Fama and French Risk Factors Constructed from Russell/Nomura Style Indexes: Evidence from Japanese Monthly and Daily Data Sets

By:

Elhaj Mabrouk Walid

&

Lau Wee Yeap

(Paper presented at the ***17th Annual Conference on Pacific Basin Finance, Economics, Accounting and Management*** and ***the 3rd International Conference on Business in Asia*** held on 1-2 July 2009 in Bangkok, Thailand)

R

Fama and French risk factors constructed from Russell/Nomura style indexes: evidence from Japanese monthly and daily data sets.

Elhaj Mabrouk Walid
Graduate School of Economics, Osaka University, Japan
1-7 Machikaneyama, Toyonaka, Osaka 560-0043
E-mail: egb008mw@mail2.econ.osaka-u.ac.jp

Wee-Yeap Lau
Faculty of Economics & Administration, University of Malaya
50603 Kuala Lumpur
E-mail: wylau@um.edu.my

Abstract:
This paper uses risk factors constructed from Russell/Nomura style indexes as proxies in an attempt to make the Fama and French three-factor asset pricing model more appealing. The performance of these benchmark factors is evaluated through a direct and simple generalized method of moments test using both daily and monthly data sets of the 33 Japanese industry indexes. Our constructed Fama and French three risk factors can explain returns on most of the 33 industry indexes of all common stocks listed on Tokyo Stock Exchange First Section, JASDAQ, Hercules, and other exchanges. Moreover, the three factors risk premia finding confirms the conclusion concerning the nature of the reversal of the size effect.

Keywords: Fama and French three-factor model, Generalized Method of Moments (GMM)

(P)

1. Introduction:

Fama and French (1993) have proposed the size and Book-to-Market (BM) risk factors measurement method. They have proved the three-factor model's effectiveness and robustness. The asset pricing theory's empirical results presented a remarkably weak explanatory power for the unconditional single factor models, Fama and French (1992), Jagannathan, Kubota and Takehara (1998).

The theoretical basis of a multi-factor model was at first presented by Ross (1976) under non-arbitrage conditions. Afterwards, Grinblatt and Titman (1987) featured the equivalence of the mean-variance efficiency and the arbitrage price theory under linear price value form. Later on, mean-variance efficiency of multi-benchmark portfolio factors has been presented by Fama and French (1993, 1996).

The Fama and French (1993) three-factor model represented a potential success in asset pricing theory. Major researches have approved this model's final conclusions, Davis (1994), and Fama and French (1993, 1995, 1996, 1998).

Meanwhile, since the publication of Fama and French findings, the empirical performance of beta and the Capital Asset Pricing Model (CAPM) are the origin of controversy and intense debate in the academic literature and popular press of the last decade (see for example, Pare, 1992; Kuhn and seals McDonald, 1995; and Tully, 1998). Amihud *et al* (1993), Black (1993) and Kothari *et al* (1995) suspected the procedures of data selection and featured the insufficiency of econometric issues to explain the Fama and French results. Kothari *et al* (1995) criticized the monthly sampling interval shortage to precisely estimate beta. Despite the ongoing critics, the use of the Fama and French (FF) three-factor asset pricing model has increasingly achieved acceptance among academia and practitioners.

The one factor CAPM of Sharp (1964), Lintner (1965), and Black (1972) shows tractability when put into practice. The wide range of alternative market indexes used as proxies for the CAPM enhances its appeal for applicability. On the contrary, the FF three-factor model is more problematic and less appealing. It has a much higher degree of complexity when measuring the size and BM risk factors.

Faff (2003, 2004) has constructed the Fama and French size and BM risk factors with four available commercial style indexes produced by the Frank Russell Investment Group and determined their efficacy using a sample of US and Australian industry indexes. These indexes are "designed" with mixed characteristics of size and BM; namely small value index, large value index, large growth index and small growth index.

Consequently, the aim of this paper is to construct simple benchmarks for Fama and French factors in the Japanese market by using Russell/Nomura style indexes provided by Russell Investment Group and the Financial & Economic Research Center of Nomura Securities. The four Russell/Nomura style indexes are the Russell/Nomura small value

2

index, Russell/Nomura large growth index, Russell/Nomura large value index, and Russell/Nomura small growth index.

