

SOME EMPIRICAL TESTS FOR THE JANUARY EFFECT

by

Yue Hu

B.A., Tsinghua University, 2005

PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS

In the Department
of
Economics

© Yue Hu 2006

SIMON FRASER UNIVERSITY

Fall 2006

All rights reserved. This work may not be
reproduced in whole or in part, by photocopy
or other means, without permission of the author.

APPROVAL

Name: **Yue Hu**
Degree: **M. A. (Economics)**
Title of Project: **Some Empirical Tests For The January Effect**

Examining Committee:

Chair: Robbie Jones

Robert Grauer
Senior Supervisor

Ken Kasa
Supervisor

Terry Heaps
Internal Examiner

Date Approved: Friday, November 17, 2006



DECLARATION OF PARTIAL COPYRIGHT LICENCE

The author, whose copyright is declared on the title page of this work, has granted to Simon Fraser University the right to lend this thesis, project or extended essay to users of the Simon Fraser University Library, and to make partial or single copies only for such users or in response to a request from the library of any other university, or other educational institution, on its own behalf or for one of its users.

The author has further granted permission to Simon Fraser University to keep or make a digital copy for use in its circulating collection (currently available to the public at the "Institutional Repository" link of the SFU Library website <www.lib.sfu.ca> at: <<http://ir.lib.sfu.ca/handle/1892/112>>) and, without changing the content, to translate the thesis/project or extended essays, if technically possible, to any medium or format for the purpose of preservation of the digital work.

The author has further agreed that permission for multiple copying of this work for scholarly purposes may be granted by either the author or the Dean of Graduate Studies.

It is understood that copying or publication of this work for financial gain shall not be allowed without the author's written permission.

Permission for public performance, or limited permission for private scholarly use, of any multimedia materials forming part of this work, may have been granted by the author. This information may be found on the separately catalogued multimedia material and in the signed Partial Copyright Licence.

The original Partial Copyright Licence attesting to these terms, and signed by this author, may be found in the original bound copy of this work, retained in the Simon Fraser University Archive.

Simon Fraser University Library
Burnaby, BC, Canada

ABSTRACT

This study tests for the existence of the January effect in dividend yield, size and book-to-market ratio sorted portfolios. The paper employs dummy variable regressions to test for the effect in value-weighted and equal-weighted portfolios in 1931-2005, 1931-1978 and 1979-2005 time periods.

The results show that the January effect exists in value-weighted and equal-weighted portfolios in all three time periods. The January effect is increasing in dividend yield and book-to-market ratio, and is decreasing in portfolio size. The January effect is more significant for equal-weighted portfolios and 1932-1978 time period.

Keywords: the January effect, dividend yield, size, book-to-market ratio

DEDICATION

感谢我的爸爸妈妈，感谢多年来你们谆谆的教导、及时的鼓励、默默的支持以及宽厚的包容。没有你们不求回报的付出，没有那个永远向我敞开的温暖的家，我也就没有机会和勇气在遥远的地球背面，用另一种语言向你们送上这份礼物。我一定会继续努力，来报答你们永无止境的爱。

*To my beloved parents,
for their encouragement and love.*

*To my lovely BaoBao,
for his understanding and support.*

ACKNOWLEDGEMENTS

The most sincere appreciation is addressed to Professor Robert Grauer for making the data available, also for his patience, encouragement, thoughtful guidance and invaluable assistance throughout the project.

Appreciation is also extended to Professor Terry Heaps, for his careful reviews and useful comments.

I also thank Professor Ken Kasa and Professor Robert Jones, for their comments and encouragements.

TABLE OF CONTENTS

Approval.....	ii
Abstract.....	iii
Dedication.....	iv
Acknowledgements.....	v
Table of Contents.....	vi
List of Figures.....	viii
List of Tables.....	x
1. Introduction.....	1
2. Literature Review.....	4
2.1 Tax-Loss Selling.....	4
2.2 Window Dressing.....	19
2.3 Performance Hedging.....	22
2.4 Declining January effect.....	24
2.5 Conclusion.....	26
<i>The existence of the January effect</i>	26
<i>Small firm January effect</i>	27
<i>Tax-loss selling hypothesis</i>	27
<i>Window dressing hypothesis</i>	29
<i>Performance hedging hypothesis</i>	29
<i>Declining January effect</i>	30
3. Empirical Study.....	31

3.1	Data Description.....	31
3.2	Methodology	32
4.	Results.....	34
4.1	Documentation of the January Effect.....	34
4.2	The January Effect in Dividend Yield Sorted Portfolios	38
4.3	The January Effect in Size Sorted Portfolios.....	44
4.4	The January Effect in Book-to-Market Ratio Sorted Portfolios.....	50
4.5	The January Effect in Size and Book-to-Market Ratio Sorted Portfolios	56
5.	Conclusion	62
	Reference List.....	64

LIST OF FIGURES

Figure 1: Average Returns for Each Month by Dividend Yield Quintiles 1931-2005 (Value-Weighted).....	35
Figure 2: Average Returns for Each Month by Dividend Yield Quintiles 1931-2005 (Equal-Weighted).....	35
Figure 3: Average Returns for Each Month by Size Quintiles 1931-2005 (Value-Weighted) ..	36
Figure 4: Average Returns for Each Month by Size Quintiles 1931-2005 (Equal-Weighted)..	36
Figure 5: Average Returns for Each Month by BE/ME Quintiles 1931-2005 (Value-Weighted)	37
Figure 6: Average Returns for Each Month by BE/ME Quintiles 1931-2005 (Equal-Weighted)	37
Figure 7: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1931-2005 (Value-Weighted).....	42
Figure 8: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1931-2005 (Equal-Weighted).....	42
Figure 9: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1931-1978 (Value-Weighted).....	43
Figure 10: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1931-1978 (Equal-Weighted).....	43
Figure 11: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1979-2005 (Value-Weighted).....	43
Figure 12: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1979-2005 (Equal-Weighted).....	43
Figure 13: Average Returns for January and the Rest of the Year by Size Quintiles 1931-2005 (Value-Weighted).....	48
Figure 14: Average Returns for January and the Rest of the Year by Size Quintiles 1931-2005 (Equal-Weighted).....	48

Figure 15: Average Returns for January and the Rest of the Year by Size Quintiles 1931-1978 (Value-Weighted)	49
Figure 16: Average Returns for January and the Rest of the Year by Size Quintiles 1931-1978 (Equal-Weighted)	49
Figure 17: Average Returns for January and the Rest of the Year by Size Quintiles 1979-2005 (Value-Weighted)	49
Figure 18: Average Returns for January and the Rest of the Year by Size Quintiles 1979-2005 (Equal-Weighted)	49
Figure 19: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1931-2005 (Value-Weighted)	54
Figure 20: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1931-2005 (Equal-Weighted)	54
Figure 21: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1931-1978 (Value-Weighted)	55
Figure 22: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1931-1978 (Equal-Weighted)	55
Figure 23: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1979-2005 (Value-Weighted)	55
Figure 24: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1979-2005 (Equal-Weighted)	55

LIST OF TABLES

Table 1: Test for the January Effect by Dividend Yield Quintiles	41
Table 2: Test for the January Effect by Size Quintiles	47
Table 3: Test for the January Effect by BE/ME Quintiles	53
Table 4: Test for the January Effect by 25 Portfolios Formed on Size and BE/ME 1931-2005	59
Table 5: Test for the January Effect by 25 Portfolios Formed on Size and BE/ME 1931-1978	60
Table 6: Test for the January Effect by 25 Portfolios Formed on Size and BE/ME 1979-2005	61

1. Introduction

An increasing collection of papers has found that the average rate of return to stocks in the month of January is higher than in any other month of the year. This seasonal anomaly is known in the literature as the January effect. The January effect is first studied by Wachtel (1942). By using Dow Jones Industrial Average, Wachtel (1942) finds seasonality in stock prices for the time period 1927-1942. Rozeff and Kinney (1976) reintroduce the January effect to modern finance by investigating monthly returns on the New York Stock Exchange in different time periods. Tests in each period reject the null hypothesis of equal monthly returns, and high January returns are the primary factors creating a significant difference. Keim (1983) uses monthly dummies to test for the January Effect and also proves the relationship between The January effect and size effect by computing regression for size portfolios. Many subsequent studies also substantiate this effect. A typical definition of the January effect is the tendency of the stock market to rise between the last day of December and the end of the first week in January. In the literature of the January effect, most of the studies support the existence of this effect, and especially the January effect is more significant for small firms. There are various explanations for the January effect, while tax-loss selling, window dressing and performance hedging are the most popular ones.

The first explanation of the January effect is provided by tax-loss selling hypothesis. This hypothesis is first studied by Wachtel (1942), Branch (1977) and Dyl (1977). Under this hypothesis, investors are more likely to sell bad performed

common stocks in order to realize capital losses to reduce tax liability. Thus the prices of “losers” decrease in the end of the year. Consequently, in the beginning of the next year, since there is no tax reducing incentive for investors, there will be less pressure on the bad performed stocks, their prices will increase.

Window dressing hypothesis is first developed by Haugen and Lakonishok (1987) and Lakonishok et al. (1991). The intuition behind this hypothesis is that institutional managers are evaluated based on their performance and their investment philosophy. The institutions buy both risky and small stocks but sell them before the end of the year so that they do not show up in their year-end holdings. In January, they buy back risky and small stocks to replace the low-risk and large ones.

The third explanation for the January effect is performance hedging hypothesis. According to the performance hedging hypothesis, portfolio managers are often evaluated based on their returns over and above a specified benchmark. In the case that their returns exceed the returns of the benchmark at some time in the year, this hypothesis suggests that they'll rearrange their portfolio to get close to the benchmark for the rest of the year. The portfolio managers will sell the riskier securities in their portfolio, which are more likely to be small stocks. Once the calendar year ends and their bonus is collected, they reinvest in the riskier small stocks that they believe will outperform their benchmark.

In this project, first I show the existence of the January effect by plotting monthly returns for each month in the figures. Then by using dividend yield

quintiles, size quintiles, book-to-market ratio quintiles and 25 portfolios formed on size and book-to-market ratio in dummy variable regressions, I analyze the dividend yield related, size related and book-to-market ratio related January effect. The difference between January return and average return for the rest of the year is also plotted.

The paper contains five sections. Section II reviews the literature on the January effect and small firm January effect sorted by different kinds of explanations for the seasonal anomaly. Section III provides the data and methodology employed in the study. Section IV provides the empirical test results and a brief discussion. Section V provides conclusion and implication for further research.

2. Literature Review

2.1 Tax-Loss Selling

Roll's paper (1983) is the most famous paper in the literature about the January effect, which provides evidence supporting the existence of small firm January effect and the tax-loss selling hypothesis. In the first place, Roll (1983) analyzes the mean difference in returns between an equal-weighted index (AMEX) which represents small stocks and a value-weighted index (NYSE) which stands for large stocks for first trading day and last 20 trading days of every calendar month between July 1962 and December 1980. The result shows that only for early January that small firms have higher returns than other stocks. The five largest daily mean return differences occur in the last trading day of December and the first four trading days of January. This implies that the January effect exists especially for small firms.

In the second place, Roll (1983) tests the hypothesis of tax-loss selling by computing a cross-sectional regression between the returns during the year excluding the first five and last five trading days and the returns during the last five days of December through the first four days of January. The result is that the coefficients are all negative for AMEX and NYSE stocks, and most of them are significant. Furthermore, the stocks with negative returns in the previous year have higher returns around the first day of January. All of these results are consistent with the tax-loss selling hypothesis, since the worse the stocks performed in the previous year the larger tax losses they will have.

Thirdly, Roll (1983) tries to answer why small firms have larger year-end rallies and higher average returns. From analyzing the data, Roll (1983) finds out that small firms are more volatile than larger ones, they are more probable to have negative returns, thus are more likely to have losses during the previous year. This implies that tax-loss selling effect will be more significant for small firms. Also, Roll (1983) does pooled cross-sectional regressions with the stock turn-of-the-year returns as dependent variable, and preceding year's returns and AMEX dummy as independent variables. The preceding year's return coefficients are all negative and significant, which is consistent with the tax-loss selling hypothesis. The AMEX dummy coefficients are all positive and significant which suggests that small firms have a more significant January effect. More important is that the high turn-of-the-year returns for small stocks are not offset by lower returns during the rest of the year. Roll (1983) explains this as some unmeasured risk.

The fourth part of the paper focuses on whether transaction costs can be an explanation for the persistent turn-of-the-year premium. The intuition in this part is that the January effect is more significant for small firms, and small firms always have lower prices which imply higher transaction costs. Here transaction cost is the bid-ask spread. If the transaction cost is high enough, then the turn-of-the-year premium cannot be eliminated for small firms. Although we know the long-term premium for small stocks is caused by risk, the transaction cost can still explain why the small firm premium occurs in the turn of the year. In order to test the hypothesis, Roll (1983) forms a group of stocks which are the first ten

stocks that achieved their annual low on the sixth from the last trading day, purchased on the second from last trading day and sold at the close of the fourth trading day of January. Before adding the transaction cost, selected groups for both NYSE and AMEX have larger excess mean returns than the whole sample. Then, Roll (1983) adds the bid-ask spread plus twice the commission rate as the transaction cost for stocks. The excess mean return decreases from 6.89% to 3.94% for the group in NYSE, decreases from 14.2% to 10.3 for the group in AMEX. Furthermore, when the difference between a day's high and low transaction prices is added, the excess mean return for the group decreases to 1.27% and 7.25% for NYSE and AMEX respectively. Thus, the transaction cost prevents arbitrage opportunities for small stocks, and the turn-of-the-year premium can not be eliminated for small stocks.

