.009	15.97%	0.61	0.0%
RETI TELEMATICHE ITALIAN	-0.018	10.29%	1.36	0.0%
RIZZOLI CORRIERE DELLA SERA	-0.007	48.85%	1.56	0.0%
ROSSS	0.004	86.33%	1.28	0.0%
SABAF	-0.001	91.82%	0.52	0.0%
SADI SERVIZI INDUSTRIALI	-0.012	11.98%	0.59	0.0%
SAES GETTERS	0.001	92.36%	0.98	0.0%
SAFILO GROUP	-0.007	61.06%	1.40	0.0%
SAIPEM	0.004	43.69%	0.72	0.0%
SARAS	-0.010	27.13%	0.97	0.0%
SAVE-AEP.DI VNZ.MRC.POLO	0.005	48.87%	0.85	0.0%
SCREEN SER.BCAST.TEC.	**-0.041**	**1.13%**	0.56	1.8%
SEAT PAGINE GIALLE	**-0.063**	**2.42%**	**0.66**	**17.4%**
SERVIZI ITALIA	-0.008	40.74%	0.44	0.4%
SIAS	0.007	19.59%	0.70	0.0%
SINTESI SOCIETA DI INVMI	**-0.032**	**3.71%**	**0.10**	**66.8%**
SNAI	-0.002	77.44%	1.15	0.0%
SNAM	0.005	14.48%	0.36	0.0%
SO.AEREOPORTO TOSCANO	-0.004	63.52%	0.42	0.1%
SOGEFI	0.002	71.34%	1.02	0.0%

Table 1. Empirical results (continued)

Company	Estimated Alfa	p-value alfa	Estimated Beta	p-value beta
SOL	0.003	46.99%	0.46	0.0%
SORIN	0.002	76.31%	1.07	0.0%
SS LAZIO	-0.020	18.96%	0.56	2.8%
STEFANEL	**-0.016**	**1.10%**	1.04	0.0%
TAS TGA.AVANZATA SISTEMI	-0.017	28.00%	0.69	1.0%
TELECOM ITALIA	-0.008	10.57%	1.11	0.0%
TELECOM ITALIA MEDIA	-0.008	37.99%	1.37	0.0%
TERNA RETE ELETTRICA NAZ	0.007	6.96%	0.44	0.0%
TISCALI	-0.019	11.27%	2.10	0.0%
TOD'S	0.011	5.02%	0.96	0.0%
TREVI FIN INDUSTRIALE	0.010	28.58%	1.25	0.0%
TXT E-SOLUTION	-0.004	73.07%	1.03	0.0%
VALSOIA	0.004	62.29%	0.65	0.0%
VIANINI INDR.	-0.004	43.37%	0.66	0.0%
VIANINI LAVORI	-0.002	67.24%	0.84	0.0%
VINCENZO ZUCCHI	-0.009	6.01%	0.61	0.0%
ZIGNAGO VETRO	0.002	79.74%	0.26	0.8%

References

1. Banz, R. W., (1981), "The Relationship Between Return and Market Value of Common Stocks", Journal of Financial Economics, 9:1, pp. 3–18.
2. Fama, E. F. and K. R. French, (1992), "The Cross-Section of Expected Stock Returns", the Journal of Finance, vol. 47, pp. 427-465.
3. Fama, E. F. and K. R. French, (1993), "Common Risk Factors in the Returns on Stocks and Bonds", Journal of Financial Economics, 33:1, pp. 3–56.
4. Lintner, J., (1965), "The Valuation of Risky Assets and Selection of Risky Investments in Stock Portfolios and Capital Budgets", the Review of Economics and Statistics, vol. 47, 1, pp. 13-37.
5. Lusting, H. and S. Van Nieuwerburgh S., (2005), "Housing Collateral, Consumption Insurance, and Risk Premia: An Empirical Perspective", the Journal of Finance, vol. 60, pp. 1167-1219.
6. Markowitz, H., (1952), "Portfolio Selection", the Journal of Finance, vol. 7, pp. 77-91.
7. Mossin, J., (1966), "Equilibrium in a Capital Asset Market", Econometrica, vol. 34, pp. 768-783.
8. Petrova, R., (2006), "Do the Fama-French Factors Proxy for Innovations in Predictive Variables?", the Journal of Finance, vol. 61, pp. 581-612.
9. Piazzesi, M., M. Schneider, and S. Tuzel, (2007), "Housing consumption and asset pricing", Journal of Financial Economics, vol. 83, pp. 531-569.
10. Sharpe, W. F., (1964), "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk", the Journal of Finance, 19:3, pp. 425– 42.