The construction of these two factors from style indexes is similar to the original construction presented by Faff (2003, 2004). The FF three factors risk premia are determined on the overall cross-sectional test instead of a group test as in Faff (2003, 2004).

Moreover, the performance of benchmark choice is evaluated using a simple generalized method of moments (GMM) test. The choice of the GMM can be justified since it encompasses the OLS, instrumental variables (IVs), and maximum likelihood estimators. The GMM approach has the merit of allowing for tests of model validity without the classical assumption of normal distribution of returns. It permits, also, to improve mean-variance efficiency and to avoid bias between variables.

The following section presents the FF three-factor model. Section 3 describes the dataset, explains the Fama and French size and BM factors construction using Russell/Nomura proxy indexes and provides descriptive statistics of the three factors risk premia. Section 4 presents the empirical results. Section 5 concludes the paper.

2. Fama and French model:

Throughout their research of 1992, 1993, 1996 and 1998, Fama and French shaped up the three-factor model as:

$$E(R_i) - R_f = b_i(E(R_m) - R_f) + s_i E(SMB) + h_i E(HML) \quad (1)$$

$E(R_i) - R_f$ is the expected excess return on asset i.

$E(R_m) - R_f$ is the expected excess on market return.

$E(SMB)$ is the expected return on proxy portfolio for the "Small minus Big" size factor.

$E(HML)$ is the expected return on proxy portfolio for the "High minus Low" BM factor.

The estimated factors b_i, s_i and h_i are obtained from the empirical counterpart of this model:

$$R_{it} - R_{ft} = \alpha_i + b_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it} \quad (2)$$

$R_{it} - R_{ft}$ is the realized excess return on asset i at time t.

$R_{mt} - R_{ft}$ is the realized excess market return at time t.

SMB_t is the realized return on the proxy portfolio for the size factor at time t.

HML_t is the realized return on the proxy portfolio for the BM factor at time t.

By comparing the expectations of equation (2) with equation (1), we observe the intercept α_i null hypothesis expected to be valid for all i. Thus as advocated, when imposing zero intercept restriction, the FF model can be directly tested. The FF model method is tested

3

using the GMM methodology in a system of equations:

$$R_{it} - R_{ft} = b_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it} \quad (3)$$

$$R_{mt} - R_{ft} = \nu_m + \xi_t \quad (4)$$

$$SMB_t = \nu_{SMB} + \psi_t \quad (5)$$

$$HML_t = \nu_{HML} + \zeta_t \quad (6)$$

Where ν_m is the estimated market premium, ν_{SMB} is the estimated SMB premium and ν_{HML} is the estimated HML premium.

We apply the GMM approach of MacKinlay and Richardson (1991) to test the FF three-factor model.

In the system of equations ((3), (4), (5) and (6)) there are six parameters ($b_i, s_i, h_i, \nu_m, \nu_{SMB}, \nu_{HML}$) and seven sample moments to estimate. This test of over-identified restrictions is used to examine whether the moment restrictions are valid or not.

Also, this study tests other null hypothesis:

$$H_0: b_i = 0, H_0: s_i = 0, H_0: h_i = 0, H_0: \bar{\nu}_m = 0, H_0: \bar{\nu}_{SMB} = 0, H_0: \bar{\nu}_{HML} = 0$$

to examine the significance of the hypothetical parameters and the FF factors risk premia across industries, where $\bar{\nu}_m$, $\bar{\nu}_{SMB}$, and $\bar{\nu}_{HML}$ denote the cross-sectional mean value of ν_m, ν_{SMB}, and ν_{HML}, respectively. With this sort of testing the zero risk premia hypotheses our method differentiates itself from Faff (2003, 2004).

