International Review of Social Sciences and Humanities
Vol. 3, No. 2 (2012), pp. 186-196
www.irssh.com
ISSN 2248-9010 (Online), ISSN 2250-0715 (Print)

A Test of the Value Premia: The Industry Cases in Japan

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(Received: 28-3-12 / Accepted: 24-4-12)

Abstract

We investigated how the value premiaover the TOPIX existed in the Japanese value industry stock returns. First, we clarified that, for our full analyzing period of July 2001 to March 2012, the statistically significant value premia existed in the Russell-Nomura overall value index returns. Second, we also found that 24 industry returns out of 32 Russell-Nomura value industry returns had the value premia in our full sample period. Third, we empirically derived that through all our three sub-periods, the Overall value index, Foods, Pharmaceutical, Glass & Ceramics Products, Machinery, Transportation Equipments, and Wholesale Trade industries had the value premia. Further, we also demonstrated that even after the US Lehman Shock, in addition to the Russell-Nomura overall value index, 20 industries out of 32 Russell-Nomura value industry index returns showed the value premia in Japan.

Keywords: Value premia, Russell-Nomura value index, Industry stock returns.

1. Introduction

The value premia is a well-known return source as high-minus-low book-to-market factor returnpremia of Fama and French (1993) model suggest.For example, in academic researches, with respect to this value premia, DeBondt and Thaler (1985), Fama and French (1993, 1998), and Cohen et al. (2003) are the representative studies for example. Further, new researches such asPetkova and Zhang (2005),Chen et al. (2008), and Fong (2012) also follow the above studies. As far as we know, however, there are few studies which inspect this value premia in returns of industry stocks. Moreover, little research carefully divides the analyzing sample periods before and after the Lehman Shockalthough these types of research design are important.

Based on the above research motivations, this paper attempts to inspect which industries and which periods recorded the value premia in Japan, and these are this paper's research objectives. We conduct the research by using the Russell-Nomura value industry indices.

Documenting our contributions in this paper, first is our finding of the existence of the value premia in the Russell-Nomura overall value indexfor our full sample period of July 2001 to March 2012. Our second contribution is the finding that24 industries out of 32 Russell-Nomura industry returns had the value premia for our full sample period. Further, our third contribution is the finding that in our all three sub-periods, the Overall value index, Foods, Pharmaceutical, Glass & Ceramics Products, Machinery, Transportation Equipments, and Wholesale Trade had the continuous value premia. Fourth, we also found that, after the period of the US Lehman Shock, the Russell-Nomura overall value index and 20 industries out of 32 Russell-Nomura industry index returns still recorded the value premia.

The rest of the paper is organized as follows. First, Section 2 explainsthe data we analyze, Section 3 describes our research design, Section 4 documents our empirical results, and Section 5 concludes the paper.

2. Data

For our analysis, we exploit the monthly data of the Tokyo Stock Price Index (TOPIX), monthly data of the Russell-Nomura overall value index, and monthly data of their value industry indices. Our full analyzing period is from July 2001 to March 2012. The Russell-Nomura industries which we can obtain data for our full period are those of 32 industries. Namely the industries are 1) Fishery, Agriculture & Forestry, 2) Mining, 3) Construction, 4) Foods, 5) Textiles & Apparels, 6) Pulp & Paper, 7) Chemicals, 8) Pharmaceutical, 9) Oil & Coal Products, 10) Rubber Products, 11) Glass & Ceramics Products, 12) Iron & Steel, 13) Nonferrous Metals, 14) Metal Products, 15) Machinery, 16) Electric Appliances, 17) Transportation Equipments, 18) Precision Instruments, 19) Other Products, 20) Electric Power & Gas, 21) Land Transportation, 22) Marin Transportation, 23) Warehousing & Harbor Transportation Services, 24) Information & Communication, 25) Wholesale Trade, 26) Retail Trade, 27) Banks, 28) Securities & Commodity Futures, 29) Insurance, 30) Other Financing Business, 31) Real Estate, and 32) Services. Figure 1 shows the time-series trends of the TOPIX with the Russell-Nomura value overall index. In addition, Figure 2 indicates the trends of the Russell-Nomura industry value indices with the TOPIX and their overall value index. In these figures, we set their starting values as 100.