Finally, due to the analysis of the paper, a new problem rises. If the tax-loss selling causes the January effect and this effect is permanent due to transaction cost, then the non-systematic risk will be so large that the previous systematic risk models can not price the long-term assets return correctly. However, as Roll (1983) discusses in the paper, if an investor measures his results over exactly a one-year period, then the annual seasonal is not important. Using annual data can avoid the bias in systematic risk models, although this kind of estimation is poor to assess the effect of adding a particular asset to a portfolio. In conclusion, Roll's (1983) main argument is that tax-loss selling is the explanation of the January effect, and small-sized firms are affected more by the tax-loss selling hypothesis than large firms are.

For the persistence of the January effect due to the transaction cost, Constantinides (1984) provides an explanation which can further explain Roll's (1983) results. His intuition is that there is no denying that if the transaction cost is zero, investors will sell the losers immediately. But when transaction cost exists, investors will wait until the marginal benefit of selling the losers exceeds the marginal cost which is the transactional cost. Thus in December when the tax-related benefits outweigh the transactional cost, investors will sell the bad performed stocks, and in January these losers earn higher returns, resulting in the January effect.

Schultz (1985) supports the tax-loss selling hypothesis by investigating returns for both pre-tax and post-tax periods. In the first place, Schultz (1985) forms portfolios of small firms for January and the rest the year each year in 1900-1929 and 1963-1980 time periods. The criteria for small firms is that the stocks' bid price be no greater than \$5 on the day prior to the beginning of the given period.

Then, Schultz (1985) investigates the nine-day return on the small firm portfolio minus the nine-day return on the Dow Jones Industrials computed from the second to the last trading day in December through the eighth trading day in January for each January from 1900 through 1917. About half of the differences are positive and half are negative, thus no January effect is found in the years prior to 1918. However, when the same comparisons are done for 1918-1929 and 1963-1980 time periods, the differences are all positive, which implies the January effect exists after 1918.

In addition, Schultz (1985) regresses price change of the small firm portfolio on the January dummy and the percentage change in the Dow Jones Industrials for 1900-1917, 1918-1929 and 1963-1980 time periods. The January dummy coefficient is insignificant different from zero for the 1900-1917 time period, thus there is no evidence of a January effect prior to 1917. However, significant January effect can be found in 1918-1929 and 1963-1980 time periods. In conclusion, no January effect can be found before the 1917 Revenue Act, while a significant January effect exists in post-1918 time periods. Thus, the January effect can be explained by the tax-loss selling hypothesis. However, use the same method, but with a different sample firms, Pettengill (1986) and Jones (1987) reject the existence of the January effect by investigating pre-tax and post-tax returns for a whole index including all firms. Thus Schultz (1985)'s result by using only small firm portfolios in an index is a proof of the small firm January effect.

Seyhun (1988) also supports the tax-loss selling hypothesis. Seyhun (1988) divides the explanations for the January effect into two groups: one is that the positive return at the beginning of year is the result of price pressure due to demand for the securities and tax-loss selling hypothesis is one of these kinds of explanations; the other one is that positive return at the beginning of a year represents compensation for the increased risk of trading against informed traders. This paper is all about the tests for these two groups of explanations. The sample is chosen from the CRSP between 1975 and 1981. In the first step, Seyhun (1988) computes a regression with returns for five firm size groups as

the dependent variable and January dummy as the independent variable. The result is that the return for small firms in January is 12.9% higher than in other months, the return is declining from small firms to large ones. Thus the January effect exists especially for small firms.

Secondly, Seyhun (1988) introduces two insider trading measures: one is called aggregate net number of transactions by executives (NE), it is the sum of insider transaction dummies which equals one for purchase and minus one for sale. Aggregate net number of transactions in size group k and month t ($ANE_{k,t}$) is the sum of NE in size group k and month t . The other one is called aggregate number of transaction ($AANE_{k,t}$), it is the sum of insider transaction dummies which equals one for each transaction in size group k and time t . Then, Seyhun (1988) computes a regression with ANE as dependent variable, December and January dummies as independent variables for size group 1 to 5. The result shows that the purchasing activity for executives in small firms is increasing in December, while in large firms the selling activity is increasing in December for executives. But the increasing of purchasing activity in January is not significant for small firms based on the regression.

Furthermore, Seyhun (1988) tests the risk-premium hypothesis with AANE as dependent variable, December and January dummies as independent variables. The result is that in December the insider trading in all firms is increasing, but there is no significant change in January. Seyhun (1988) thinks it is the tax-loss selling effect that leads to the higher trading in December. Thus in conclusion, all of the tests in this paper suggest that small firm insiders tend to

purchase more in December. This enables insiders in small firms to gain more of the positive return in January. However, corporate insiders do not increase their stock purchases in January. Thus the price run-up in small firms in January cannot be interpreted as compensation for greater expected losses against informed traders in January, and the final conclusion is that the January effect may be caused by increasing turn-of-the-year demand for securities such as the tax-loss selling.

To my point of view, this paper is a good one to reject the insider trading as an explanation for the January effect, but is not a good one for supporting any other explanations, since Seyhun (1988) does not test directly whether the hypothesis of increasing turn-of-the-year demand for securities is rejected. Even if the January effect is not caused by insider trading, it is not equivalent to say increasing demand is the cause of the turn-of-the-year premium since there may be other possible explanations. Thus I think Seyhun (1988) should also include some direct tests for the increasing turn-of-the-year demand for securities before his conclusion.

In all of the analyses for the tax-loss selling hypothesis above, the authors use firm size as a screen; they find the January effect is more significant for small firms, which implies that the anomaly can be explained by tax-loss selling hypothesis. This is because returns to small stocks are more volatile, the possibility of negative return is higher for small stocks, and thus rational investors are more likely to sell small stocks to realize capital losses to reduce tax liability in the year's end. Branch and Chang (1990) introduce a new screen into the tests

and support the tax-loss selling hypothesis. Since low stock prices are associated with smaller, younger and more troubled firms, Branch and Chang (1990) introduce the low per share price as a new appropriate screen which can include a larger sample of stocks than former screens. The sample is chosen from the Compustat price-dividend-earnings tapes from 1970 to 1983. In the first place, Branch and Chang (1990) compute a simple regression with January returns as the dependent variable, December winners' returns and December losers' returns as the independent variables. The result is that coefficients for the December losers' returns are all negative and significant, while coefficients for the December winners' returns are mixed and not significant. Thus the return reversal is more evident for December losers than December winners, which is consistent with the January effect.

Then, Branch and Chang (1990) add the logarithm of the December per share stock price plus one as an independent variable. The result of the regression shows a similar pattern. The December losers' coefficients are negative and significant, the December winners' coefficients are mixed and insignificant. The coefficients for per share price are all negative and significant, also the adjusted R square increases from 0.038 to 0.089, which indicates that the per share price helps explain the January effect, and the lower the per share price the higher the January returns.

Furthermore, Branch and Chang (1990) add some interaction terms between per share price and losers' December returns and winners' December returns. The intuition here is that, the interaction terms tell us whether the

January returns of the December losers tend to rise more if the stocks have lower per share prices. The results do not change for the coefficients for single variables. For the interaction terms, only the December losers interacted with per share price variables have positive and significant coefficients. This implies that the higher the per share price, the lower the January return for December losers, since the December losers' return has a negative sign. Thus finally, Branch and Chang (1990) conclude that the December losers which have lower per share prices are more likely to outperform the market in the following January. The more significant inverse relationship between January and December returns of December losers implies the year-end tax-loss selling pressure.

The distinguished strength of this paper is the introduction of low per share price as a new screen variable. By using this screen, more stocks that are depressed at year-end but rebound in January are included. Tests of this paper show that poor December performance and low per share price are usable variables for screening, and this makes us consider using more screen variables such as low market capitalization and low PE in the tests for the January effect.

Chen and Singal's paper (2004) is a very recent supporter for the tax-loss selling hypothesis. In the first part, Chen and Singal (2004) test the existence of the January effect based on the sample of common stocks traded on the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), and NASDAQ. The result is that the five-day January return is 2.1%, which is higher compared with the five-day December return of 1.1%. This implies the continued existence of the January effect.

Secondly, Chen and Singal (2004) test the tax-loss hypothesis based on returns. They use the daily cash flows that above the reference price over the total cash flows as the measure of potential for tax-loss selling (PTS), here high-PTS stocks are loser stocks since most investors purchased them above the reference price. Chen and Singal (2004) find out that high-PTS stocks experience a greater selling pressure than low-PTS stocks in December, and high-PTS stocks have higher buying pressure in January. The test suggests that stocks earn 4.95% less in the highest PTS quartile in the last five days of December than in the first five days of January, thus we can see that tax-loss selling hypothesis cannot be rejected in this case. The average return of the lowest PTS quartile stocks earns 1.9% more in the last five days of December than in the first five days of January. This is consistent with tax-loss selling since fewer investors sell winner stocks in December which makes their prices higher in December. In addition, Chen and Singal (2004) simultaneously control for PTS, risk, price, and size. When the December return is the dependent variable, the coefficient of PTS is negative and significant, which implies that the higher the PTS the lower the December return. When the January return is the dependent variable, the coefficient of PTS is positive and significant. These are also consistent with tax-loss selling hypothesis.

Thirdly, Chen and Singal (2004) test the tax-loss hypothesis based on turnover. They use share turnover as the measure of volume, they introduce a market model with individual turnover on the left hand side and market turnover on the right hand side, and then use the estimated coefficients to compute the

abnormal turnover. The result is that the abnormal turnover for small stocks is 30.7% higher in December than in January, the reverse is true for large stocks, and this implies the large trading volume for small stocks in December and for large stocks in January which is consistent with tax-loss selling hypothesis. In addition Chen and Singal (2004) estimate a model to simultaneously control for PTS, Risk and Size. The result is also consistent with tax-loss selling hypothesis. Furthermore, Chen and Singal (2004) do not find evidence supporting window dressing hypothesis, which I will discuss in the next part.

All of the above are studies which support the hypothesis of tax-loss selling. However, in several cases the tax-loss selling hypothesis cannot explain the January effect. For example, Pettengill (1986) examines the returns for both pre-tax and post-tax periods, but he doesn't find any evidence that can support the tax-loss selling hypothesis. The sample used in this paper is chosen from the Cowles Industrial Index from 1871 to 1937. First of all, by comparing the returns for January with the returns for other months, Pettengill (1986) finds out that in the pre-tax years 1871-1917 without dividends, the mean January return is more than eight times larger than the mean returns for all the other months. Pettengill (1986) also uses the Mann-Whitney test to avoid skewness, under this test the January returns are higher than returns for other months. When dividends are included, the January returns are still higher than returns for other months. Since in the pre-tax years the January effect is significant, Pettengill (1986) concludes that tax-loss selling is not the cause of the January effect. Secondly, Pettengill (1986) compares the January effect in pre-tax period with the January effect in

post-tax period. The result is that in both periods, the average January return for the Cowles Industrial is about eight times higher than the average returns for the other months. The significance level of the Mann-Whitney test is higher in the pre-tax sample. This also contradicts the tax-loss selling hypothesis.

As Pettengill (1986) rejects the tax-loss selling hypothesis for the January effect, he then wants to test whether firm size is a factor which can explain the January effect by comparing returns of the Cowles Industrial Index and the Dow Jones Industrial Index. Since Cowles Index includes more equities, it will be influenced more by small firms. The comparison shows that the January effect is significant for both indices, while the difference in the mean return is larger for the Cowles Index. This implies that small firms have a much stronger January effect.

Finally, Pettengill (1986) wants to test especially whether the small firm January effect is caused by tax-loss selling. The result shows that the Cowles Index January returns are 1.47% higher than January returns for Dow Index in pre-tax period. In the post-tax period, the difference in January returns between Cowles Index and Dow Index decreases to 0.7%. After tax, the January effect is even smaller than before, thus there must be some factor rather than tax-loss selling pressure that causes the small firm January effect. In conclusion, in this paper Pettengill (1986) confirms the hypothesis that small firm experiences larger January effect, but rejects the hypothesis that tax-loss selling pressure causes the January effect. He suggests that some non-tax influences may explain the

January effect, and thus further research should be done to find out the real causes.

From the same point of view by dividing the whole sample into pre-tax and post-tax periods, Jones (1987) also rejects the tax-loss selling hypothesis in his paper. His analysis is based on the data from the industrial stock price series of the Cowles Commission for the period 1871 through 1938. Firstly, Jones (1987) computes a regression with monthly return on the left hand side and month dummies on the right hand side. By assuming the effective post-tax period begins with 1918, the regressions are done for two time periods: February 1871 through December 1917 and January 1918 through December 1938 for the pre-tax and post-tax years respectively. The results are: first of all, the estimate for the pre-tax period of February 1871 through December 1917 indicates that several months had significantly lower returns than January. The null hypothesis of equality of dummy coefficients from February to December cannot be rejected. This is consistent with the existence of a January effect in the pre-tax period. But in the post-tax period, the hypothesis of equal dummy coefficients cannot be rejected either. Then, Jones (1987) estimates the model using both pre-tax and post-tax period data, the hypothesis of identical coefficients in the two periods cannot be rejected. There is a January effect both before and after the effective imposition of taxes to the similar magnitude, thus the tax-loss selling pressure may not be an appropriate explanation for the January effect.

Secondly, Jones (1987) regresses the monthly return on the January dummy. This model is a direct test of the January effect. For both the pre-tax and

post-tax periods, the coefficients the January dummy are statistically significant, although they are different. Also, the hypothesis that the coefficients are equal across tax regimes cannot be rejected. So in conclusion, the Jones (1987) states that the January effect is not caused by tax-loss selling pressure.

Cox and Johnston (1998) use the potential tax-loss selling (PTS) to do the test, which is similar to the analysis done by Chen and Singal (2004), but they reject the tax-loss selling hypothesis when the transaction costs and measurement errors are included. Their analysis is based on the data from NYSE and AMEX for the period for each year 1988 through 1992. In the first step, Cox and Johnston (1998) examine the mean January abnormal return of the high PTS stocks, and find out that mean abnormal returns are 18.06% during the first five trading days of January and 27.68% for the full month of January. This confirms the January effect. Next, Cox and Johnston (1998) use a sample which only includes firms that are below the mean with regard to both firm size and level of institutional ownership. The mean abnormal return for the sub sample is indeed higher than the overall sample, which is consistent with the tax-loss selling hypothesis.