3. Data description:

3.1. Data:

The data comprises daily and monthly returns over the 33 Japanese industry indexes, the Russell/Nomura four value and growth-weighted "style" indexes, the Russell/Nomura total market index (Nomura Securities Global Quantitative Research Center), and a proxy for the risk-free rate (Financial Quest). The data is on an 11 year period, from January 6, 1997 to April 24, 2008, for daily returns and on a 21 year period, from January 1986 to March 2008, for monthly returns. Notice that the total market index, the 33 industry indexes and the value and growth-weighted "style" indexes' returns are inclusive of dividends. The four Russell/Nomura Japanese equity "style" indexes provided by Russell Investment Group and the Financial & Economic Research Center of Nomura Securities are used to construct proxies for the Fama and French SMB and HML factors. The style indexes used are: the Russell/Nomura large cap value index, Russell/Nomura large cap growth index, Russell/Nomura small cap value index, and Russell/Nomura small cap growth index[1]. Further, the Russell/Nomura total market index will be used as a market index. And the 30-day gensaki rates will be a proxy for the risk-free rate[2].

The Russell/Nomura total market index covers 98% of all listed stocks in terms of market capitalization. It includes 2007 stocks from all markets.

The Russell/Nomura large cap value index (Russell/Nomura large cap growth index) appraises the performance of the 237 (214) largest companies in the Russell/Nomura total market index with lower (higher) adjusted Price-to-Book (P/B) ratios and lower (higher) forecasted growth values. And the Russell/Nomura small cap value index (Russell/Nomura small cap growth index) appraises the performance of the 1004 (552) smallest companies in the Russell/Nomura total market index with lower (higher) adjusted P/B ratios and lower (higher) forecasted growth values.

The Fama and French three factors are the following proxies. First, the excess market return is the return on the Russell/Nomura total market differed to the converted 30-day and daily gensaki rates. Second, the return on the SMB portfolio is defined as the difference between average return on small stock portfolios and the average return on large stock portfolios.

$$SMB_t = \left(\frac{R_{SV_t} + R_{SG_t}}{2}\right) - \left(\frac{R_{LV_t} + R_{LG_t}}{2}\right)$$

Where:

R_{SV_t} is the realized return on the Russell/Nomura small cap value index at time t.

R_{SG_t} is the realized return on the Russell/Nomura small cap growth index at time t.

R_{LV_t} is the realized return on the Russell/Nomura large cap value index at time t.

R_{LG_t} is the realized return on the Russell/Nomura large cap growth index at time t.

And finally, the return on HML portfolio is the difference between the average return on high BM equity portfolios and the average return on low BM equity portfolios.

$$HML_t = \left(\frac{R_{LV_t} + R_{SV_t}}{2}\right) - \left(\frac{R_{LG_t} + R_{SG_t}}{2}\right)$$

3.2. Descriptive statistics and correlations between Fama and French model factors:

Table I shows basic descriptive statistics and correlations of the proxies for the French and Fama factors derived from the Russell/Nomura Japanese "style" indexes. Several points from this table are worth noting. First, the average market risk premium over the daily and

---

[1] A description of these indexes are presented on the Nomura securities website located at: http://qr.nomura.co.jp/en/frcnri/docs/RN_rule200707E.pdf

[2] Previously Daniel et al (2001) and Chiao and Hueng (2004) used 30-day gensaki rates as a proxy for the risk-free rate.

5

Table I:

Basic descriptive statistics and correlation between proxy Fama and French Factors

This table, in Panel A, presents the mean, median, maximum, minimum, standard deviation for the excess market return, the Fama and French "Small minus Big" size portfolio factor (SMB), and the Fama and French "High minus Low" book-to-market portfolio factor (HML). In panel B the correlations between the Fama and French factors are depicted

	Daily data:04/01/1997-24/04/2008			Monthly data: 01/1986-03/2008		
	$R_{mt} - R_{ft}$	SMB_t	HML_t	$R_{mt} - R_{ft}$	SMB_t	HML_t
Panel A: Basic descriptive statistics						
Mean	0.00221	-0.00007	0.00013	0.01744	0.00006	0.00444
Median	0.00195	0.00008	0.00002	0.01291	-0.00104	0.00397
Maximum	0.06147	0.03332	0.05548	0.17434	0.11361	0.10159
Minimum	-0.06291	-0.02790	-0.04098	-0.20638	-0.14054	-0.11879
Std. Dev.	0.01263	0.00655	0.00568	0.05586	0.03720	0.02540
Panel B: Correlations						
$R_{mt} - R_{ft}$	1			1		
SMB_t	-0.3859	1		-0.0365	1	
HML_t	-0.2663	0.0511	1	-0.1013	0.0395	1

