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Are Dividend Yield and ROE Smart Portfolio Fundamentals? The Recent Case of Japan

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Abstract

This paper attempts to test whether dividend yield and ROE are important fundamentals for obtaining positive alpha by using a four factor asset pricing model. As a result, our investigations derive several interesting findings as follows. First, (1) we clarify that for the period from January 2009 to March 2013, our second highest and third highest dividend-yield portfolios deliver statistically significant positive alphas. Second, (2) we also reveal that for the period from January 2009 to March 2013, our second highest and third highest ROE portfolios yield statistically significant positive alphas. Overall, our empirical examinations demonstrate that after the Lehman shock period, dividend yield and ROE are the important fundamentals for constructing smart portfolios in Japan.

Keywords: Asset pricing model, Dividend yield, ROE, Smart beta

1. Introduction

After serious financial crises, many investors become increasingly interested in alternative investment strategies, called as smart beta, instead of conventional market capitalization-based indices. Currently, smart beta seems not to have a strict definition, and it can be understood as rule-based investment strategies, in which the traditional market capitalization weights are not employed. It can be considered that such traditional schemes yield only sub-optimal returns since they may overweight overvalued equities and underweight undervalued equities. It is also recognized that smart beta strategies are those aim at attaining a better risk-return profile than those from conventional indexing schemes by constructing indices or portfolios based on such measures as cash flows, liquidity, volatility, and/or earnings. Most importantly, are then these strategies effective in the real world equity portfolio management?

In order to answer the above question, as a case study, this paper attempts to test whether dividend yield and ROE are important fundamentals for obtaining positive risk-adjusted return. As a result, our investigations find interesting evidence as follows. First, (1) we find that for the period from January 2009 to March 2013, our second highest and third highest dividend-yield portfolios deliver statistically significant positive alphas. Second, (2) we also clarify that for the period from January 2009 to March 2013, our second highest and third highest ROE portfolios also produce statistically significant positive alphas. As above, our empirical examinations in this paper demonstrate that after the Lehman shock period, dividend yield and ROE are useful fundamentals for constructing smart portfolios in Japan. After this introduction, Section 2 conducts literature review; Section 3 documents our data; and Sections 4 explains our model. Section 5 reports our results and finally, Section 6 concludes the paper.

2. Literature Review

This section concisely reviews related studies; however, we note that there is little previous study regarding smart beta. First, a practical research by Shepherd (2014) implemented some analyses related to the smart beta investing in corporate bonds. A recent paper by Malkiel (2014) suggested that smart beta strategies were not effective. Further, Hsu et al. (2015) implemented robustness checks for value, momentum, beta, quality, illiquidity, and size factors by using the Sharpe ratio in several international stock markets in the context of smart beta strategies. They reported mixed results for the effectiveness of the strategies they tested. AlMahdi (2015) tested several smart beta strategies and the paper reported that one portfolio was stable under stress and another portfolio could be used to obtain higher returns.

Moreover, using European stock data for the period from March 15, 2002 to May 1, 2012, Bertrand & Lapointe (2015) investigated the effects of the use of a socially responsible investment (SRI) universe on the performance of risk-based asset allocation strategies. They found that the use of the SRI universe had a positive contribution to risk-adjusted performance of risk-based asset allocations; however, they also suggested that this contribution was not uniform and represented only a small part of the total alpha that was observed in their study.