3. Research Design

This section explains our research design. Using the data explained above, we first divide our full sample period into three sub-periods. Namely, we test the value premia in four periods that include the full sample period and three-sub-periods. The first sub-period is from July 2001 to January 2005, the second sub-period is from February 2005 to August 2008, and the third sub-period is from September 2008 to March 2012. We note that the above third sub-period is that after the US Lehman Shock.

Next, based on the above settings, by the *t*-tests for excess returns, we inspect which industries had the statistically significant value premia in Japan. Further, we also check which period had the value perima by scrutinizing the periods before and after the Lehman Shock.

The benchmark in our *t*-tests for the value premiais the TOPIX return.That is, the excess returns we scrutinizeare industry returns minus TOPIX returns.

Figure 1. TOPIX and the Russell-Nomura Japan Equity Overall Value Index

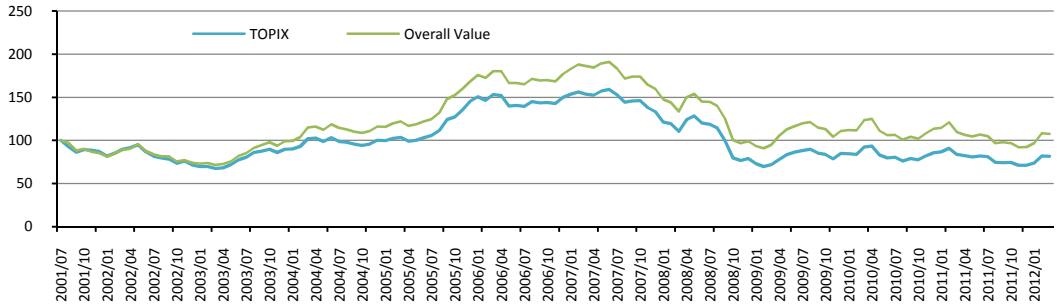
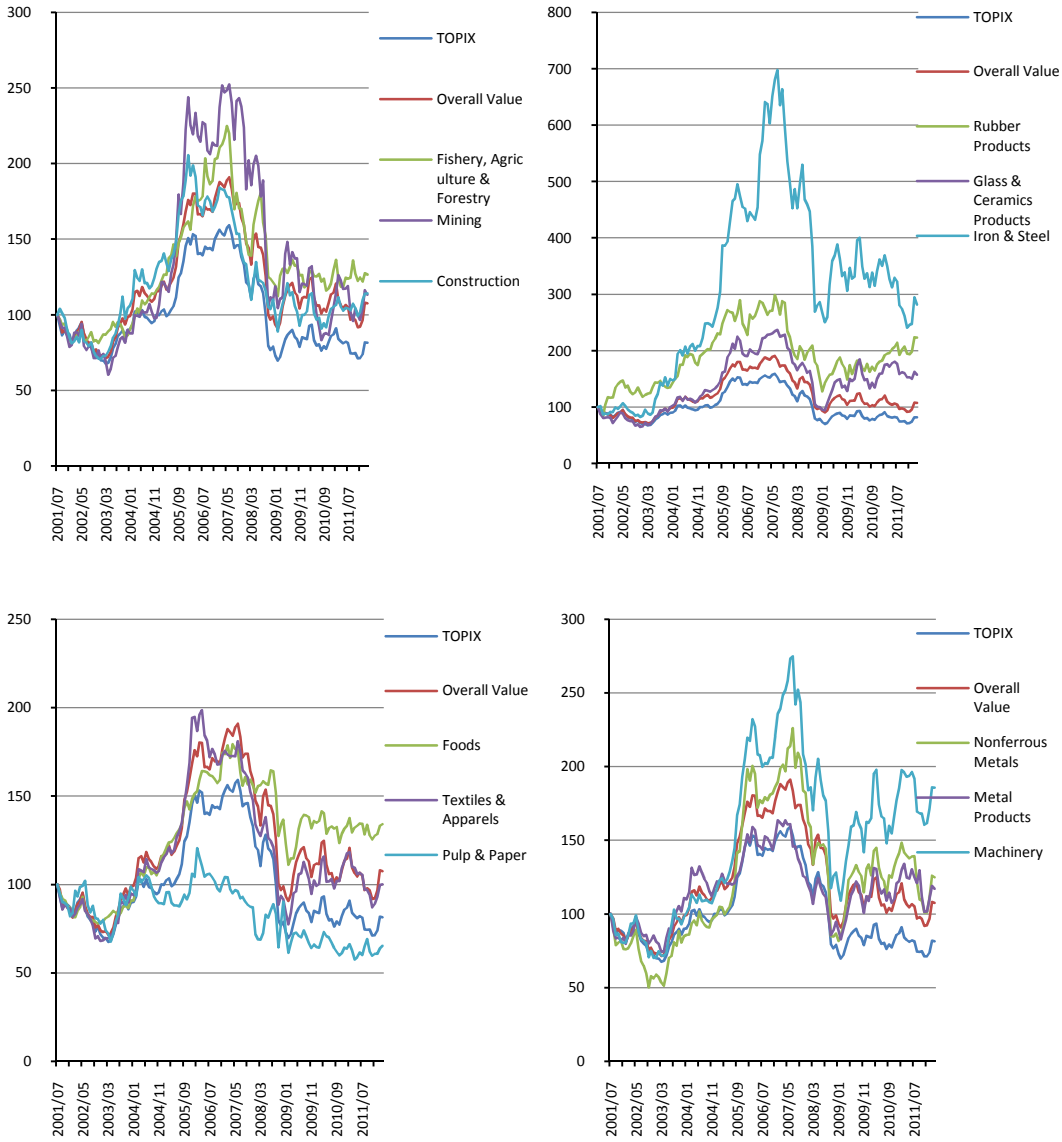
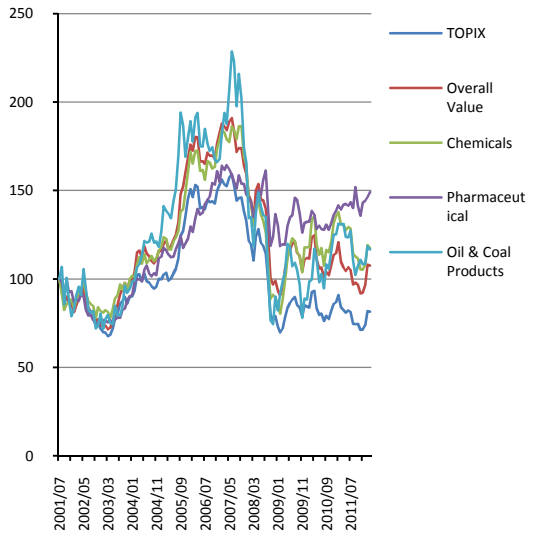