monthly data sets is positive (3.52% per annual and 2.58% per annual, respectively). Second, the average SMB and HML premia are positive for the monthly data equal to 2.22% and 3.22% per annual, respectively. This is consistent with Fama and French (1993). Third, the average SMB is negative, close to zero for the daily returns, and positive close to zero for the monthly returns. This is consistent with previous research made in this issue, Faff (2003). Fourth, and in panel B, the correlation between the SMB and HML factors is close to zero for both daily and monthly data. This is consistent with Fama and French (1993), who computed a negative and close to zero (-0.08) correlation level between SMB and HML on a monthly sample size.

4. Empirical Framework:

We resume the results of the over-identified Fama and French time series regressions after using the system of equation (3), (4), (5), and (6) across Japanese industry portfolios. We can summarize the findings of the Fama and French factor loading betas in table II. The most remarkable result consistent with Fama and French (1993), in this table is that the mean market beta value is close to one for both data sets. And contrary to Faff (2003)'s findings concerning the significance proportion of SMB betas and HML betas, a high proportion of HML betas are statistically significant. On the one hand, 31 (27) out of 33 industries have significant HML betas for daily (monthly) data. And on the other hand, 26(25) industries have significant SMB betas for daily (monthly) data. The market betas show a significant and positive sign all along the sample portfolios. The majority of the SMB (HML) betas are

6

Table II:
Summary of FF factor betas across Japanese industry portfolios

This table shows in Panel A the mean, median, maximum, minimum, skew ness, and the number of positive and negative sign for the estimated Fama and French factor betas. And in Panel B it describes the correlation between the estimated Fama and French factor betas of daily (denoted by (*d*)) and monthly (denoted by (*m*)) data sets.

Panel A: Summary statistics

	Daily data:04/01/1997-24/04/2008			Monthly data: 01/1986-03/2008		
	b_i	s_i	h_i	b_i	s_i	h_i
Mean	0.9855	0.1812	0.3682	1.0101	0.2125	0.3225
Median	0.9930	0.2340	0.5946	0.9967	0.2876	0.4151
Min	0.8712	-0.3754	-0.9165	0.7029	-0.6645	-1.0274
Max	1.1384	0.6905	1.1793	1.5527	0.7434	1.2527
Skew ness	0.0020	-0.3766	-0.7655	0.9222	-0.8255	-0.5305
No. sig. positive	33	22	23	33	22	20
No. sig. negative	0	4	8	0	3	7

Panel B: The three factors correlations

	$b_i(d)$	$b_i(m)$	$s_i(d)$	$s_i(m)$	$h_i(d)$	$h_i(m)$
$b_i(d)$	1					
$b_i(m)$	0.6539	1				
$s_i(d)$	0.2529	0.1292	1			
$s_i(m)$	0.0861	0.0184	0.6272	1		
$h_i(d)$	0.2487	0.2356	0.364	0.0525	1	
$h_i(m)$	0.0043	0.1406	0.3378	0.1121	0.8974	1

significant and positive, around 85% (75%).

For daily versus monthly data set, it happens that the same industries are ranked coincidently in the extremes of the beta value interval. For instance, Securities & Commodity Futures portfolio's market beta is the first ranked value and Service portfolio's HML beta is the last ranked value for both daily and monthly data sets. In panel B, the correlation between monthly and daily pairs is rather high in a range of 0.6 to 0.89. Finally, most factor betas are positively correlated, the lowest correlations occur between the monthly set of factor beta.

Tables III and IV show, not surprisingly, that excess return on the market portfolio captures more variation on the industry portfolio of stocks[3]. Hence the totalities of market factor betas are positively close to one and statistically highly significant, on both daily and monthly data sets.

Taking the case of highest and lowest market beta, Securities & Commodities Futures' beta is the highest (1.55 and 1.13) for both daily and monthly data sets and Mining (Electric Power & Gas)'s beta is the lowest at 0.87 (0.7) for daily (monthly) data set. This implies that Securities & Commodities Futures are most sensitive, whereas Mining and

[3] Fama and French (1993) justified this result and brought it to the fact that market leaves more important variation in stock returns than other factors.