Table 1. Descriptive statistics of the Japanese equity portfolios sorted by dividend yields and ROE: for the period from July 1987 to March 2013

Panel A. Dividend yield portfolios					
	P1	P2	P3	P4	P5
Mean	0.9480	0.5885	0.4936	0.3880	0.2282
Median	−0.0300	0.6000	0.5200	0.3000	0.0900
Maximum	196.3000	31.9000	22.1400	20.9100	20.9800
Minimum	−22.4600	−18.7600	−17.9200	−18.8500	−17.9500
Standard deviation	12.7000	6.1259	5.9529	5.9988	5.7115
Skewness	11.8312	0.4374	0.0356	0.1372	−0.0254
Kurtosis	182.5947	5.5401	4.1690	3.9773	3.8221
	P6	P7	P8	P9	P10
Mean	0.3203	0.3191	0.0493	−0.1072	−0.3132
Median	0.4400	0.2100	0.1500	0.1600	−0.6200
Maximum	26.2600	19.3500	21.0000	19.1300	21.7200
Minimum	−19.6800	−18.6900	−22.6200	−22.8600	−22.6500
Standard deviation	5.8997	5.5725	5.8841	6.2104	7.1712
Skewness	0.0828	−0.1709	−0.0557	−0.3146	0.0043
Kurtosis	4.5578	3.9259	4.0986	3.8918	3.4408
Panel B. ROE portfolios					
	P1	P2	P3	P4	P5
Mean	0.0386	0.0974	0.2108	0.1394	0.3284
Median	0.0000	0.0900	0.2300	0.1100	0.5000
Maximum	20.5500	21.2600	17.8600	18.1100	18.2700
Minimum	−24.5600	−21.8000	−19.2500	−20.6600	−20.4400
Standard deviation	6.8093	5.9797	5.5229	5.3276	5.3475
Skewness	−0.1176	−0.1046	−0.0636	−0.1090	−0.2339
Kurtosis	3.8580	4.0899	3.8467	3.8197	4.1130
	P6	P7	P8	P9	P10
Mean	0.1426	0.2338	0.0074	0.2988	0.0668
Median	0.4000	0.0500	0.2100	0.0500	−0.2700
Maximum	18.4100	24.9900	22.3400	74.7300	26.7600
Minimum	−18.0200	−18.0000	−19.9000	−23.8600	−20.7200
Standard deviation	5.5330	5.8824	6.1804	7.9117	7.6697
Skewness	−0.0381	0.2455	0.0703	2.6802	0.1973
Kurtosis	3.9237	4.3965	3.7486	27.5881	3.6193

Notes. In this table, 'P' means portfolio and in Panel A, P1 shows the highest dividend-yield equity portfolio and P10 means the lowest dividend-yield portfolio. In Panel B, P1 denotes the highest return on equity (ROE) stock portfolio and P10 means the lowest ROE portfolio. The number of the monthly observations in our full sample period is 309.

3. Data

In this section, we document the data used in this research. This study uses four factors for the asset pricing model; ten returns of the portfolios ranked by dividend yields; and ten returns of the portfolios ranked by ROE for Japanese stock markets. All data except for the Tokyo stock price index (TOPIX), which are used in this study are kindly supplied by Stefano Marmi. TOPIX data are from the Quick Corp.

Table 1 displays the descriptive statistics of the Japanese equity portfolios sorted by dividend yields and ROE for the period from July 1987 to March 2013. In this table, in Panel A, P1 shows the highest dividend-yield equity portfolio and P10 means the lowest dividend-yield portfolio. In addition, in Panel B, P1 denotes the highest ROE stock portfolio and P10 means the lowest ROE portfolio. As far as this full sample period, we understand first that (1) higher dividend-yield portfolios show the higher returns; while somewhat differently, it is also understood that (2) higher ROE portfolios do not necessarily yield higher returns in general.

4. The Model

This section documents our empirical asset pricing model, which is to evaluate the performance of our dividend-yield and ROE based portfolios. More specifically, the model used in our tests is the following four factor asset pricing model (1):

$$R_{p,t} = \alpha_p + \tau_p(R_M - R_F) + \chi_p SMB_t + \phi_p HML_t + \xi_p WML_t + \kappa_{p,t}. \quad (1)$$

In the above model, $R_{p,t}$ denotes one of the returns of the portfolios ranked by dividend yields or ROE; R_M–R_F denotes the excess market return over the risk free rate; SMB means the small stock premium factor; HML denotes the value premium factor; and WML means the momentum factor. Namely, this four factor model comprises Fama-French (1993) three factor model and a momentum factor. Using this model, we examine the existence of the positive risk-adjusted returns: positive alphas in the portfolios ranked by dividend yields or ROE.