Figure 2. TOPIX, the Russell-Nomura Overall Value Index, and Russell-Nomura Value Industry Indices

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TOPIX
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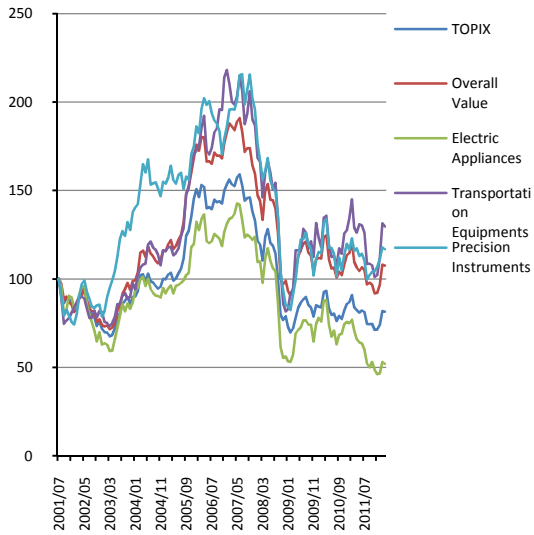
Pharmaceutical
Oil & Coal Products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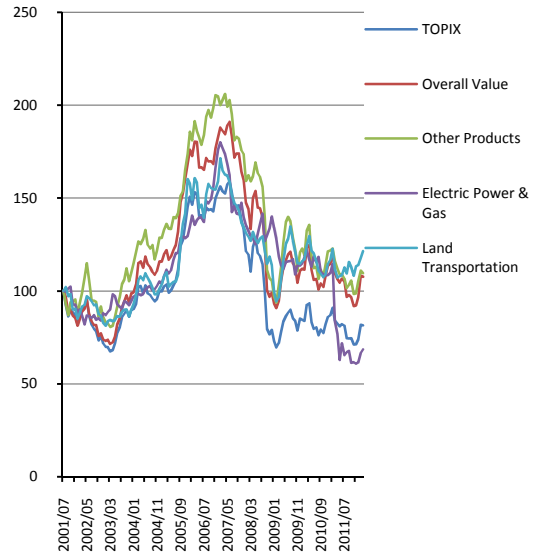
Transportation Equipments
Precision Instruments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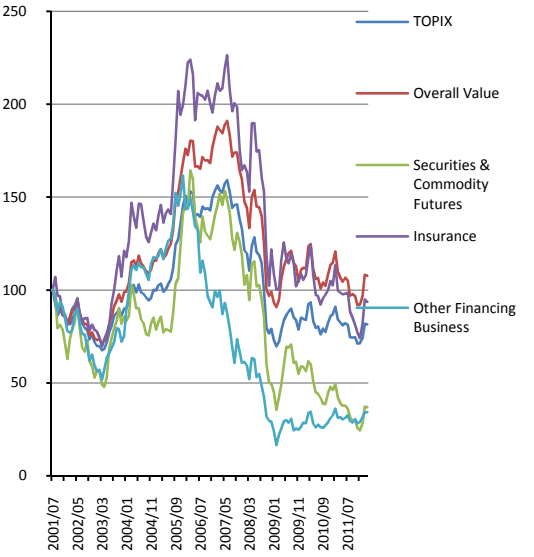
Overall Value
Other Products
Electric Power & Gas
Land Transportation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Overall Value
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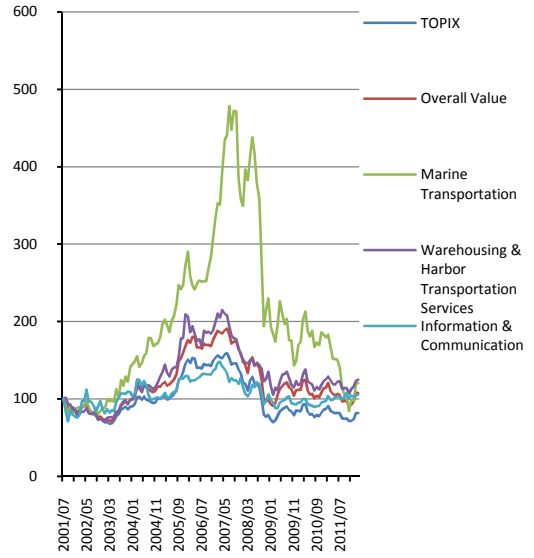
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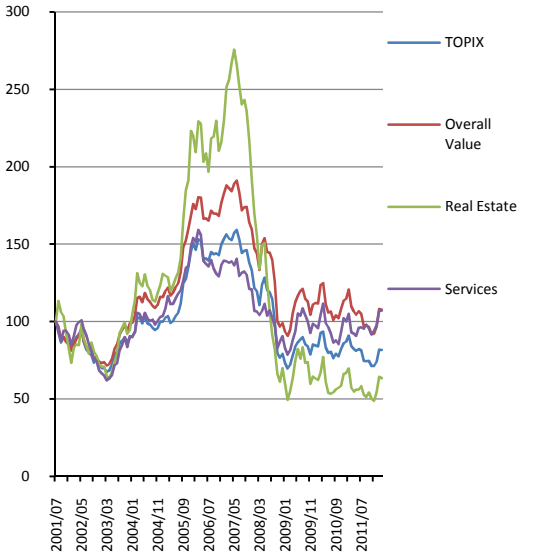
Marine Transportation
Warehousing & Harbor Transportation Services
Information & Communication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TOPIX
Overall Value
Real Estate
Services