However, Cox and Johnston (1998) state that in order to get the real return of stocks, the transaction costs and measurement errors should be considered. Transaction cost includes bid-ask spreads and brokerage commissions. The bid-ask bounce can cause the measurement errors. Thus in the third step, in order to limit the impact of market microstructure effects in the calculated returns, Cox and Johnston (1998) use another sub sample which

deletes stocks with share prices below \$2. Since for stocks with prices above \$2, the transaction cost and measurement error are higher according to the analysis. Then the result is that over the first five trading days in January, the abnormal return declines to only 1.5%, and for the full month of January the abnormal return disappears. Thus when taking into account the transaction cost and measurement error, tax-loss selling cannot explain the January effect.

Fountas and Seredakis (2002) investigate the January effect by cross country analyses with very recent sample of data, and they reject the hypothesis of tax-loss selling. The analyses are based on the sample including 18 countries and weekly data cover the period 1989 to 1996, and the monthly data cover the period 1987 to 1995. First of all, Fountas and Seredakis (2002) regress the stock market return on month dummies from January to December. The result shows that, for all countries in the sample, significant seasonal effects exist.

Secondly, Fountas and Seredakis (2002) regress the stock market return on month dummies from February to December. The intuition is that if each of the dummy coefficients is less than zero, the January effect exists. The result shows that only for Chile, Greece, Korea, Taiwan and Turkey, the average January returns are higher than average returns for some of the rest of the months of the year.

Thirdly, Fountas and Seredakis (2002) regress the stock market return on January dummy, the January dummy equals zero in January, thus if the dummy coefficient is less than zero, the result is consistent with the January effect and tax-loss selling hypothesis. However, according to the result, only for Chile, the

average return in January exceeds the average return over the rest of the year, which causes Fountas and Seredakis (2002) to reject both the January effect and tax-loss selling hypothesis. Since this paper is based on a very recent sample, the rejection of the January effect in this paper may imply the decreasing of the January effect in recent years which will be discussed later.

2.2 Window Dressing

Window dressing is the second most popular explanation for the January effect. When the tax-loss selling hypothesis is rejected, people always test for the window dressing hypothesis. For instance, Athanassakos (2002) rejects the tax-loss selling, but supports the widow dressing hypothesis in his paper. The logic in this paper is that the tax-loss selling hypothesis is based on the behavior of individual investors, whereas the focus of the window dressing hypothesis is on institutional investors. Thus only the window dressing hypothesis predicts that the returns of low-risk, well-known firms are lower in January compared to other months. So the tests in this paper are based on the null hypothesis of no seasonal pattern in the excess returns of highly scrutinized firms. The sample is chosen from 101 firms representing 13 industries in the Toronto Stock Exchange Review from 1980 to 1998.

Athanassakos (2002) first regresses the return of stocks on monthly dummies. The result is that when using the CFMRC equally weighted stock index, the coefficient for the January dummy is positive and significant and all the other dummies are negative. However, when Athanassakos (2002) uses another

sample based on TSE-300 which puts more weights on large stocks, the sample of highly scrutinized firms earned negative excess returns in January, and the excess returns increase over the remainder of the year. This result rejects the tax-loss selling hypothesis, since under this hypothesis high returns in January on small firms are the result of selling pressure in December by individuals, this will not affect the stock price of well-known and larger firms, but Athanassakos (2002) finds seasonality for large stocks. This result is consistent with the window dressing hypothesis which focuses on institutional investors.

Secondly, Athanassakos (2002) also regresses the return of stocks on month dummies and interaction terms of month dummies and independent variables which stand for market capitalization, beta coefficient, bond rating and TSE-industry classification. The result is that the signs of the coefficients are positive for the interaction term between January and market capitalization, between January and beta; negative for the interaction between January and TSE-industry classification and bond rating. The results imply that the larger the firm, the higher the systematic risk, the riskier the industry in which a firm belongs or the lower the bonding rating, the higher the January returns. Thus, Athanassakos (2002) concludes that the January effect is strong for low quality stocks with a high beta in high-risk industries. By the same kind of test, Athanassakos (2002) finds out that the January effect is weak for high quality stocks with low beta in low risk industries, for these stocks October and November are seasonally strong months. This result also supports the window dressing hypothesis, since managers tend to sell weak performed stocks in the

last quarter of a year, move to less risky securities and drive up their prices, as a result low-risk and high quality stocks will have a strong last quarter of the year.

However, in the literature of the January effect, we also have the paper of Chen and Singal (2004) which rejects the window dressing hypothesis. The test for window dressing hypothesis is based on the five-trading-day periods at the end of June and the beginning of July, by doing this the tax-loss selling and window dressing effects can be separated. The intuition here is that managers are likely to buy small stocks at the beginning of the year and engage continually in risk taking and window dressing, December-January and June-July periods are equal for window dressing to occur. So first of all, when finding out that the return for the last five trading days of June (0.1%) is similar to the return for the first five trading days of July (0.5%), their variations are also very close to each other, Chen and Singal (2004) reject the window dressing hypothesis.

Secondly, Chen and Singal (2004) analyze returns by size, they find out that the five-day July return is only slightly positive for small stocks (0.5%), but highly positive for large stocks. Compared to the large positive five-day January return for small stocks, Chen and Singal (2004) reject the window dressing hypothesis.

Finally, Chen and Singal (2004) test the window dressing hypothesis based on turnover. Again, when compared with the change in abnormal turnover from December to January, the change from June to July is much smaller for both large and small stocks. Thus the results above can be used to reject the window dressing hypothesis.

2.3 Performance Hedging

Another popular explanation for the January effect is the performance hedging hypothesis, the difference between window dressing and performance hedging hypothesis is that, window dressing occurs only at fiscal year ends while performance hedging occurs year round. Lee, Porter and Weaver (1998) find support for the performance hedging hypothesis in their paper. Their logic is that, when the tax-loss selling hypothesis is not taken into account, the January effect is caused either by window dressing or by performance hedging, furthermore if the total dollars invested in funds with a December fiscal year end is declining and the size of the small-firm the January effect is also declining, then it must be the window dressing that causes the January effect, other wise the reason for the January effect is performance hedging. Based on this logic, in the first step, Lee, Porter and Weaver (1998) test whether the percentage of funds selecting a December fiscal year end pre 1983 equals the percentage post 1983, where 1983 is an event date for analysis. The data are drawn from the 1993 CRSP and 1994 MMFD. The result is that for all equity mutual funds with a starting date before 1983, 36.8% chose December as FYE, but after 1983 the percentage declines to 26.1%, the percentage is significantly different in the test.

In the second step Lee, Porter and Weaver (1998) test whether the average percentage of Total Net Asset Value represented by funds with a December FYE is the same pre and post 1983. The result is that, the NAV for the overall sample declines from 46.17% in 1980 to 24.5% in 1993, and the NAV for

small cap funds declines from 65.27% to 25%. This implies that mutual funds with a non-December FYE attract larger amounts of investment over time. By analyzing the data, Lee, Porter and Weaver (1998) find out that although the small firm January effect declines from 1976 to 1990, the effect reverses in 1992 to 1993. Thus based on the logic of this paper, the window dressing hypothesis should be rejected.

Thirdly, Lee, Porter and Weaver (1998) test the hypothesis of whether the average January return for mutual funds with December FYEs equals the average January return for mutual funds with FYEs other than December. The result cannot reject the hypothesis of equal returns. This is consistent with the performance hedging hypothesis, since this hypothesis is unrelated to the choice of FYE.

Finally, to further distinguish window dressing from performance hedging hypothesis, Lee, Porter and Weaver (1998) do another test of whether the monthly average return for mutual funds that had a FYE in the previous month equals the average return for mutual funds that did not have a FYE in the previous month. The result shows that no month has significant different returns, which supports the performance hedging hypothesis. All these four tests reject the window dressing hypothesis and support the performance hedging hypothesis, thus Lee, Porter and Weaver (1998) conclude that performance hedging is the main cause of the January effect.

This paper is an extension of Haugen and Lakonishok's paper (1987), which rejects the hypothesis of tax-loss selling, thus in this paper, Lee, Porter

and Weaver (1998) ignore the tax-loss selling pressure directly, if they can test the tax-loss selling hypothesis together with the other hypothesis, this paper might be more convincing. Also, although Lee, Porter and Weaver (1998) can reject the hypothesis of window dressing, there may still be other possibilities that cause the January effect other than the performance hedging, which should be taken into account.

2.4 Declining January effect

Although providing various kinds of explanations, most of the studies in the literature of the January effect show evidence which supports this anomaly. However, some papers even reject the January effect, and the most famous of these studies are done by Anthony. One of Anthony's paper (2003), which focuses on the U.S. equity markets, shows a declining January effect. Anthony finds it problematic to assume the coefficients for factors that affect the January returns to be constant over time and across markets, he suggests taking the dynamics of this effect into consideration. His study is based on several indices including the Dow Jones 30 Industrial Average, the S&P 500, the Russell 1000, the Russell 2000 and the Russell 3000. In order to take the dynamics into consideration, Anthony (2003) introduces a power ratio method. The ratio is calculated with one plus January return to the power of 12 as the numerator, and one plus the annual return as denominator.

In the first place, by using the power ratio method, the result is that for every index the power ratio is greater than one for more than half of the years,

which is consistent with the January effect. However, for all of the indices, the power ratios are declining during 1988 through 2000, while none of the factors that cause the January effect reported in the literature is declining in this period. This trend is pronounced for both small and large firms. Anthony (2003) attributes this decline to the investors' experience, since more experienced investors would like to sell more in January to make profits.

In the second place, Anthony (2003) computes regressions with the power ratio as dependent variable and five factors as independent variables. He finds out that the January effect is negatively related to real GDP growth, inflation and annual market returns; positively related to standard deviation and variance of the annual market return. Thus the upward trend in real GDP growth and in stock market return may explain the declining the January effect. The expected values of real GDP growth, inflation and annual market returns have more significant impacts on the January effect. This implies that investors can expect the anomaly and try to exploit the profit from selling more in January.

By using the same power ratio methodology, Anthony studies the January effect of stock returns in United Kingdom with Simon (2003), and further confirms his conclusion about the declining January effect. In this paper Anthony and Simon (2003) use two major stock indices FT 30 and FT 700 in the United Kingdom for the period during 1976 through 2000. The result is the same as the previous study in U.S. stock market, the January effect is declining in United Kingdom which may be explained as a trend toward market efficiency.

2.5 Conclusion

There are so many researches in the literature about the January effect, most of them show evidence that can support the existence of the turn-of-the-year anomaly, while some of them show declining trend of this effect. All of these papers try to explain the causes of the January effect, and the three most famous explanations are tax-loss selling, window dressing and performance hedging which have been discussed above.

The existence of the January effect

There are three main methods in the literature to test the existence of the January effect. First of all, some of the authors like Chen and Singal (2004) analyze the sample directly and find out that the five-day January return is higher than the last-day December return. This implies the continued existence of the January effect. Another method is used by Branch and Chang (1990). They compute a regression with January returns as dependent variable, December winners' and losers' returns as independent variables. The coefficient for the December losers' return is negative and significant, which also supports the existence of the January effect. Other authors such as Keim (1983), Schultz (1985), Athanassakos (2002), Fountas and Seredakis (2002) use month dummies as independent variables to test the existence of the January effect; the result shows that, significant seasonal effects exist especially for January.

Small firm January effect

On the one hand, many authors such as Roll (1983), Pettengill (1986), Athanassakos (2002), Chen and Singal (2004) use returns of equal-weighted index and value-weighted index during the last trading day in December and first several trading days in January to test for the small firm January effect, where the equal-weighted index stands for small stocks and the value-weighted index stands for large stocks. The result is that, for the early January, the equal-weighted index has higher return than the other, which is consistent with the small firm January effect. In a very similar test for the small firm January effect, Branch and Chan (1990) introduce per share stock price as a more appropriate screen. They add per share price as an independent variable, and find out that the January effect is more significant for low per share price stocks. On the other hand, Keim (1983), Schultz (1985) and Seyhun (1988) test the small firm January effect by dividing stocks into size groups. They compute a regression with returns for five or ten firm size groups as the dependent variable and January dummy as the independent variable. Since the January return is declining from small firms to large ones, the January effect exists especially for small firms.

Tax-loss selling hypothesis

The first method to test the tax-loss selling hypothesis is to compare the returns during the year excluding the first five and last trading days and the returns during the last day of December through the first four days of January. For example, Roll (1983) finds out that the coefficients are all negative, which is

consistent with tax-loss selling hypothesis. The second method is to use the potential for tax-loss selling (PTS) as an explanatory variable, Chen and Singal (2004) find out that when the December return is the dependent variable, the coefficient of PTS is negative and significant, which implies that the higher the PTS the lower is the December return. Cox and Johnston (1998) use the PTS to do the test which is similar to the analysis done by Chen and Singal (2004), but they reject the tax-loss selling hypothesis when the transaction costs and measurement errors are included. The third method is based on turnover, Chen and Singal's result (2004) is that the abnormal turnover for small stocks is 30.7% higher in December than in January, the reverse is true for large stocks, and this implies the large trading volume for small stocks in December and for large stocks in January which is consistent with tax-loss selling hypothesis. What's more, Seyhun (1988) tests the hypothesis of tax-loss selling indirectly by rejecting the hypothesis of compensation for the increased risk of trading against informed traders. Finally, when some authors examine the returns for both pre-tax and post-tax periods like Pettengill (1986) and Jones (1987), they cannot find any evidence that can support the tax-loss selling hypothesis. This is because the January effect is significant for both pre-tax and post-tax periods in this kind of analyses. However, by using the same method, Schultz (1985) supports the existence of the January effect in small firm portfolios formed on the stock's bid price. Thus this further implies the small firm January effect.