Table III: GMM test of FF model, using daily data

Panel A: Loading factors and GMM statistics

Industry	b_i		s_i		h_i		GMM	
Fishery, Agriculture & Forestry	0.946	(13.46)***	0.69	(10.78)***	0.649	(11.02)***	2.457	[0.1170]
Mining	0.871	(7.47)***	0.414	(4.25)***	0.831	(8.64)***	3.212	[0.0731]
Construction	0.997	(19.55)***	0.542	(12.53)***	0.888	(19.2)***	0.01	[0.9189]
Foods	0.895	(18.44)***	0.308	(7.58)***	0.757	(17.51)***	0.198	[0.6566]
Textiles & Apparels	0.999	(21.67)***	0.476	(11.59)***	0.753	(17.63)***	1.641	[0.2002]
Pulp & Paper	0.988	(11.69)***	0.202	(2.76)***	1.115	(14.75)***	1.198	[0.2737]
Chemicals	0.979	(28.39)***	0.081	(2.6)***	0.392	(10.03)***	5.243	[0.0220]
Pharmaceutical	0.948	(15.2)***	0.023	-0.4	0.493	(7.8)***	0.068	[0.7949]
Oil & Coal Products	1.025	(11.24)***	0.317	(3.82)***	1.179	(14.73)***	0.011	[0.9166]
Rubber Products	0.993	(10.42)***	-0.126	(-1.46)	0.439	(3.98)***	1.29	[0.2561]
Glass & Ceramics Products	1.004	(16.54)***	0.261	(4.85)***	0.495	(8.7)***	0.034	[0.8528]
Iron & Steel	1.068	(12.04)***	0.314	(4.42)***	0.811	(11.61)***	0.012	[0.9119]
Nonferrous Metals	1.089	(15.99)***	0.234	(3.83)***	0.058	-0.89	0.809	[0.3685]
Metal Products	1.011	(17.69)***	0.441	(8.78)***	0.791	(13.44)***	2.954	[0.0856]
Machinery	1.02	(24.29)***	0.313	(8.32)***	0.103	(2.52)**	0.427	[0.5135]
Electric Appliances	1.018	(26.95)***	-0.331	(-9.94)***	-0.673	(-18.33)***	2.343	[0.1259]
Transportation Equipment	1.048	(20.03)***	-0.375	(-7.53)***	0.313	(5.44)***	0.574	[0.4485]
Precision Instruments	1.002	(18.1)***	-0.028	(-0.58)	-0.392	(-7.59)***	3.295	[0.0695]
Other Products	0.876	(13.34)***	-0.012	(-0.23)	-0.128	(-2.33)**	1.076	[0.2996]
Electric Power & Gas	0.898	(13.63)***	0.249	(4.2)***	0.842	(12.31)***	0.375	[0.5402]
Land Transportation	0.898	(18.31)***	0.19	(4.39)***	0.667	(16.78)***	0.071	[0.7900]
Marine Transportation	0.941	(9.42)***	0.209	(2.41)**	0.785	(9.26)***	0.293	[0.5885]
Air Transportation	0.881	(10.72)***	0.292	(4.12)***	0.776	(8.73)***	0.37	[0.5432]
Warehousing & Transport. S	0.979	(17.27)***	0.549	(10.67)***	0.595	(10.71)***	0.53	[0.4667]
Information & Communication	0.99	(13.63)***	-0.293	(-4.4)***	-0.795	(-11.82)***	0.339	[0.5606]
Wholesale Trade	0.997	(14.3)***	0.258	(4.21)***	-0.367	(-5.23)***	1.328	[0.2491]
Retail Trade	0.959	(19.48)***	0.226	(4.93)***	0.025	-0.42	3.428	[0.0641]
Banks	1.049	(16.47)***	-0.058	(-1.04)	0.847	(14.79)***	1.147	[0.2841]
Securities & Commodity Futures	1.138	(13.18)***	-0.195	(-2.45)**	-0.397	(-4.37)***	0.417	[0.5184]
Insurance	0.954	(11.84)***	-0.081	(-1.14)	0.901	(12.14)***	0.348	[0.5555]
Other Financing Business	1.045	(13.57)***	0.328	(4.97)***	-0.359	(-5.46)***	0.095	[0.7573]
Real Estate	1.047	(11.68)***	0.069	-0.85	0.676	(7.42)***	0.25	[0.6173]
Services	0.972	(22.98)***	0.491	(12.94)***	-0.917	(-22.45)***	1.555	[0.2124]