Table 2. Estimation results of the four factor asset pricing model for the dividend-yield equity portfolios in Japan

Panel A. Results from July 1987 to December 2008					
P1			P2		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	−0.8369***	0.0001	Alpha	0.2338	0.1939
EMR	0.9767***	0.0000	EMR	0.8556***	0.0000
SMB	−0.3460***	0.0000	SMB	0.3158***	0.0000
HML	1.3433***	0.0000	HML	0.2934***	0.0000
WML	−0.2988***	0.0000	WML	−0.3079***	0.0007
Adj. R^2	0.9175		*Adj*. R^2	0.7952	
P3			P4		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.1980	0.2566	Alpha	0.1194	0.4762
EMR	0.8771***	0.0000	EMR	0.9001***	0.0000
SMB	0.2516***	0.0000	SMB	0.1757***	0.0003
HML	0.2098***	0.0000	HML	0.2411***	0.0000
WML	−0.2624***	0.0007	WML	−0.2393***	0.0006
Adj. R^2	0.8160		*Adj*. R^2	0.8336	
P5			P6		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.0898	0.5640	Alpha	0.1400	0.3088
EMR	0.8905***	0.0000	EMR	0.9426***	0.0000
SMB	0.0843**	0.0368	SMB	0.0725	0.1031
HML	0.0682**	0.0452	HML	0.1055***	0.0036
WML	−0.1847***	0.0053	WML	−0.1341**	0.0118
Adj. R^2	0.8404		*Adj*. R^2	0.8479	
P7			P8		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.2126	0.1050	Alpha	0.0955	0.5187
EMR	0.8866***	0.0000	EMR	0.9038***	0.0000
SMB	0.0552	0.1560	SMB	−0.1671***	0.0011
HML	0.0258	0.3851	HML	−0.1154***	0.0017
WML	−0.1185***	0.0008	WML	−0.1082*	0.0722
Adj. R^2	0.8684		*Adj*. R^2	0.8443	
P9			P10		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	−0.0704	0.6327	Alpha	−0.1748	0.5305
EMR	0.9864***	0.0000	EMR	1.1028***	0.0000
SMB	−0.1589***	0.0002	SMB	−0.1538*	0.0634
HML	−0.1104***	0.0014	HML	−0.2100***	0.0063
WML	−0.0351	0.3783	WML	0.0358	0.7236
Adj. R^2	0.8599		*Adj*. R^2	0.7647	
Panel B. Results from January 2009 to March 2013					

P1			P2		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	−0.1541	0.6279	Alpha	0.4552**	0.0421
EMR	1.0106***	0.0000	EMR	0.9076***	0.0000
SMB	0.2563*	0.0611	SMB	−0.2538***	0.0047
HML	0.3102**	0.0326	HML	0.0478	0.5831
WML	−0.3415***	0.0040	WML	0.0706	0.2047
Adj. R^2	0.8281		*Adj*. R^2	0.9170	
P3			P4		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.4822**	0.0287	Alpha	−0.0117	0.9723
EMR	0.8853***	0.0000	EMR	0.9169***	0.0000
SMB	−0.0848	0.4753	SMB	−0.0221	0.8638
HML	0.3895***	0.0018	HML	0.0137	0.9483
WML	0.0246	0.7421	WML	−0.0394	0.6139
Adj. R^2	0.8948		*Adj*. R^2	0.8136	
P5			P6		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.2882	0.1007	Alpha	0.3493	0.3395
EMR	0.8585***	0.0000	EMR	0.9209***	0.0000
SMB	0.0471	0.4268	SMB	0.1226	0.3300
HML	0.0874	0.2715	HML	0.1625	0.1554
WML	−0.1572***	0.0000	WML	0.0138	0.7579
Adj. R^2	0.9211		*Adj*. R^2	0.8784	
P7			P8		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.3047	0.1995	Alpha	0.0341	0.8996
EMR	0.8897***	0.0000	EMR	0.9928***	0.0000
SMB	0.1064	0.2396	SMB	−0.0577	0.5728
HML	−0.0022	0.9683	HML	0.0604	0.5990
WML	−0.1655***	0.0021	WML	−0.0851	0.2505
Adj. R^2	0.8788		*Adj*. R^2	0.8671	
P9			P10		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	−0.2085	0.3809	Alpha	0.0683	0.7671
EMR	1.0047***	0.0000	EMR	0.9504***	0.0000
SMB	0.2252**	0.0499	SMB	0.2557*	0.0624
HML	−0.1011	0.5425	HML	−0.1247	0.5599
WML	−0.1227	0.1882	WML	−0.1236*	0.0998
Adj. R^2	0.8457		*Adj*. R^2	0.8372	