Window dressing hypothesis

To test the window dressing hypothesis, the first method is based on the logic that only the window dressing hypothesis predicts the lower returns of low-risk, well-known stocks in January compared to other months. Athanassakos (2002) uses both equal-weighted and value-weighted indices do to regressions with month dummies as explanatory variables; he finds significant negative returns for value-weighted indices only in January. This is consistent with window dressing hypothesis. The second method says that tax-loss selling only occurs at the turn of the year, while window dressing can occur semi-annually. Chen and Singal (2004) find out that the return for the last five trading days of June (0.1%) is similar to the return for the first five trading days of July (0.5%), thus the absence of a semi-annual anomaly rejects the window dressing hypothesis.

Performance hedging hypothesis

Lee, Porter and Weaver (1998) support the performance hedging hypothesis by the logic that when tax-loss selling hypothesis is not taken into account, the January effect is caused either by window dressing or by performance hedging, furthermore if the total dollars invested in funds with a December fiscal year end is declining and the size of the small-firm January effect is also declining, then it must be the window dressing that causes the January effect, otherwise the reason for the January effect is the performance hedging.

Declining January effect

Roll (1983) tries to add transaction cost into the regression, after the transaction cost has been added, the January effect is declining for both large and small stocks, but small firm stocks still have a turn-of-the-year premium, so the transaction cost may be an explanation for the persistence of the January effect. Anthony (2003) suggests taking the dynamics of this effect into consideration by introducing a power ratio method. The result is that for all of the indices, the power ratios are declining during 1988 through 2000, this shows a declining trend in the January effect, and requires more factors to be added to explain the January effect.

3. Empirical Study

3.1 Data Description

The main purpose of this study is to test for the existence of the January effect in dividend yield, size and book-to-market ratio sorted portfolios. The study also focuses only on American stocks.

The data for this study is drawn from the Kenneth R. French data library¹. Monthly returns for portfolios formed on dividend yield, on size, on book-to-market ratio and on both size and book-to-market ratio are used. Monthly returns for portfolios formed on dividend yield are available from July 1927 to December 2005. Portfolios are formed on D/P at the end of each June using NYSE breakpoints. The dividend yield used to form portfolios in June of year t is the total dividends paid from July of $t-1$ to June of t per dollar of equity in June of t . I use the zero dividend portfolio, which includes firms with zero dividend, and dividend quintile portfolios. For the 79-year time period from 1927 to 2005, there are 265 firms with zero-dividend yield and 873 firms with positive dividend yield on average. For the 75-year time period from 1931 to 2005 used in my analysis later, there are 269 firms with zero-dividend yield and 899 firms with positive dividend yield on average. Thus, approximately there are 269 firms in the zero-dividend yield portfolio and 180 firms in each dividend yield quintile. Monthly returns for portfolios formed on size are available from July 1926 to December 2005. The portfolios are constructed at the end of each June using the June market equity and NYSE breakpoints. I use the size quintile portfolios in my

¹ http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

analysis. Monthly returns for portfolios formed on book-to-market ratio are available from July 1926 to December 2005. Portfolios are formed on BE/ME at the end of each June using NYSE breakpoints. The BE used in June of year t is the book equity for the last fiscal year end in $t-1$. ME is price times shares outstanding at the end of December of $t-1$. I use the book-to-market ratio quintile portfolios in my analysis. For size quintiles and BE/ME quintiles, in the 75-year time period from 1931 to 2005 used in my analysis later, approximately there are 234 firms in each quintile. Monthly returns for 25 portfolios formed on size and book-to-market ratio are available from July 1926 to December 2005. The portfolios, which are constructed at the end of each June, are the intersections of 5 portfolios formed on size (market equity, ME) and 5 portfolios formed on book-to-market ratio (BE/ME). The size breakpoints for year t are the NYSE market equity quintiles at the end of June of t . BE/ME for June of year t is the book equity for the last fiscal year end in $t-1$ divided by ME for December of $t-1$. The BE/ME breakpoints are NYSE quintiles. For 25 portfolios formed on size and book-to-market ratio, in the 75-year time period from 1931 to 2005 used in my analysis later, approximately there are 47 firms in each portfolio.

3.2 Methodology

Two main methods are used in this study. The first method involves plotting the relationship between January return and the monthly average return for the other months for dividend yield quintiles, size quintiles and BE/ME quintiles. By analyzing the graphs we will see whether the January effect exists

and whether there exists a relationship between dividend yield, size, book-to-market ratio and the January effect.

The second method uses formal statistical methods to test for the existence of the January effect. If the returns to stocks have similar trends from February to December and only the January return shows very different trend from all the other months in the first method, the second method involves testing the null hypothesis of equal January return and return for the rest of the year. To test for the January effect for value-weighted and equal-weighted indices, I estimate the following regression coefficients

$$R_{it} = a_{0i} + a_{1i}Jan_t + e_{it},$$

$i = 0, 1, 2, 3, 4, 5$ for non-dividend and dividend yield quintile portfolios,

or $i = 1, 2, 3, 4, 5$ for size and BE/ME quintile portfolios,

R_{it} = monthly return on quintile portfolio i in month t ,

Jan_t = January dummy which is 1 for January and 0 for the rest of the year.

In the result of the regression, a_{0i} stands for the average return for portfolio i from February to December, a_{1i} stands for the difference between January return and return for the rest of the year. For each of the quintile portfolios, I run the regression for the whole period from 1931 to 2005, for the period from 1931 to 1978 and for the period from 1979 to 2005. This is because I want to compare my result with Keim's result in 1986 which was based on the time period from 1931 to 1978.

4. Results

4.1 Documentation of the January Effect

I begin the analysis of the American stock market by examining two market indices, a Value-Weighted Index and an Equal-Weighted Index for the dividend yield quintiles, size quintiles and BE/ME quintiles separately.

As shown in Figure 1 through Figure 6, the results are: first of all, for all of the six portfolios in the analysis, the average percentage return in January is higher than the average percentage return in all of the other months.

In the second place, for dividend yield quintiles, the higher the dividend yield, the higher the pretax rates of return in January on common stocks, portfolio with zero dividend yield has even higher returns than other portfolios. For size quintiles, other things equal, the smaller a firm's size, the higher its rates of return, especially in January. For BE/ME quintiles shown in Figure 5 and Figure 6, the higher the book-to-market ratio, the larger the rates of return especially in January.

The third result is that, for each of the three sets of portfolios, January return is higher for the equal-weighted portfolio than for the value-weighted portfolio. The result is also reasonable, since value-weighted portfolio weights more on large stocks, thus it stands for large stocks while equal-weighted portfolio stands for small stocks. January return is much higher for equal-weighted portfolio is consistent with the former result that the smaller a firm's size, the higher its January percentage return.

Figure 1: Average Returns for Each Month by Dividend Yield Quintiles 1931-2005 (Value-Weighted)

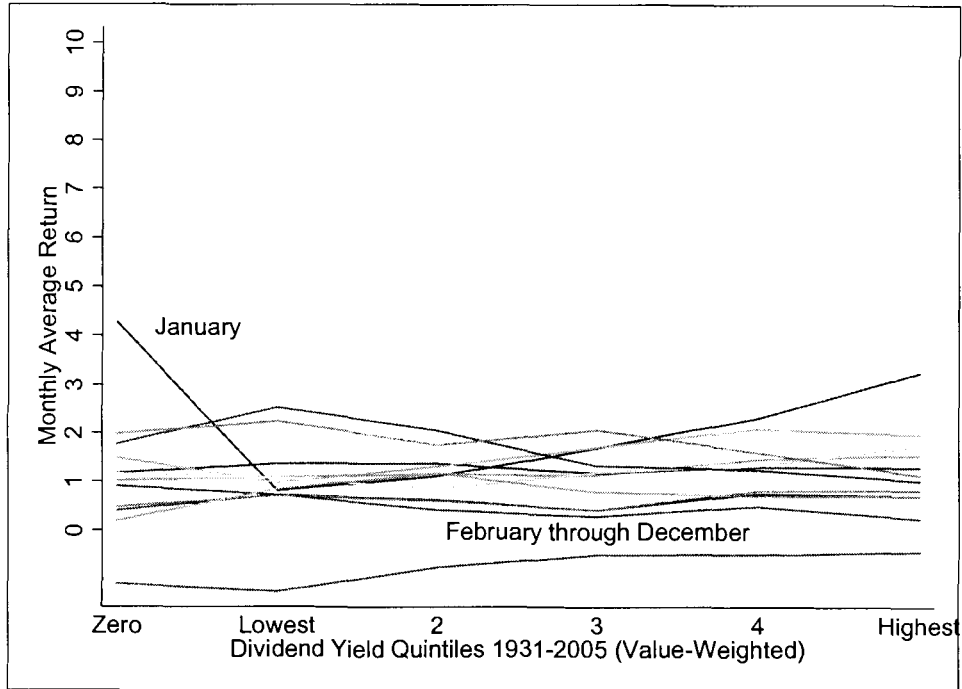


Figure 2: Average Returns for Each Month by Dividend Yield Quintiles 1931-2005 (Equal-Weighted)

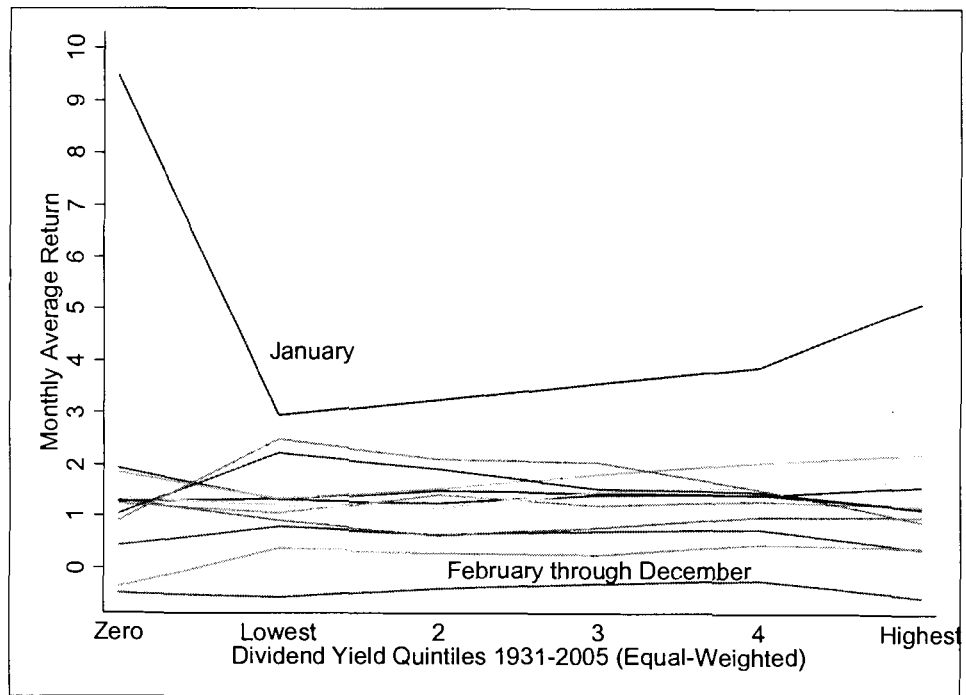


Figure 3: Average Returns for Each Month by Size Quintiles 1931-2005 (Value-Weighted)

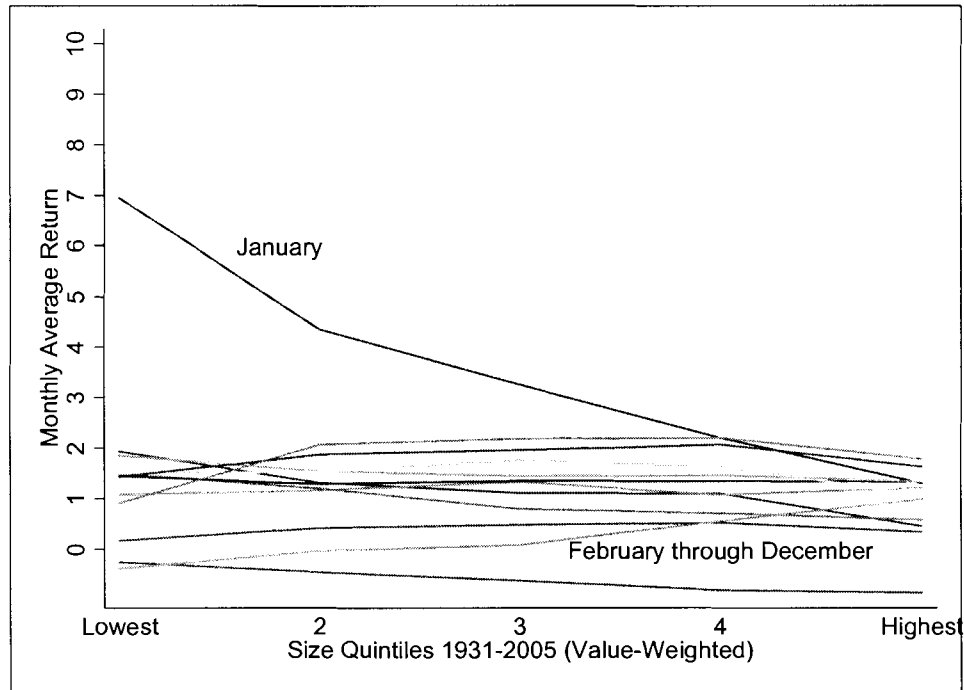


Figure 4: Average Returns for Each Month by Size Quintiles 1931-2005 (Equal-Weighted)