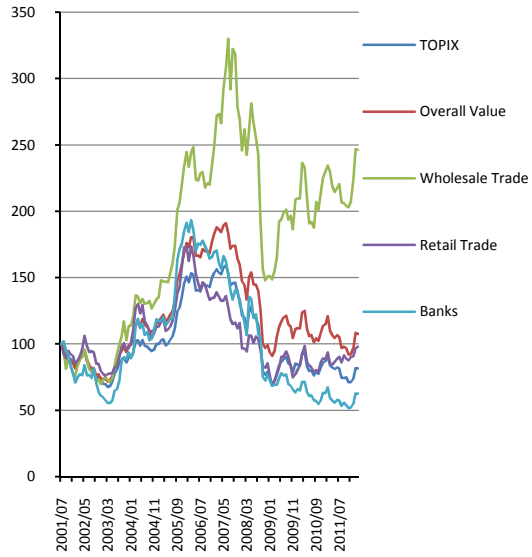

Table 1. The *t*-tests of the valuepremia of the overall and industry indices: From July 2001 to March 2012

Industries	*t*-value	*p*-value
1. Overall Index	9.0901***	0.0000
2.Fishery, Agriculture & Forestry	3.1090***	0.0012
3. Mining	3.0634***	0.0013
4. Construction	3.3464***	0.0005
5. Foods	3.9220***	0.0001
6. Textiles & Apparels	2.4261***	0.0083
7. Pulp & Paper	−0.0207	−
8. Chemicals	5.4159***	0.0000
9. Pharmaceutical	4.3659***	0.0000
10. Oil & Coal Products	3.3321***	0.0006
11. Rubber Products	5.8560***	0.0000
12. Glass & CeramicsProducts	7.0291***	0.0000
13. Iron & Steel	8.7261***	0.0000
14. Nonferrous Metals	4.5333***	0.0000
15. Metal Products	4.1655***	0.0000
16. Machinery	8.8333***	0.0000
17. Electric Appliances	−2.4920	−
18. Transportation Equipments	4.4071***	0.0000
19. Precision Instruments	3.8156***	0.0001
20. Other Products	3.8293***	0.0001
21. Electric Power & Gas	−0.5351	−
22. Land Transportation	3.3208***	0.0006
23. Marin Transportation	3.3373***	0.0006
24. Warehousing & Harbor Transportation Services	4.1754***	0.0000

25. Information & Communication	0.7982	0.2131
26. Wholesale Trade	10.1751***	0.0000
27. Retail Trade	2.8023***	0.0029
28. Banks	−0.6400	−
29. Securities & Commodity Futures	−1.5310	−
30. Insurance	2.5861***	0.0054
31. Other Financing Business	−1.9451	−
32. Real Estate	0.7983	0.2131
33. Services	3.2463***	0.0007

Notes: The *t*-tests of the value premia are conducted by using the Russell-Nomura value indices. The null hypothesis is that there exists no value premia while the alternative hypothesis is that there exist positive value premia. ***, **, and * denote the statistical significance at the 1% level, 5% level, and 10% level, respectively.

Table 2. The *t*-tests of the valuepremia of the overall and industry indices: From July 2001 to January 2005

Industries	*t*-value	*p*-value
1. Overall Index	7.3834***	0.0000
2. Fishery, Agriculture & Forestry	2.5489***	0.0073
3. Mining	1.2227	0.1141
4. Construction	4.7248***	0.0000
5. Foods	3.2674***	0.0011
6. Textiles & Apparels	3.2151***	0.0013
7. Pulp & Paper	0.2100	0.4173
8. Chemicals	4.4076***	0.0000
9. Pharmaceutical	2.0918**	0.0213
10. Oil & Coal Products	2.7632***	0.0042
11. Rubber Products	5.9066***	0.0000
12. Glass & CeramicsProducts	4.2024***	0.0001
13. Iron & Steel	7.8126***	0.0000
14. Nonferrous Metals	0.6526	0.2588
15. Metal Products	4.6081***	0.0000
16. Machinery	2.7792***	0.0041
17. Electric Appliances	−1.0797	−
18. Transportation Equipments	2.5269***	0.0077
19. Precision Instruments	7.0036***	0.0000
20. Other Products	6.2522***	0.0000
21. Electric Power & Gas	0.8094	0.2114
22. Land Transportation	1.2592	0.1075

23. Marin Transportation	5.1077***	0.0000
24. Warehousing & Harbor Transportation Services	5.1039***	0.0000
25. Information & Communication	−0.5812	−
26. Wholesale Trade	4.7802***	0.0000
27. Retail Trade	3.6469***	0.0004
28. Banks	2.1374**	0.0192
29. Securities & Commodity Futures	−0.8860	−
30. Insurance	4.7428***	0.0000
31. Other Financing Business	2.3927**	0.0106
32. Real Estate	3.5259***	0.0005
33. Services	2.0354**	0.0241

Notes: The *t*-tests of the value premia are conducted by using the Russell-Nomura value indices. The null hypothesis is that there exists no value premia while the alternative hypothesis is that there exist positive value premia. ***, **, and * denote the statistical significance at the 1% level, 5% level, and 10% level, respectively.