Notes. In this table, 'P' means portfolio and P1 shows the highest dividend-yield stock portfolio and P10 means the lowest dividend-yield stock portfolio. Alpha and EMR in this table mean the intercept of the four factor asset pricing model and excess market return, respectively. Moreover, Panel A shows the estimation results for the sample period from July 1987 to December 2008 and Panel B exhibits the results of the sample period from January 2009 to March 2013. Furthermore, ***, **, * mean the statistical significance of the coefficients at the 1%, 5%, and 10% levels, respectively and *Adj*. R^2 denotes the adjusted *R*-squared value.

5. Empirical Results

Estimation results of our four factor asset pricing model are shown in Table 2 for the dividend-yield equity portfolios in Japan, and in Table 3 for the ROE equity portfolios in Japan, respectively. More specifically, in Table 2, P1 shows the highest dividend-yield equity portfolio and P10 means the lowest dividend-yield portfolio. Further, in Table 3, P1 shows the highest ROE equity portfolio and P10 means the lowest ROE portfolio. In addition, in both Tables 2 and 3, Alpha and EMR mean the intercept of the four factor asset pricing model and excess market return, respectively. Moreover, both in Tables 2 and 3, Panel As show the results for the period from July 1987 to December 2008 and Panels B exhibit the results of the period from January 2009 to March 2013.

Documenting by focusing on the important results, first, (1) for the period from July 1987 to December 2008, there exists no positive alpha for the dividend-yield ranked portfolios; however, for the period from January 2009 to March 2013, in the second highest and third highest dividend-yield portfolios (P2 and P3 in Panel B of Table 2), we observe statistically significant positive alphas. Second, (2) for the period from July 1987 to December 2008, there exists no positive alpha for the ROE ranked portfolios; however, for the period from January 2009 to March 2013, in the second highest and third highest ROE portfolios (P2 and P3 in Panel B of Table 3), we observe statistically significant positive alphas. In sum, we understand that after the Lehman shock period, dividend yield and ROE are the fundamentals for smart portfolios in Japan.