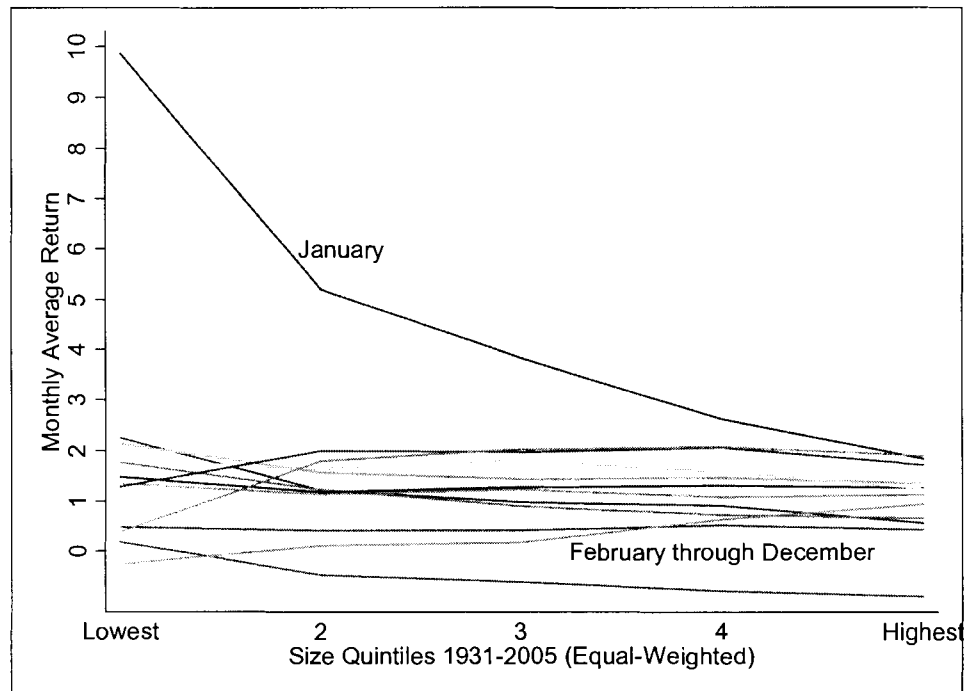


Figure 5: Average Returns for Each Month by BE/ME Quintiles 1931-2005 (Value-Weighted)

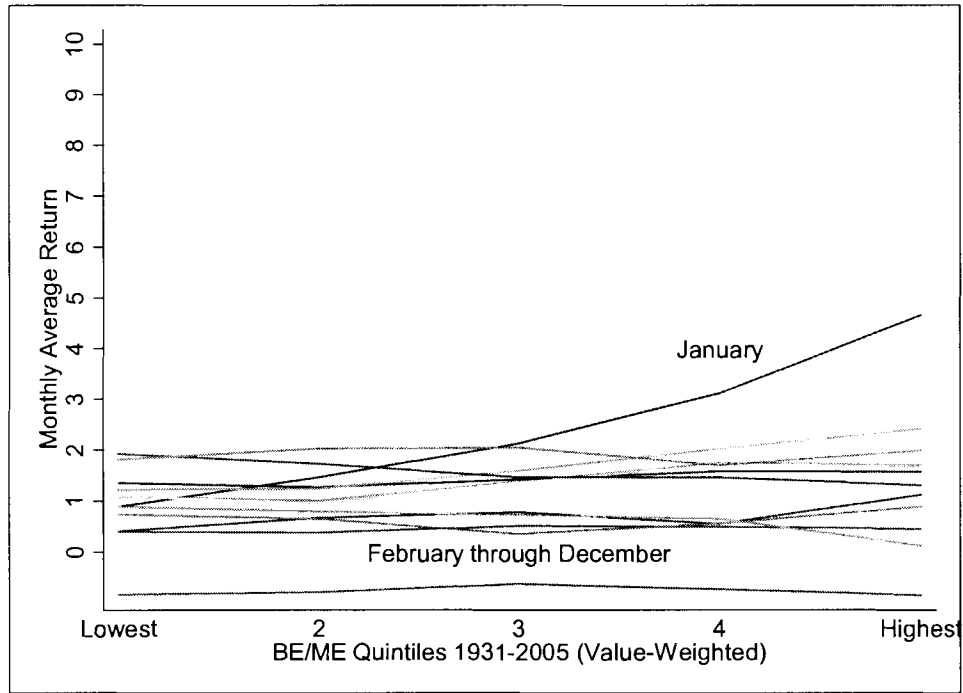
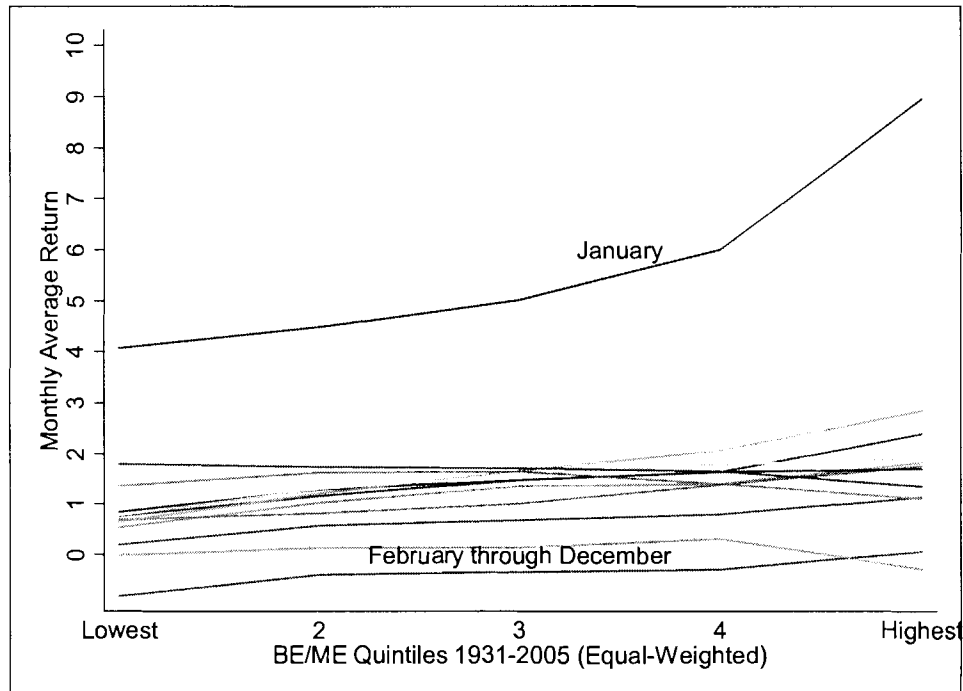


Figure 6: Average Returns for Each Month by BE/ME Quintiles 1931-2005 (Equal-Weighted)



4.2 The January Effect in Dividend Yield Sorted Portfolios

I begin the analysis of the January effect by analyzing the dividend yield quintiles. Table 1 reports the results of dummy OLS regressions $R_{it} = a_{0i} + a_{1i}Jan_t + e_{it}$ for both value-weighted and equal-weighted dividend yield quintile portfolios for 1931 to 2005, 1931 to 1978 and 1979 to 2005 time periods separately. R_{it} is the monthly return on quintile portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, a_{0i} stands for the average return on quintile portfolio i from February to December, a_{1i} stands for the difference between January average return and average return for the rest of the year. P-values for the t-test are also reported.

First of all, for value-weighted portfolio, in the period from 1931 to 2005, coefficients for the January dummy a_{1i} are all positive except for firm with the lowest dividend yield, this implies that January returns are averagely higher than the rates of return for the rest of the year. The size of the positive coefficient for the January dummy is extremely high for the zero-dividend portfolio, and increasing in the size of dividend yield. The largest difference between January and the rest of the year is for the zero-dividend portfolio which is 3.41%, the difference is negative for the portfolio with lowest dividend yield, then the difference is increasing in the size of dividend yield, the difference for portfolio with the highest dividend yield is 2.29%. Also, from the t-test for the coefficient of January dummy, January return is statistically significant different from return for the rest of the year only for portfolios with zero dividend and high dividend yields.

When there is only low dividend yield, the difference between January return and return for the rest of the year is not significant even at 10% significance level.

Secondly, by comparing the value-weighted portfolio and equal-weighted portfolio, we can see that the coefficients for the January dummy of equal-weighted portfolio are all positive and greater than those of value-weighted portfolio. Also, all of the coefficients for the January dummy of equal-weighted portfolio are statistically significant at least at 5% level, while only three coefficients for value-weighted portfolio are statistically significant at least at 5% level. Since equal-weighted portfolio puts more weights on small firms, this implies that the anomaly exists especially for small firms.

Figure 7 and Figure 8 plot the January return and average return for the rest of the year. They show a pattern which is consistent with the regression. As shown in Figure 7 and Figure 8, the lower line in the graph is the average return from February to December, which is a_{0i} in the table. The distance between these two lines is the difference between January return and return for the rest of the year, which is a_{1i} in the table. We can see that the difference is very large for zero-dividend and high dividend yield portfolios, but very small and even reversed for low dividend yield portfolios. Also, the difference between January return and return for the rest of the year is more obvious for equal-weighted portfolio.

Thirdly, for separate regressions for the period from 1931 to 1978 and the period from 1979 to 2005, the trend is similar as the whole period in Table 1: coefficients for the January dummy are all positive except for some low dividend

yield quintiles, the significance level for the January dummy is increasing in the size of dividend yield. However, the January effect is more significant for the period from 1931 to 1978. The coefficients for January dummy from 1931 to 1978 are greater than those from 1979 to 2005 except for portfolios with low dividend yield. For the period from 1931 to 1978 we can observe that the difference between January return and return for the rest of the year is statistically significant at 1% level for zero-dividend and the highest dividend yield portfolios, statistically significant at 10% for portfolio with second large dividend yield. But for the period from 1979 to 2005, the difference is only statistically significant at 5% level for zero-dividend portfolio. By comparing the value-weighted and equal-weighted indices, we can see all the coefficients of January dummy for equal-weighted portfolio are positive and greater than those for value-weighted portfolio. We have more statistically significant coefficients for equal-weighted portfolio than for value-weighted portfolio in both periods.

This can also be seen from Figure 9 through Figure 12. Obviously, the difference between January average return and return for the rest of the year, which is represented by the distance between these two lines, is large for zero-dividend portfolio and increasing in the size of dividend yield. Also, the difference is more significant for the period from 1931 to 1978, and the increasing trend for portfolios with dividend yields almost disappears for the period from 1979 to 2005. This is consistent with the table above. The same trend can be observed for equal-weighted portfolio, but the difference between January return and return for the rest of the year is more obvious for equal-weighted portfolio.

Table 1: Test for the January Effect by Dividend Yield Quintiles

		Value-Weighted										
a_{0i} (non-Jan)	Q0	Q1	Q2	Q3	Q4	Q5	P0	P1	P2	P3	P4	P5
D-P(1931 to 2005)	0.86	1.01	0.96	0.91	1.03	0.98	0.01	0.00	0.00	0.00	0.00	0.00
D-P(1931 to 1978)	0.82	0.93	0.80	0.80	0.91	0.85	0.05	0.00	0.00	0.00	0.00	0.01
D-P(1979 to 2005)	0.92	1.14	1.23	1.10	1.26	1.19	0.02	0.00	0.00	0.00	0.00	0.00
a_{1i} (Jan)	Q0	Q1	Q2	Q3	Q4	Q5	P0	P1	P2	P3	P4	P5
D-P(1931 to 2005)	3.41	-0.19	0.15	0.80	1.28	2.29	0.00	0.79	0.81	0.23	0.05	0.00
D-P(1931 to 1978)	3.78	-0.70	0.28	0.93	1.74	3.12	0.01	0.45	0.73	0.31	0.05	0.00
D-P(1979 to 2005)	2.76	0.72	-0.09	0.57	0.47	0.82	0.05	0.50	0.93	0.52	0.57	0.27
		Equal-Weighted										
a_{0i} (non-Jan)	Q0	Q1	Q2	Q3	Q4	Q5	P0	P1	P2	P3	P4	P5
D-P(1931 to 2005)	0.95	1.12	1.10	1.13	1.15	1.00	0.01	0.00	0.00	0.00	0.00	0.00
D-P(1931 to 1978)	1.08	1.01	0.94	0.98	0.97	0.90	0.03	0.00	0.00	0.00	0.00	0.01
D-P(1979 to 2005)	0.71	1.32	1.37	1.40	1.47	1.19	0.06	0.00	0.00	0.00	0.00	0.00
a_{1i} (Jan)	Q0	Q1	Q2	Q3	Q4	Q5	P0	P1	P2	P3	P4	P5
D-P(1931 to 2005)	8.52	1.81	2.15	2.44	2.73	4.08	0.00	0.02	0.00	0.00	0.00	0.00
D-P(1931 to 1978)	9.14	2.04	2.58	3.02	3.53	5.20	0.00	0.06	0.01	0.00	0.00	0.00
D-P(1979 to 2005)	7.41	1.40	1.38	1.40	1.29	2.07	0.00	0.16	0.11	0.08	0.09	0.00

Note: This table reports the results of dummy OLS regressions $R_{it} = a_{0i} + a_{1i}Jan_t + e_{it}$ for both value-weighted and equal-weighted dividend yield quintile portfolios for 1931 to 2005, 1931 to 1978 and 1979 to 2005 time periods separately. R_{it} is the monthly return on quintile portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, a_{0i} stands for the average return on quintile portfolio i from February to December, a_{1i} stands for the difference between January average return and average return for the rest of the year. P-values for the t-test are also reported.