Table 3. The *t*-tests of the valuepremia of the overall and industry indices: From February 2005 to August 2008

Industries	*t*-value	*p*-value
1. Overall Index	3.8806***	0.0002
2. Fishery, Agriculture & Forestry	2.1795**	0.0175
3. Mining	4.5526***	0.0000
4. Construction	−3.5768	−
5. Foods	2.1423**	0.0190
6. Textiles & Apparels	−1.6272	−
7. Pulp & Paper	−1.1176	−
8. Chemicals	−1.6674	−
9. Pharmaceutical	2.5881***	0.0066
10. Oil & Coal Products	0.1429	0.4435
11. Rubber Products	−0.3894	−
12. Glass & CeramicsProducts	2.8962***	0.0030
13. Iron & Steel	6.4719***	0.0000
14. Nonferrous Metals	4.2271***	0.0001
15. Metal Products	−3.9916	−
16. Machinery	5.6137***	0.0000
17. Electric Appliances	0.2057	0.4190
18. Transportation Equipments	3.1144***	0.0017
19. Precision Instruments	−2.3115	−

20. Other Products	0.6929	0.2461
21. Electric Power & Gas	1.5845*	0.0603
22. Land Transportation	1.3371*	0.0942
23. Marin Transportation	5.5891***	0.0000
24. Warehousing & Harbor Transportation Services	0.0181	0.4928
25. Information & Communication	0.4555	0.3255
26. Wholesale Trade	6.5898***	0.0000
27. Retail Trade	−3.5101	−
28. Banks	−1.9316	−
29. Securities & Commodity Futures	1.7021**	0.0481
30. Insurance	1.2075	0.1170
31. Other Financing Business	−6.7020	−
32. Real Estate	−3.9159	−
33. Services	−2.3615	−

Notes: The *t*-tests of the value premia are conducted by using the Russell-Nomura value indices. The null hypothesis is that there exists no value premia while the alternative hypothesis is that there exist positive value premia. ***, **, and * denote the statistical significance at the 1% level, 5% level, and 10% level, respectively.

Table 4. The *t*-tests of the valuepremia of the overall and industry indices: From September 2008 to March 2012

Industries	*t*-value	*p*-value
1. Overall Index	4.0099***	0.0001
2. Fishery, Agriculture & Forestry	0.8286	0.2060
3. Mining	−0.2338	−
4. Construction	3.3378***	0.0009
5. Foods	1.4527*	0.0769
6. Textiles & Apparels	2.7346***	0.0046
7. Pulp & Paper	0.6764	0.2513
8. Chemicals	5.7353***	0.0000
9. Pharmaceutical	2.8068***	0.0038
10. Oil & Coal Products	2.4476***	0.0093
11. Rubber Products	4.1345***	0.0001
12. Glass & CeramicsProducts	4.8823***	0.0000
13. Iron & Steel	−0.0025	−
14. Nonferrous Metals	3.6595***	0.0003
15. Metal Products	4.8636***	0.0000
16. Machinery	6.8831***	0.0000

17. Electric Appliances	−2.8858	−
18. Transportation Equipments	2.4246***	0.0099
19. Precision Instruments	1.8225**	0.0377
20. Other Products	−0.0090	−
21. Electric Power & Gas	−2.2990	−
22. Land Transportation	2.8980***	0.0030
23. Marin Transportation	−3.8440	−
24. Warehousing & Harbor Transportation Services	2.5610***	0.0071
25. Information & Communication	2.1386**	0.0192
26. Wholesale Trade	6.2344***	0.0000
27. Retail Trade	4.3358***	0.0000
28. Banks	−2.3105	−
29. Securities & Commodity Futures	−2.5054	−
30. Insurance	−1.2962	−
31. Other Financing Business	1.4882*	0.0721
32. Real Estate	1.1354	0.1313
33. Services	5.9322***	0.0000

Notes: The *t*-tests of the value premia are conducted by using the Russell-Nomura value indices. The null hypothesis is that there exists no value premia while the alternative hypothesis is that there exist positive value premia. ***, **, and * denote the statistical significance at the 1% level, 5% level, and 10% level, respectively.