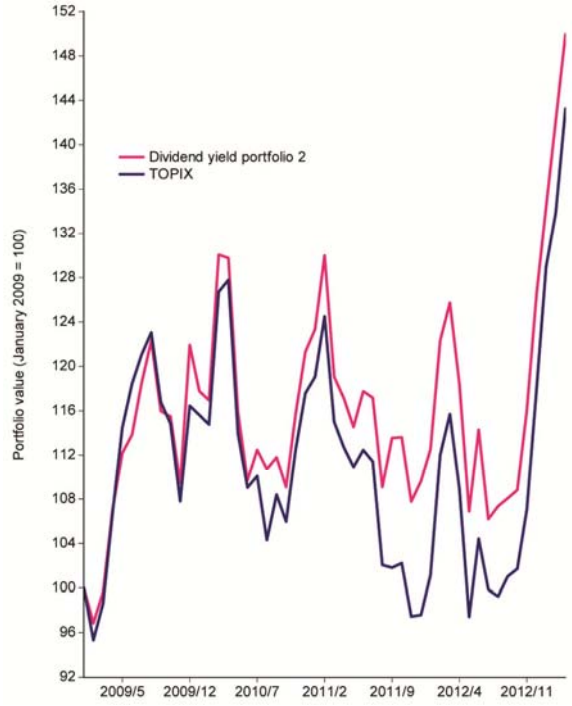
Based on the results, we show the value evolution of the dividend-yield and ROE based portfolios and TOPIX in Figure 1. This figure is exhibited as the values equal 100 in January 2009, and the evolution in this figure is from January 2009 to March 2013. Specifically, Panel A displays the second highest dividend-yield portfolio performance; Panel B exhibits the third highest dividend-yield portfolio performance; Panel C shows the second highest ROE portfolio performance; and Panel D displays the third highest ROE portfolio performance. This figure shows that the second and third highest dividend-yield portfolios and the second and third highest ROE portfolios outperform the TOPIX after the Lehman shock in September 2008.

Table 3. Estimation results of the four factor asset pricing model for the ROE stock portfolios in Japan

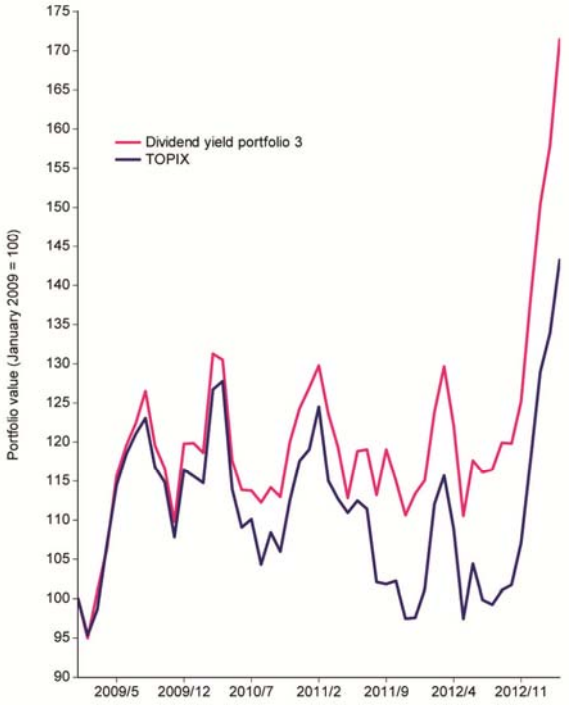
Panel A. Results from July 1987 to December 2008					
P1			P2		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.0608	0.7731	Alpha	0.0712	0.6105
EMR	1.0425***	0.0000	EMR	0.9113***	0.0000
SMB	−0.0561	0.2650	SMB	−0.0684*	0.0877
HML	−0.1247***	0.0076	HML	−0.0910***	0.0084
WML	−0.0433	0.5120	WML	−0.1819***	0.0000
Adj. R^2	0.8026		*Adj*. R^2	0.8368	
P3			P4		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.1727	0.2089	Alpha	0.0757	0.5415
EMR	0.8671***	0.0000	EMR	0.8329***	0.0000
SMB	−0.0787**	0.0489	SMB	−0.0454	0.1772
HML	−0.0871***	0.0045	HML	−0.0079	0.7790
WML	−0.0594	0.1481	WML	−0.1039**	0.0108
Adj. R^2	0.8476		*Adj*. R^2	0.8451	
P5			P6		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.2694	0.1284	Alpha	−0.0050	0.9741
EMR	0.8368***	0.0000	EMR	0.8279***	0.0000
SMB	0.0201	0.7167	SMB	0.0546	0.2341
HML	0.0267	0.5209	HML	0.0580	0.1124
WML	−0.1045	0.1658	WML	−0.1627***	0.0011
Adj. R^2	0.8155		*Adj*. R^2	0.8145	
P7			P8		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.2211	0.1056	Alpha	0.0487	0.7744
EMR	0.9380***	0.0000	EMR	0.9226***	0.0000
SMB	0.1712***	0.0004	SMB	0.0178	0.7535
HML	0.1003***	0.0043	HML	−0.0028	0.9480
WML	−0.1227**	0.0195	WML	−0.1903**	0.0110
Adj. R^2	0.8566		*Adj*. R^2	0.7890	
P9			P10		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	−0.3092*	0.0758	Alpha	−0.1586	0.4130
EMR	1.1218***	0.0000	EMR	1.1509***	0.0000
SMB	−0.1375**	0.0194	SMB	0.2381***	0.0001
HML	0.5014***	0.0000	HML	0.1776***	0.0002
WML	−0.1506**	0.0107	WML	−0.2505***	0.0001
Adj. R^2	0.8566		*Adj*. R^2	0.8566	
Panel B. Results from January 2009 to March 2013					