Figure 7: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1931-2005 (Value-Weighted)

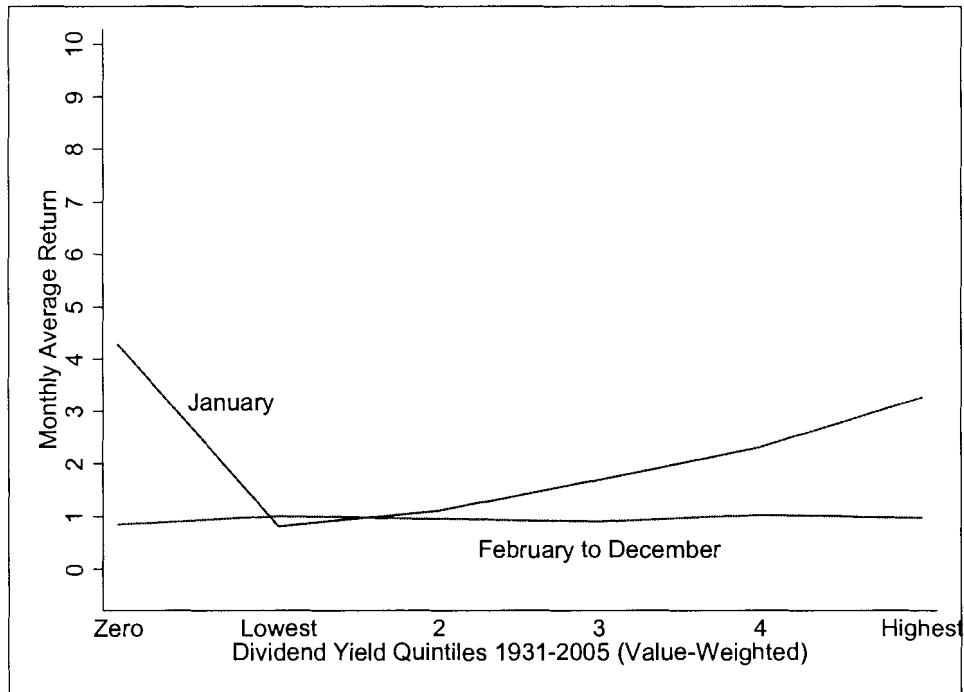


Figure 8: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1931-2005 (Equal-Weighted)

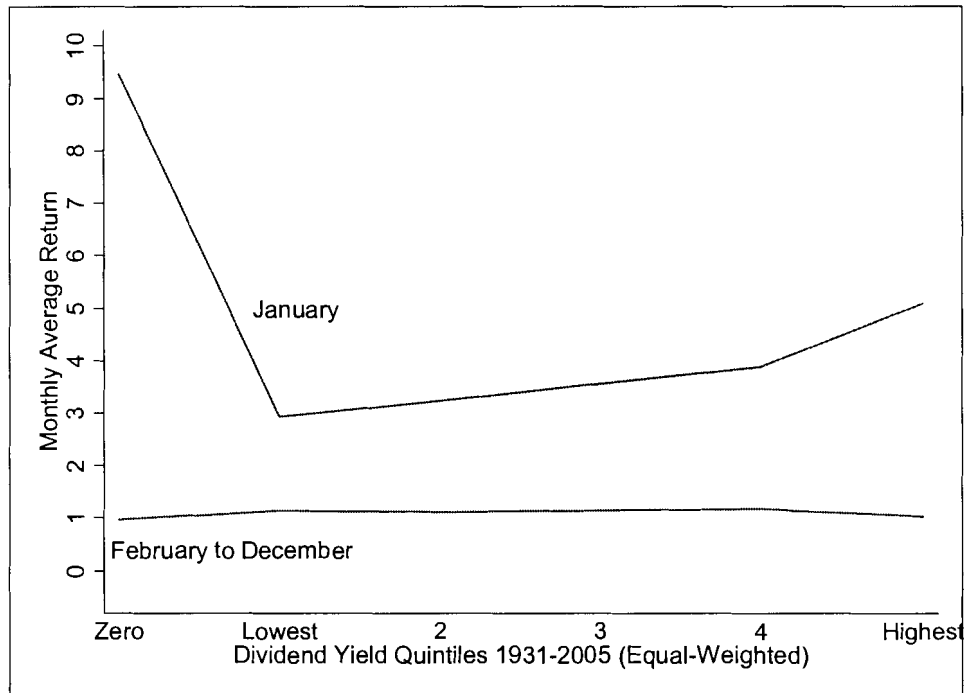


Figure 9: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1931-1978 (Value-Weighted)

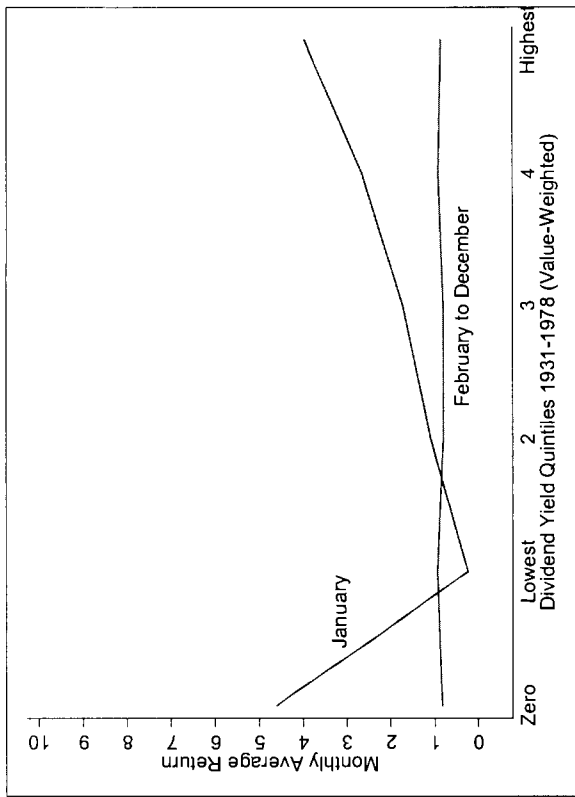


Figure 10: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1931-1978 (Equal-Weighted)

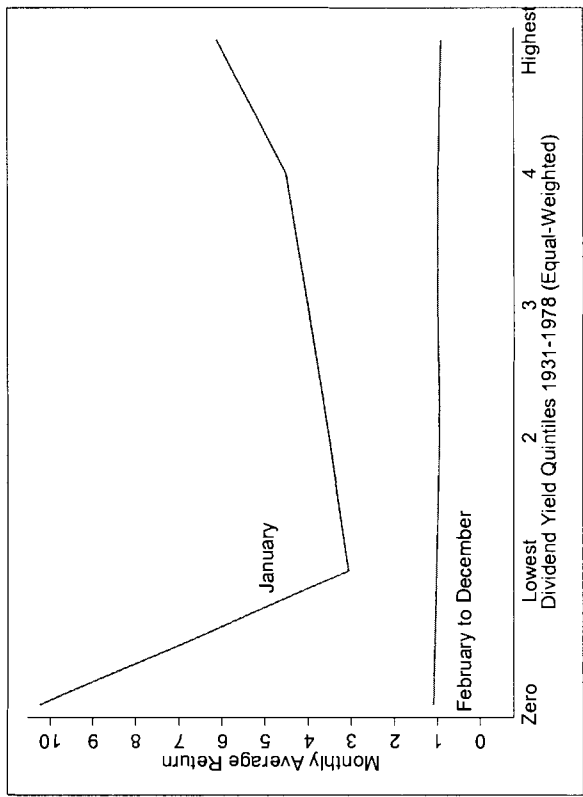


Figure 11: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1979-2005 (Value-Weighted)

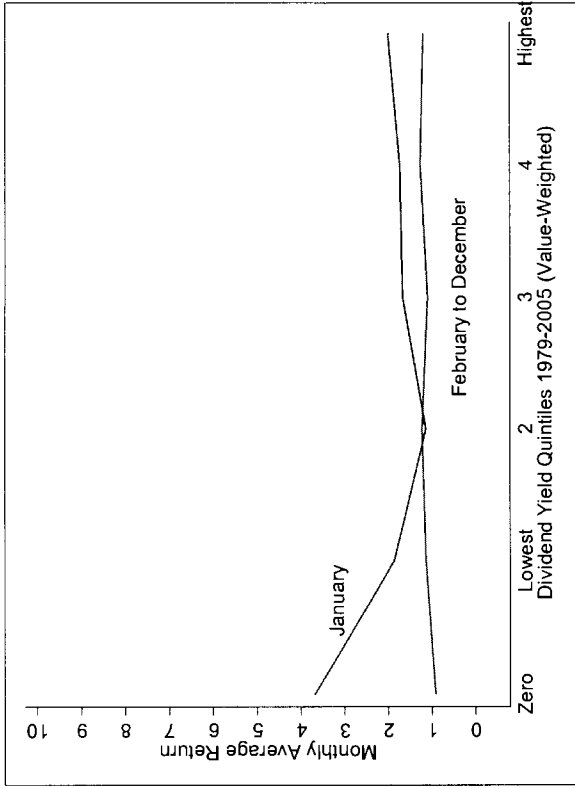
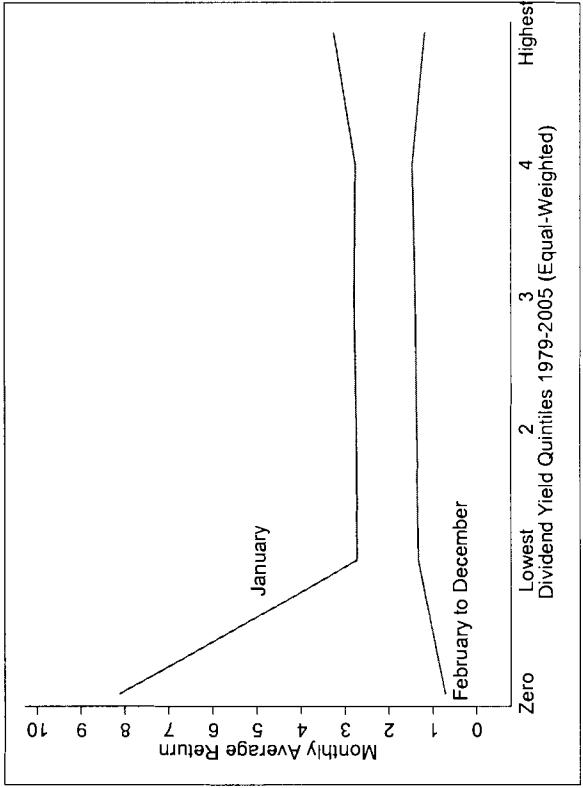


Figure 12: Average Returns for January and the Rest of the Year by Dividend Yield Quintiles 1979-2005 (Equal-Weighted)



4.3 The January Effect in Size Sorted Portfolios

Table 2 reports the results of dummy OLS regressions $R_{it} = a_{0i} + a_{1i}Jan_t + e_{it}$ for both value-weighted and equal-weighted size quintile portfolios for 1931 to 2005, 1931 to 1978 and 1979 to 2005 time periods separately. R_{it} is the monthly return on quintile portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, a_{0i} stands for the average return on quintile portfolio i from February to December, a_{1i} stands for the difference between January average return and average return for the rest of the year. P-values for the t-test are also reported.

As we can see in Table 2, first of all, in the period from 1931 to 2005, coefficients for the January dummy a_{1i} are all positive for the five quintiles. This implies that January returns are averagely higher than the rates of return for the rest of the year. The size of the positive coefficient for the January dummy is decreasing in firm size, the largest difference between January return and return for the rest of the year is for the smallest firm which is 5.93%, the difference is decreasing in firm size, and the smallest difference is for the largest firm which is only 0.41%. Also, from the t-test for the coefficient of January dummy, January return is statistically significant different from the rest of the year only for the first three quintiles, when firm size increases, the significance level decreases, the difference between January return and return for the rest of the year is not significant even at 10% significance level for large firms.

Secondly, by comparing the value-weighted portfolio and equal-weighted portfolio, we can see that coefficients for the January dummy of equal-weighted

portfolio are all positive and greater than those of value-weighted portfolio. Also, four of the coefficients for the January dummy of equal-weighted portfolio are statistically significant at least at 5% level, while only three coefficients for value-weighted portfolio are statistically significant at least at 5% level. Since equal-weighted portfolio puts more weights on small firms, this implies that the anomaly exists especially for small firms.

Figure 13 and Figure 14 plot the January return and average return for the rest of the year. They show a pattern which is consistent with the regression. In Figure 13 and Figure 14, the lower line in the graph is the average return from February to December, which is a_{0i} in the table. The distance between these two lines is the difference between January return and return for the rest of the year, which is a_{1i} in the table. We can see that the difference is decreasing in firm size from about 6% to less than 1%, which is consistent with the regression result. Also, the difference between January return and return for the rest of the year is more obvious for equal-weighted portfolio.

Thirdly, for separate regressions for the period from 1931 to 1978 and the period from 1979 to 2005 in Table 2, the trend is similar as the whole period, coefficients for the January dummy are all positive and the significance level for the January dummy is decreasing in firm size. However, the January effect is more significant for the period from 1931 to 1978. The coefficients for January dummy from 1931 to 1978 are greater than those from 1979 to 2005 except for the largest firms. For the period from 1931 to 1978 we can observe statistically significant difference between January return and return for the rest of the year

for the first three quintiles, but for the period from 1979 to 2005 we can only find statistically significant difference for the smallest firm. By comparing the value-weighted and equal-weighted indices, we can see all the coefficients of January dummy for equal-weighted portfolio are positive and greater than those for value-weighted portfolio. We have more statistically significant coefficients for equal-weighted portfolio than for value-weighted portfolio in both periods.

This can also be seen from Figure 15 through Figure 18. Obviously, the difference between January average return and return for the rest of the year, which is represented by the distance between these two lines, is decreasing in firm size. Also, the difference is more significant for the period from 1931 to 1978. This is consistent with the table above. The same trend can be observed for equal-weighted portfolio, but the difference between January return and return for the rest of the year is more obvious for equal-weighted portfolio.