Panel B: The market, SMB and HML risk premia

$\bar{v}_m$		$\bar{v}_{SMB}$		$\bar{v}_{HML}$	
0.005	(0.30)	-0.013	(-3.09)***	0.006	(2.00)**

This table exhibits the results of the demonstrated test on the FF model through the system of regressions (3), (4), (5), and (6). The test is made on a daily data sample from the 6th of January 1997 to the 24th of April 2008. GMM is the J-test statistic of over-identifying restrictions. The GMM coefficient's P-value is carried in brackets. The loading factors associated *t*-statistic is contained in parentheses below the loading coefficient estimate.

***, **, * show the level of significance at 1%, 5%, and 10%, respectively.

Table IV: GMM test of FF model, using monthly data

Panel A: Loading factors and GMM statistics

Industry	b_i		s_i		h_i		GMM	
Fishery, Agriculture & Forestry	0.927	(19.92)***	0.588	(7.21)***	0.611	(6.88)***	0.000	[0.9994]
Mining	1.093	(19.93)***	0.611	(6.4)***	0.644	(3.85)***	0.000	[0.9889]
Construction	1.046	(24.55)***	0.433	(5.27)***	1.092	(10.16)***	2.702	[0.1002]
Foods	0.81	(21.63)***	0.241	(3.9)***	0.365	(3.73)***	6.648	[0.0099]
Textiles & Apparels	0.99	(31.32)***	0.41	(7.22)***	0.593	(5.56)***	2.138	[0.1437]
Pulp & Paper	0.847	(17.13)***	0.326	(4.02)***	0.914	(5.43)***	1.517	[0.2181]
Chemicals	1.002	(34.47)***	0.288	(4.89)***	0.206	(2.19)**	0.711	[0.3992]
Pharmaceutical	0.749	(17.31)***	0.049	-0.65	0.015	-0.09	9.205	[0.0024]
Oil & Coal Products	1.025	(15.87)***	0.45	(3.59)***	0.828	(5.1)***	0.011	[0.9161]
Rubber Products	0.974	(20.33)***	0.286	(3.07)***	0.116	-0.54	0.035	[0.8517]
Glass & Ceramics Products	1.058	(28.47)***	0.312	(4.92)***	0.415	(3.2)***	0.11	[0.7398]
Iron & Steel	1.187	(21.89)***	-0.019	(-0.19)	1.186	(8.9)***	0.752	[0.3860]
Nonferrous Metals	1.194	(29.48)***	0.191	(2.53)**	0.28	(1.83)*	1.032	[0.3098]
Metal Products	0.89	(24.18)***	0.743	(11.19)***	0.438	(3.06)***	0.282	[0.5956]
Machinery	1.075	(36.67)***	0.552	(9.47)***	0.132	-1.38	0.001	[0.9817]
Electric Appliances	0.984	(20.61)***	-0.024	(-0.22)	-0.707	(-4.53)***	0.466	[0.4947]
Transportation Equipment	0.943	(27.9)***	-0.328	(-4.09)***	0.194	-1.2	2.807	[0.0939]
Precision Instruments	0.909	(19.53)***	0.337	(3.84)***	-0.399	(-2.68)***	6.423	[0.0113]
Other Products	0.856	(24.04)***	0.301	(3.58)***	-0.372	(-2.89)***	3.186	[0.0742]
Electric Power & Gas	0.703	(12.17)***	-0.665	(-5.92)***	0.423	(3.26)***	2.701	[0.1003]
Land Transportation	0.877	(16.93)***	-0.08	(-0.97)	0.652	(6.21)***	0.528	[0.4675]
Marine Transportation	1.218	(19.4)***	0.199	(1.64)*	1.253	(7.49)***	0.232	[0.6298]
Air Transportation	0.875	(11.9)***	0.252	(2.15)**	0.576	(3.33)***	0.068	[0.7942]
Warehousing & Transport. S	1.018	(25.14)***	0.483	(6.19)***	0.869	(8.08)***	0.053	[0.8174]
Information & Communication	1.102	(17.55)***	0.049	-0.49	-0.881	(-5.53)***	0.269	[0.6042]
Wholesale Trade	1.162	(29.98)***	0.37	(4.65)***	-0.469	(-2.25)**	1.438	[0.2304]
Retail Trade	0.912	(27.23)***	0.383	(5.59)***	-0.121	(-0.57)	0.182	[0.6693]
Banks	0.997	(20.2)***	-0.091	(-1.1)	0.767	(5.47)***	0.619	[0.4316]
Securities & Commodity Futures	1.553	(18.82)***	-0.192	(-1.59)	0.278	-1.47	15.488	[0.0001]
Insurance	1.042	(22.56)***	-0.415	(-4.81)***	1.011	(6.87)***	0.045	[0.8328]
Other Financing Business	1.126	(28.64)***	0.479	(6.3)***	-0.239	(-1.79)*	1.144	[0.2848]
Real Estate	1.25	(21.22)***	-0.027	(-0.21)	1.002	(5.28)***	0.619	[0.4313]
Services	0.94	(30.48)***	0.523	(7.49)***	-1.027	(-9.89)***	0.148	[0.7001]