P1			P2		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.2813	0.3898	Alpha	0.5482**	0.0248
EMR	0.9346***	0.0000	EMR	0.8811***	0.0000
SMB	0.1285	0.2962	SMB	−0.0749	0.4102
HML	0.0800	0.5622	HML	−0.0220	0.8463
WML	−0.1560	0.1458	WML	−0.0395	0.7085
Adj. R^2	0.8494		*Adj*. R^2	0.8869	
P3			P4		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.6663***	0.0013	Alpha	0.0435	0.8562
EMR	0.8907***	0.0000	EMR	0.9047***	0.0000
SMB	−0.1041	0.1398	SMB	0.3134**	0.0146
HML	0.1739***	0.0042	HML	0.0637	0.5298
WML	−0.0670	0.2700	WML	−0.0133	0.7984
Adj. R^2	0.9144		*Adj*. R^2	0.8944	
P5			P6		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	0.1875	0.4682	Alpha	−0.1613	0.5266
EMR	0.8359***	0.0000	EMR	0.9597***	0.0000
SMB	0.0702	0.5648	SMB	0.1405	0.1819
HML	0.1131	0.4342	HML	0.2833***	0.0011
WML	−0.0604	0.1647	WML	−0.1714***	0.0002
Adj. R^2	0.8489		*Adj*. R^2	0.9102	
P7			P8		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	−0.0504	0.8503	Alpha	−0.2941	0.4123
EMR	0.9488***	0.0000	EMR	0.9839***	0.0000
SMB	0.0985	0.3603	SMB	0.0263	0.7627
HML	0.1798	0.1824	HML	−0.1443	0.4417
WML	0.0603	0.4998	WML	−0.0221	0.8222
Adj. R^2	0.8899		*Adj*. R^2	0.8277	
P9			P10		
	Coefficient	*p*-value		Coefficient	*p*-value
Alpha	−0.1039	0.7706	Alpha	−0.4913	0.3070
EMR	0.9855***	0.0000	EMR	1.1753***	0.0000
SMB	0.0813	0.4121	SMB	0.0456	0.8250
HML	0.0613	0.6999	HML	−0.1271	0.6208
WML	−0.0946	0.2711	WML	−0.2914**	0.0252
Adj. R^2	0.8212		*Adj*. R^2	0.8107	