Table 2: Test for the January Effect by Size Quintiles

		Value-Weighted									
a_{0i} (non-Jan)	Q1	Q2	Q3	Q4	Q5	P1	P2	P3	P4	P5	
ME(1931 to 2005)	1.01	1.08	1.08	1.08	0.90	0.00	0.00	0.00	0.00	0.00	
ME(1931 to 1978)	1.03	1.02	0.99	0.96	0.81	0.03	0.01	0.00	0.00	0.00	
ME(1979 to 2005)	0.98	1.20	1.23	1.29	1.06	0.00	0.00	0.00	0.00	0.00	
a_{1i} (Jan)	Q1	Q2	Q3	Q4	Q5	P1	P2	P3	P4	P5	
ME(1931 to 2005)	5.93	3.27	2.19	1.12	0.41	0.00	0.00	0.01	0.14	0.51	
ME(1931 to 1978)	7.11	4.40	3.10	1.55	0.18	0.00	0.00	0.01	0.14	0.83	
ME(1979 to 2005)	3.82	1.25	0.57	0.36	0.81	0.00	0.27	0.59	0.72	0.36	
		Equal-Weighted									
a_{0i} (non-Jan)	Q1	Q2	Q3	Q4	Q5	P1	P2	P3	P4	P5	
ME(1931 to 2005)	1.17	1.07	1.05	1.05	0.93	0.00	0.00	0.00	0.00	0.00	
ME(1931 to 1978)	1.35	1.07	0.98	0.93	0.82	0.01	0.01	0.01	0.00	0.00	
ME(1979 to 2005)	0.85	1.07	1.17	1.26	1.13	0.01	0.00	0.00	0.00	0.00	
a_{1i} (Jan)	Q1	Q2	Q3	Q4	Q5	P1	P2	P3	P4	P5	
ME(1931 to 2005)	8.71	4.11	2.78	1.57	0.91	0.00	0.00	0.00	0.05	0.19	
ME(1931 to 1978)	9.59	5.23	3.61	2.06	0.90	0.00	0.00	0.00	0.06	0.34	
ME(1979 to 2005)	7.13	2.13	1.29	0.69	0.93	0.00	0.07	0.25	0.50	0.32	

Note: This table reports the results of dummy OLS regressions $R_{it} = a_{0i} + a_{1i}Jan_t + e_{it}$ for both value-weighted and equal-weighted size quintile portfolios for 1931 to 2005, 1931 to 1978 and 1979 to 2005 time periods separately. R_{it} is the monthly return on quintile portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, a_{0i} stands for the average return on quintile portfolio i from February to December, a_{1i} stands for the difference between January average return and average return for the rest of the year. P-values for the t-test are also reported.

Figure 13: Average Returns for January and the Rest of the Year by Size Quintiles 1931-2005 (Value-Weighted)

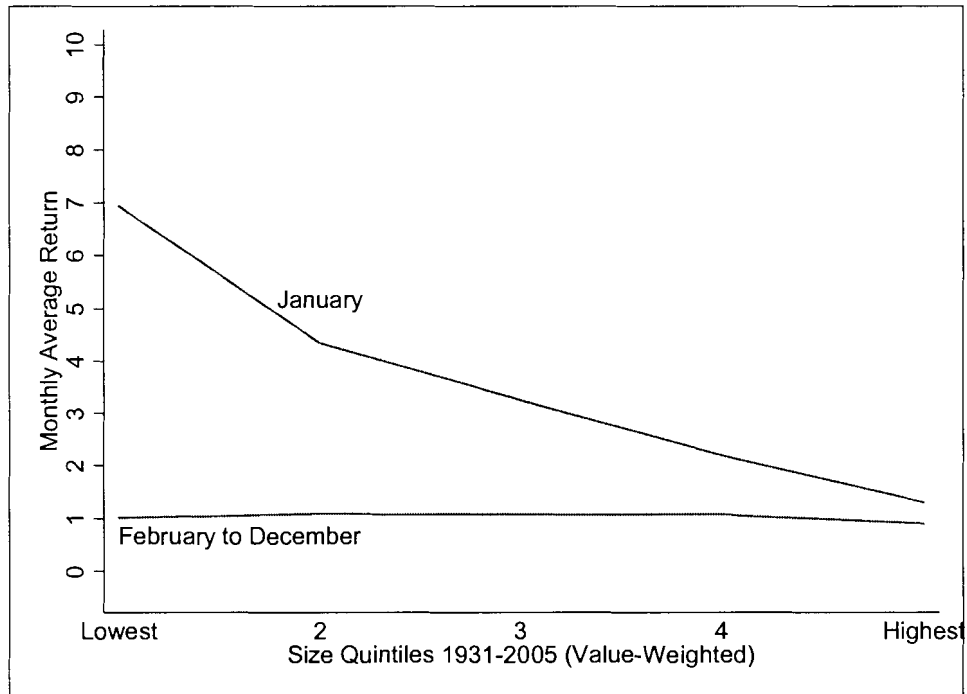


Figure 14: Average Returns for January and the Rest of the Year by Size Quintiles 1931-2005 (Equal-Weighted)

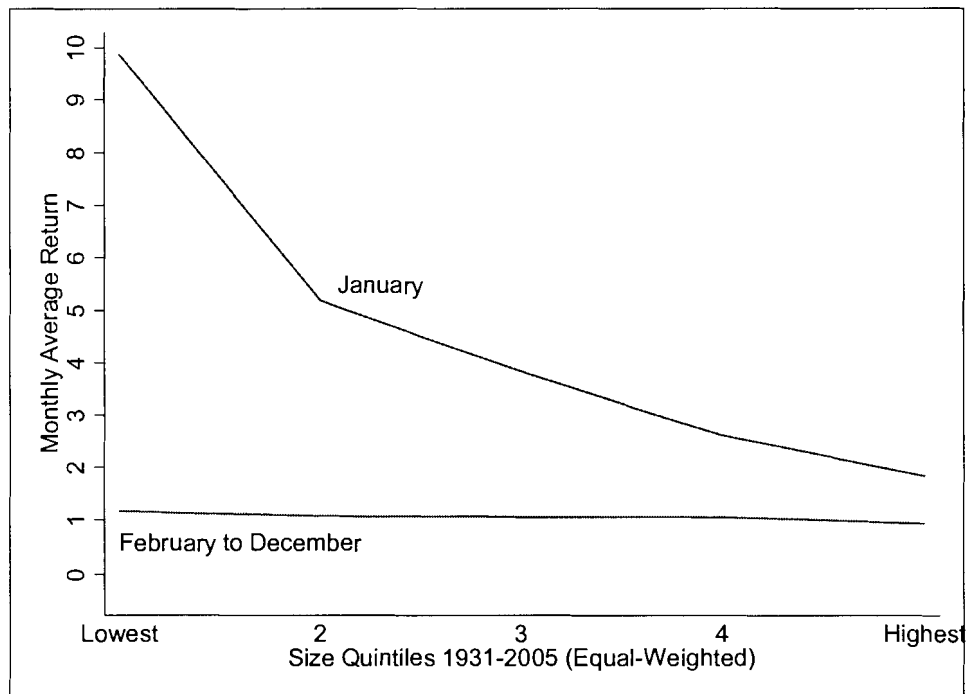


Figure 15: Average Returns for January and the Rest of the Year by Size Quintiles 1931-1978 (Value-Weighted)

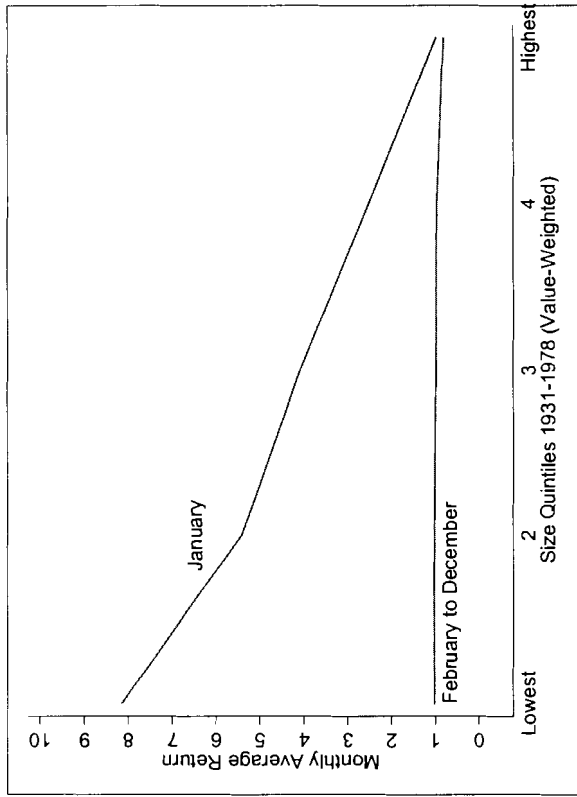


Figure 16: Average Returns for January and the Rest of the Year by Size Quintiles 1931-1978 (Equal-Weighted)

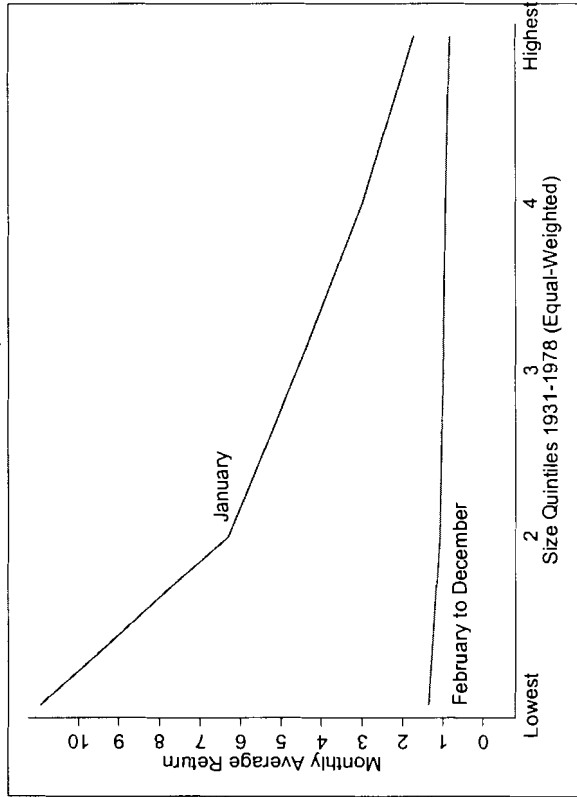


Figure 17: Average Returns for January and the Rest of the Year by Size Quintiles 1979-2005 (Value-Weighted)

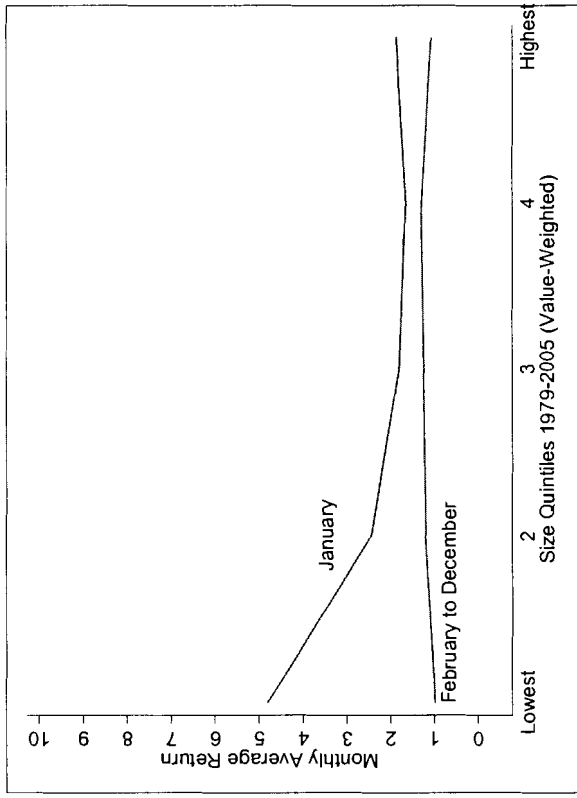
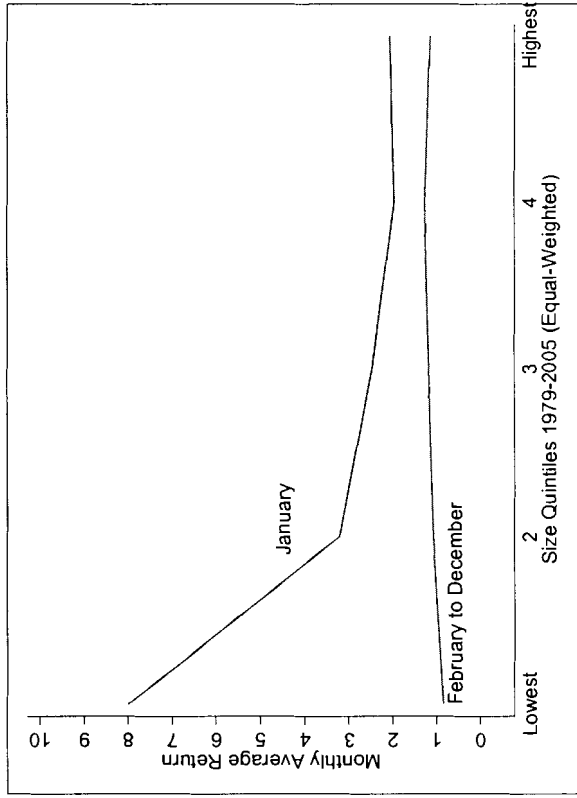


Figure 18: Average Returns for January and the Rest of the Year by Size Quintiles 1979-2005 (Equal-Weighted)



4.4 The January Effect in Book-to-Market Ratio Sorted Portfolios

Table 3 reports the results of dummy OLS regressions $R_{it} = a_{0i} + a_{1i}Jan_t + e_{it}$ for both value-weighted and equal-weighted book-to-market quintile portfolios for 1931 to 2005, 1931 to 1978 and 1979 to 2005 time periods separately. R_{it} is the monthly return on quintile portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, a_{0i} stands for the average return on quintile portfolio i from February to December, a_{1i} stands for the difference between January average return and average return for the rest of the year. P-values for the t-test are also reported.