4. Empirical Tests

This section describes our empirical results. First, Table 1 shows the results of the *t*-tests of the value premia for our full analyzing period. Namely, the results are for July 2001 to March 2012 (Full sample period). Table 2shows the *t*-tests results of the value premia for July 2001 to January 2005 (First sub-sample period). Third, Table 3 exhibits the results of the same *t*-tests for February 2005 to August 2008 (Second sub-sample period). Finally, Table 4 shows the results of the same *t*-tests for September 2008 to March 2012 (Third sub-sample period).
In all our *t*-tests, the null hypothesis is zero value premia when we take the average values in the test periods, while the alternative hypothesis is that there are positive value premia when we take the average values in the test periods. With respect to the results, first, Table 1 shows that the following Russell-Nomura industries had the value premia over the returns of TOPIX for our full analyzing period. That is, 1) Overall index, 2) Fishery, Agriculture & Forestry, 3) Mining, 4) Construction, 5) Foods, 6) Textiles & Apparels, 7) Chemicals, 8) Pharmaceutical, 9) Oil & Coal Products, 10) Rubber Products, 11) Glass & Ceramics Products, 12) Iron & Steel, 13) Nonferrous Metals, 14) Metal Products, 15) Machinery, 16) Transportation Equipments, 17) Precision Instruments, 18) Other Products, 19) Land Transportation,20) Marin Transportation,21) Warehousing & Harbor Transportation Services, 22) Wholesale Trade, 23) Retail Trade, 24) Insurance, and 25) Services. We therefore recognize that in about 80% of the Russell-Nomura industries, there exist value premiafor our full analyzing period.

Next, inspecting Tables 2 to 4, these tables demonstrate that, in all our three sub-periods, the value premia are recognized in the following indices. That is, the Overall value return and the industry returns of 1) Foods, 2) Pharmaceutical, 3) Glass & Ceramics Products, 4) Machinery, 5) Transportation Equipments, and 6) Wholesale Trade had the value premia. Moreover, inspecting our third sub-period that is after the Lehman Shock in Table 4, there were the statistically significant value premia in the following 20 industries in addition to the Overall index, namely, 1) Construction, 2) Foods, 3) Textiles & Apparels, 4) Chemicals, 5) Pharmaceutical, 6) Oil & Coal Products, 7) Rubber Products, 8) Glass & Ceramics Products, 9) Nonferrous Metals, 10) Metal Products, 11) Machinery, 12) Transportation Equipments, 13) Precision Instruments, 14) Land Transportation, 15) Warehousing & Harbor Transportation Services, 16) Information & Communication, 17) Wholesale Trade, 18) Retail Trade, 19) Other Financing Business, and 20) Services. That is, about 70% of the industries in Japan had the value premia even after the period of the Lehman Shock.

5. Conclusions

This paper inspected whether the value premia existed in the Japanese industry returns by empiricaltests. Our empirical examinationsimplemented in this paper derived the following novel contributions.

1. First, we revealed that the statistically significant value premia existed in the Russell-Nomura overall value index returns for our full sample period of July 2001 to March 2012.
2. Second, also for our full samples, we foundthe existence of the value premia in 24 industries out of 32 Russell-Nomura value industry returns.
3. Third, we also clarified that in all our three sub-periods, the Overall value index, Foods, Pharmaceutical, Glass & Ceramics Products, Machinery, Transportation Equipments, and Wholesale Tradeindustries had the statistically significant continuous value premia. It is quite interesting that the continuous value premia are recognized in the overall index through all our sub-periods.
4. Furthermore, we also revealed that even after the US Lehman Shock, not only in theRussell-Nomura overall value index returns, 20 Japanese industries out of 32 Russell-Nomura value industry index returns also had the value premia.

As above, our findings in this paper will contribute to the body of academic researches of the field of investments in finance. Future related works using our findings and related data may be also valuable, and these works are our future tasks.

Acknowledgement

This work was supported in part by the Japan Society for the Promotion of Science.The author greatly thanks the Chief Editor for the repeated kind paper invitations to write to this Journal.

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