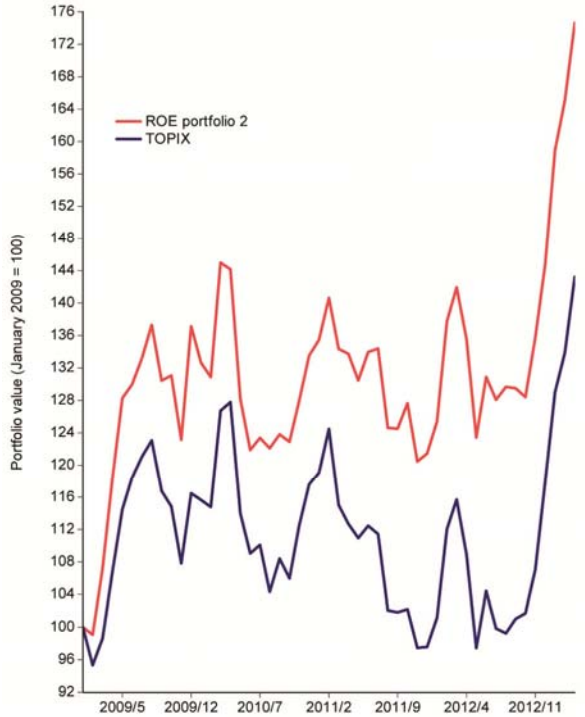
Notes. In this table, 'P' means portfolio and P1 indicates the highest return on equity (ROE) stock portfolio and P10 means the lowest ROE stock portfolio. Alpha and EMR in this table mean the intercept of the four factor asset pricing model and excess market return, respectively. Moreover, Panel A presents the estimation results for the sample period from July 1987 to December 2008 and Panel B exhibits the results of the sample period from January 2009 to March 2013. Furthermore, ***, **, * mean the statistical significance of the coefficients at the 1%, 5%, and 10% levels, respectively and *Adj*. R^2 denotes the adjusted *R*-squared value.



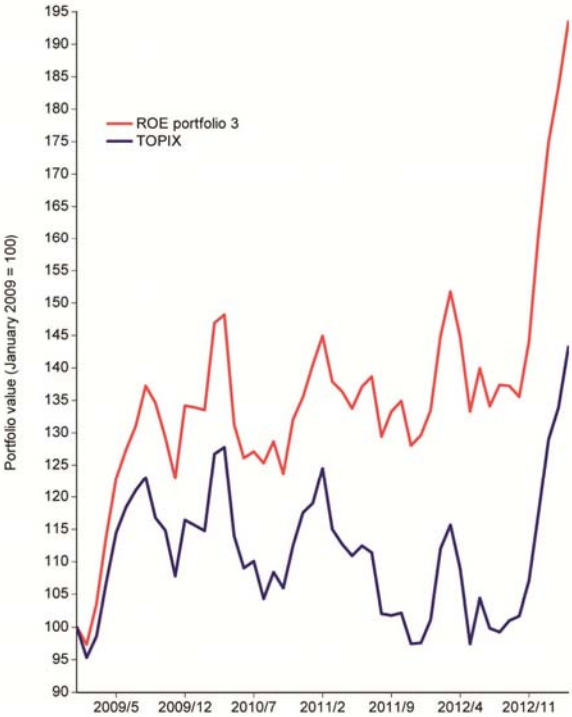
Panel A. Second highest dividend-yield portfolio



Panel B. Third highest dividend-yield portfolio



Panel C. Second highest ROE portfolio



Panel D. Third highest ROE portfolio

Figure 1. Performances of the Dividend-yield and ROE Based Portfolios and TOPIX: Evolution from January 2009 to March 2013.

6. Conclusions

This paper attempted to test whether dividend yield and ROE are important fundamentals for obtaining positive alpha. As a result, our investigations derived several interesting findings as follows. First, we found that (1) for the period from January 2009 to March 2013, our second highest and third highest dividend-yield portfolios delivered statistically significant positive alphas. Second, we also found that (2) for the period from January 2009 to March 2013, our second highest and third highest ROE portfolios produced statistically significant positive alphas. To sum up, our empirical examinations demonstrated that after the Lehman shock period, dividend yield and ROE were the fundamentals for building smart portfolios in Japan.

The findings from our study shall be important for considering the effectiveness for the so-called smart beta strategies. Experiencing crucial financial crises, better risk-return profile than those from traditional market capitalization-based indices is more strongly needed in equity investments. Continuing this line of empirical research is one of our future tasks.

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