Panel B: The market, SMB and HML risk premia

$\overline{v}_m$		$\overline{v}_{SMB}$		$\overline{v}_{HML}$	
0.146	(0.48)	-0.163	(-1.18)	0.275	(4.26)***

This table exhibits the results of the demonstrated test on the FF model through the system of regressions (3), (4), (5), and (6). The test is made on a monthly data sample from January 1986 to March 2008. GMM is the J-test statistic of over-identifying restrictions. The GMM coefficient's P-value is carried in brackets. The loading factors associated *t*-statistic is contained in parentheses below the loading coefficient estimate.

***, **, * show the level of significance at 1%, 5%, and 10%, respectively.

Electric Power & Gas are least sensitive to changes in the market as a whole. The highest positive exposure to size factor is Fishery, Agriculture and Forestry (0.69) on a daily data set and Metal products (0.74) on a monthly data set. However, Transportation Equipment has the highest negative exposure to size factor at -0.37 and Electric Power & Gas at -0.74 for daily and monthly data sets, respectively.

We notice on table IV that Information and Communication has a highly considered negative exposure to BM factor at -0.8 (-0.88) on daily (monthly) data set. This is consistent with the fact the IT shares with high BM ratio (consequently negative factor loading on BM factor) are often overvalued.

Oil & Coal Products (Marine Transportation) has the highest positive exposure to BM factor for daily (monthly) data set.

The GMM test statistics null hypothesis assumes that the risk factors have not an effect on the FF model. The outcome presented in the right side of Table III and IV supports the validity of the FF three factors model for most industries in the Japanese stock market. Only five (six) sectors did not support the FF model for daily (monthly) data set, since their P-value is less then 10%. Construction (Fishery, Agriculture & Forestry) gives the greatest endorsement to the FF model since its P-value is 0.9189 (0.9994) for daily (monthly) data set.

Our findings are consistent with a wave of recent similar findings supporting the overall performance of the FF model when using risk factors constructed using style indexes[4].

Further examination of the three factors risk premia in panel B of table III and IV discloses that the market and book-to-market factors risk premia are positive and the size factor premium is negative. This confirms the conclusion concerning the nature of the reversal of the size effect.

6. Conclusion:

The primary contribution of this paper is to create and bring to practice a new simple method through which style indexes can be used as proxies to compute Fama and French risk factors. We used data provided from the Nomura Securities. These proxy risk factors show similarity in properties to those used in previous literature and were quite favorable for the FF model. Using samples of daily data (6th of January 1997 to 24th of April 2008) and samples of monthly data (January 1986 to March 2008), this analysis's outcome reveals strong evidence on the performance of the risk factors constructed from style indexes

[4] Pham T. L (2006) succeeded to determine the performance of FF model using monthly data with different "off-the-shelf" style indexes of Daiwa securities to construct FF risk factors.

explaining returns on industry indexes in the Japanese market. This work is more likely to tend toward the same result supporting the use of the FF model with factors created from style indexes on both daily and monthly data sets. Moreover, the FF factors risk premia support previous findings on the reversal of the size effect and ascertain their validity.

References:

Amihud Y., Christensen B., and Mendelson H. (1993) "Further evidence on the risk-return relationship" unpublished manuscript.

Black F., (1972) "Capital market equilibrium with restricted borrowing" Journal of Business Vol. 45, pp. 444-455

Black F., (1993) "Beta and return" Journal of Portfolio Management Vol. 20, pp. 8-18

Chiao C., Hueng C. J., (2005) "Overraction effects independent of risk and characteristics: evidence from the Japanese stock market" Japan and the World Economy Vol. 17, pp. 431-455

Daniel K., Titman S., and John Wei K. C., (2001) "Explaining the cross-section of stock returns in Japan: Factors or characteristics?" The Journal of Finance Vol. LVI, No. 2, pp. 743-766

Davis J., (1994) "The cross-section of realized stock returns: the pre-COMPUSTAT evidence" Journal of Finance Vol. 49, pp. 1579-1593

Fama E. F., and French K. R., (1992) "The cross-section of expected stock returns" The Journal of Finance Vol. XLVII, No. 2, pp. 427-465

Fama E. F., and French K. R., (1993) "Common risk factors in the returns on stocks and bonds" Journal of Financial Economics Vol. 33, pp. 3-56

Fama E. F., and French K. R., (1995) "Size and Book-to-Market factors in earnings and returns" The Journal of Finance Vol. L, No. 1, pp. 131-155

Fama E. F., (1996) "Multifactor portfolio efficiency and multifactor asset pricing" Journal of Financial and Quantitative Analysis Vol. 31, No. 4, pp. 441-465

Fama E. F., and French K. R., (1998) "Value versus growth: the international evidence" The Journal of Finance Vol. LIII, No. 6, pp. 1975-1999

Grinblatt M., and Titman S., (1987) "The relation between mean-variance efficiency and arbitrage pricing" Journal of Business, University of Chicago Press Vol. 60, No. 1, pp. 97-112

Jagannathan R., Kubota K., and Takehara H., (1998) "Relationship between Labor-Income Risk and Average Return: Empirical Evidence from the Japanese Stock Market," Journal of Business 71, No 3, 319-47.

Kuhn S., and Seals McDonald K., (1995) "Cheap stocks: are they trash or are they treasure?"

Fortune, 16th of October

Kothari S., Shanken J., and Sloan R., (1995) "Another look at the cross-section of expected stock returns" Journal of Finance Vol. 50, pp. 185-224

Lintner J., (1965) "Security prices, risk and maximal gains from diversification" Journal of Finance pp. 585-615

Pare T., (1992) "The Solomon of stocks finds a better way to pick them" Fortune, 1st of June, pp. 23-24

Pham T. L., (2006) "Constructing Fama-French Factors from style indexes: Japanese evidence" Economics Bulletin Vol.7, No. 7, pp. 1-10

Robert W. Faff., (2003) "Creating Fama and French Factors with style" The Financial Review Vol. 38, pp. 311-322

Robert W. Faff., (2004) "A simple test of the Fama and French model using daily data: Australian evidence" Applied Financial Economics Vol. 14, pp. 83-92

Ross Stephen A., (1976) "The arbitrage theory of capital asset pricing," Journal of Economic Theory, Elsevier, vol. 13(3), 341-360

Sharp W. F., (1964) "Capital asset prices: a theory of market equilibrium under conditions of risk" Journal of Finance Vol. 19, pp. 425-442

Tully S., (1998) "How the really smart money invests" Fortune, 6th of July

MacKinlay A., and Richardson M. (1991) "Using generalized method of moments to test mean-variance efficiency" Journal of Finance Vol. 46, pp. 511-527