For the BE/ME quintiles in Table 3, first of all, for most of the quintiles except the lowest BE/ME quintile, average rates of return for January are higher than rates of return for the rest of the year, which is represented by the positive coefficients a_{1i} for the January dummy. January average return is lower than return for the rest of the year for firm with the lowest BE/ME ratio. The positive difference is increasing with BE/ME ratio from 0.52 to 4.48. The coefficient for the January dummy is statistically significant at 1% level only for firm with the highest BE/ME ratio and statistically significant at 5% level only for firm with the second highest BE/ME ratio, other coefficients are not significant at all. Thus the January effect is increasing in BE/ME ratio.

Secondly, by comparing the value-weighted portfolio and equal-weighted portfolio, we can see that coefficients for the January dummy of equal-weighted portfolio are all positive and much greater than those of value-weighted portfolio. Also, all of the coefficients for the January dummy of equal-weighted portfolio are

statistically significant at 1% level, while only two coefficients for value-weighted portfolio are statistically significant at least at 5% level. Since equal-weighted portfolio puts more weights on small firms, this implies that the anomaly exists especially for small firms.

Figure 19 and Figure 20 plot the January return and average return for the rest of the year. They show a pattern which is consistent with the regression. The lower line is the average rate of return from February to December for the five quintiles, which is represented by a_{0i} in the regression result. The distance between these two lines is the difference between January return and return for the rest of the year, which is represented by a_{1i} . From the graph we can see that the difference is positive for most of the quintiles which implies the existence of the January effect, the difference is increasing in BE/ME ratio from about 0 to about 4 which is consistent with the result of the regression. Also, the difference between January return and return for the rest of the year is more obvious for equal-weighted portfolio.

Thirdly, for separate regressions for the period from 1931 to 1978 and the period from 1979 to 2005, the trend is similar as the whole period, coefficients for the January dummy are all positive except for the lowest BE/ME quintile from 1931 to 1978. The significance level for the January dummy is increasing in BE/ME. However, the January effect is more significant for the period from 1931 to 1978. The coefficients for January dummy from 1931 to 1978 are greater than those from 1979 to 2005 for portfolios with high BE/ME ratios. For the period from 1931 to 1978 we can observe statistically significant difference between

January return and return for the rest of the year for the last two quintiles, but for the period from 1979 to 2005 we can only find statistically significant difference for portfolios with the highest BE/ME ratio. By comparing the value-weighted and equal-weighted indices, we can see all the coefficients of January dummy for equal-weighted portfolio are positive and much greater than those for value-weighted portfolio. We have more statistically significant coefficients for equal-weighted portfolio than for value-weighted portfolio in both periods. A strange result is that for equal-weighted portfolio, from 1979 to 2005, the trend is reversed, the return for firm with the lowest BE/ME ratio is even higher than the medium BE/ME ratio firms, and the difference is statistically significant.

This can also be seen from Figure 21 through Figure 24. Obviously, the difference between January return and return for the rest of the year which is represented by the distance between the two lines is decreasing in firm size. Also, the difference is more significant for the period from 1931 to 1978, for the period from 1979 to 2005, the January effect almost disappears for BE/ME quintiles. This is consistent with the table above. The same trend can be observed for equal-weighted portfolio, but the difference between January return and return for the rest of the year is more obvious for equal-weighted portfolio. Also, the trend for equal-weighted portfolio from 1979 to 2005 is reversed, the return differences for both low and high BE/ME ratio firms are greater than those for firms with medium BE/ME ratios.

Table 3: Test for the January Effect by BE/ME Quintiles

		Value-Weighted									
a_{0i} (non-Jan)		Q1	Q2	Q3	Q4	Q5	P1	P2	P3	P4	P5
BE/ME(1931 to 2005)		0.92	0.90	1.00	1.07	1.13	0.00	0.00	0.00	0.00	0.00
BE/ME(1931 to 1978)		0.85	0.73	0.90	0.99	1.05	0.00	0.00	0.00	0.01	0.01
BE/ME(1979 to 2005)		1.03	1.20	1.19	1.21	1.28	0.00	0.00	0.00	0.00	0.00
a_{1i} (Jan)		Q1	Q2	Q3	Q4	Q5	P1	P2	P3	P4	P5
BE/ME(1931 to 2005)		-0.33	0.55	1.13	2.05	3.53	0.96	0.39	0.11	0.01	0.00
BE/ME(1931 to 1978)		-0.37	0.52	1.47	2.65	4.48	0.68	0.54	0.13	0.03	0.00
BE/ME(1979 to 2005)		0.56	0.62	0.53	0.99	1.85	0.58	0.51	0.54	0.22	0.04
		Equal-Weighted									
a_{0i} (non-Jan)		Q1	Q2	Q3	Q4	Q5	P1	P2	P3	P4	P5
BE/ME(1931 to 2005)		0.62	0.94	1.12	1.24	1.43	0.01	0.00	0.00	0.00	0.00
BE/ME(1931 to 1978)		0.75	0.89	1.03	1.19	1.42	0.01	0.01	0.00	0.00	0.00
BE/ME(1979 to 2005)		0.38	1.04	1.28	1.35	1.45	0.36	0.00	0.00	0.00	0.00
a_{1i} (Jan)		Q1	Q2	Q3	Q4	Q5	P1	P2	P3	P4	P5
BE/ME(1931 to 2005)		3.45	3.54	3.90	4.75	7.51	0.00	0.00	0.00	0.00	0.00
BE/ME(1931 to 1978)		2.27	3.31	4.21	5.40	8.45	0.03	0.00	0.00	0.00	0.00
BE/ME(1979 to 2005)		5.55	3.95	3.32	3.60	5.84	0.00	0.00	0.00	0.00	0.00

Note: This table reports the results of dummy OLS regressions $R_{it} = a_{0i} + a_{1i}Jan_t + e_{it}$ for both value-weighted and equal-weighted book-to-market quintile portfolios for 1931 to 2005, 1931 to 1978 and 1979 to 2005 time periods separately. R_{it} is the monthly return on quintile portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, a_{0i} stands for the average return on quintile portfolio i from February to December, a_{1i} stands for the difference between January average return and average return for the rest of the year. P-values for the t-test are also reported.

Figure 19: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1931-2005 (Value-Weighted)

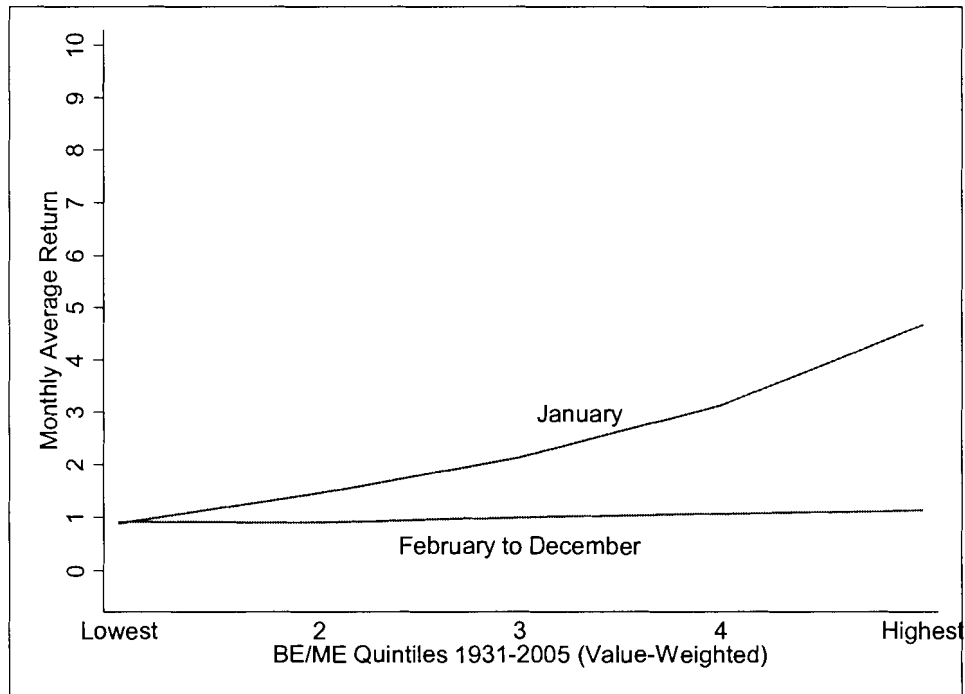


Figure 20: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1931-2005 (Equal-Weighted)

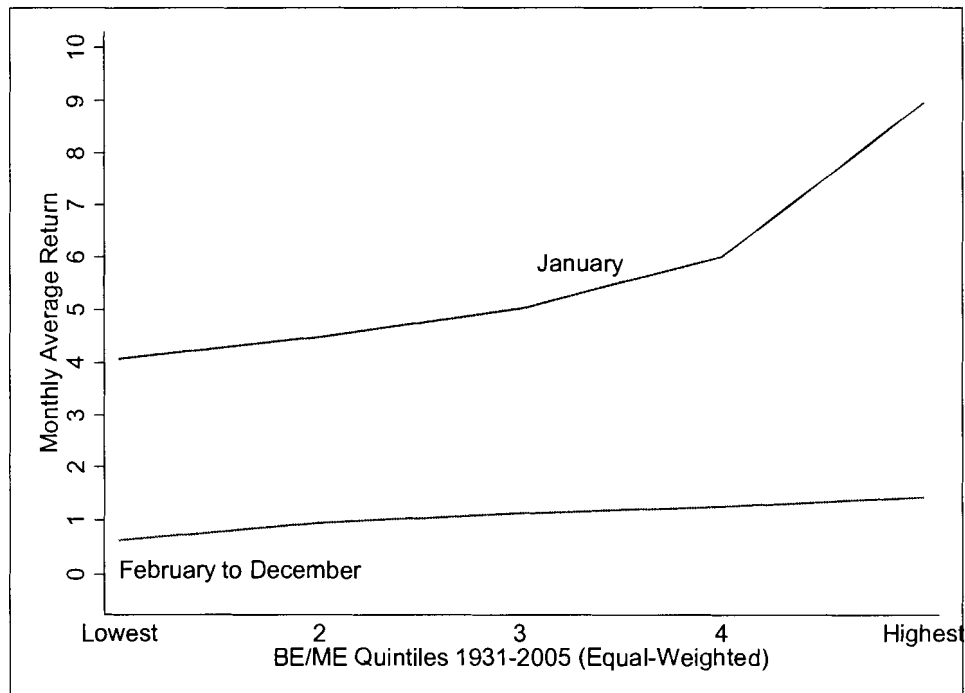


Figure 21: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1931-1978 (Value-Weighted)

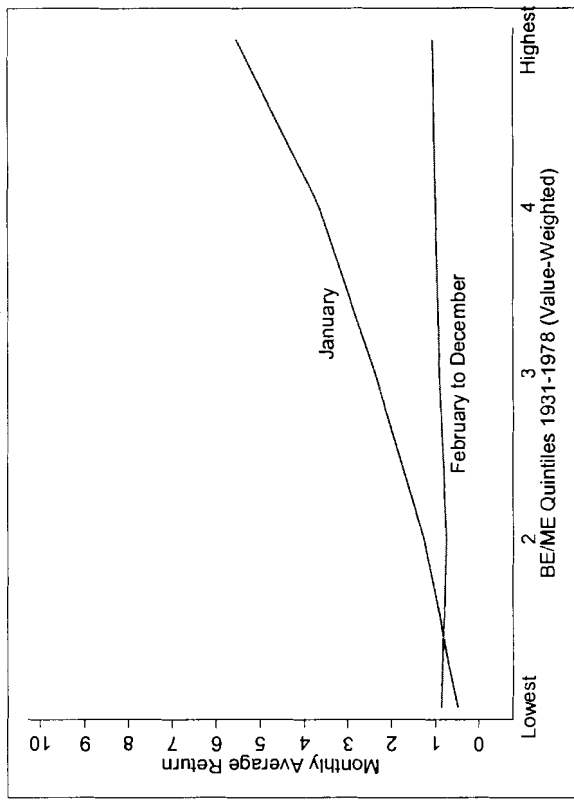


Figure 23: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1979-2005 (Value-Weighted)

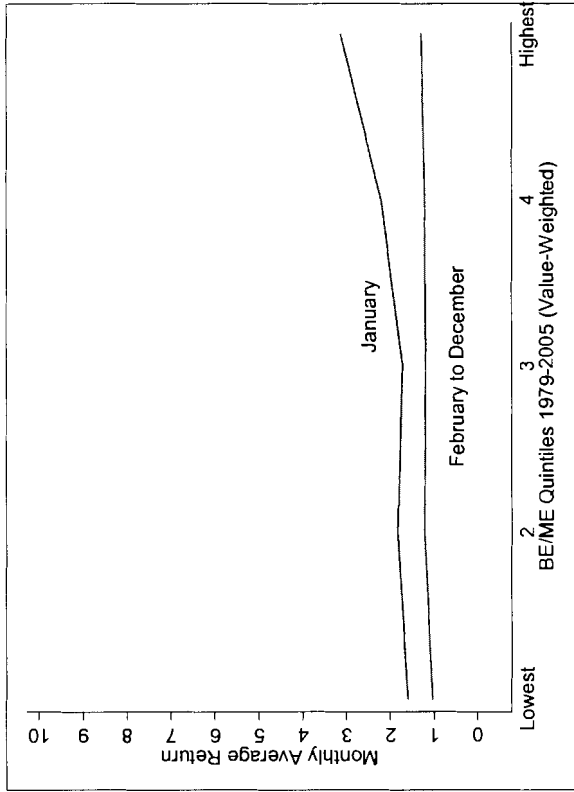


Figure 22: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1931-1978 (Equal-Weighted)

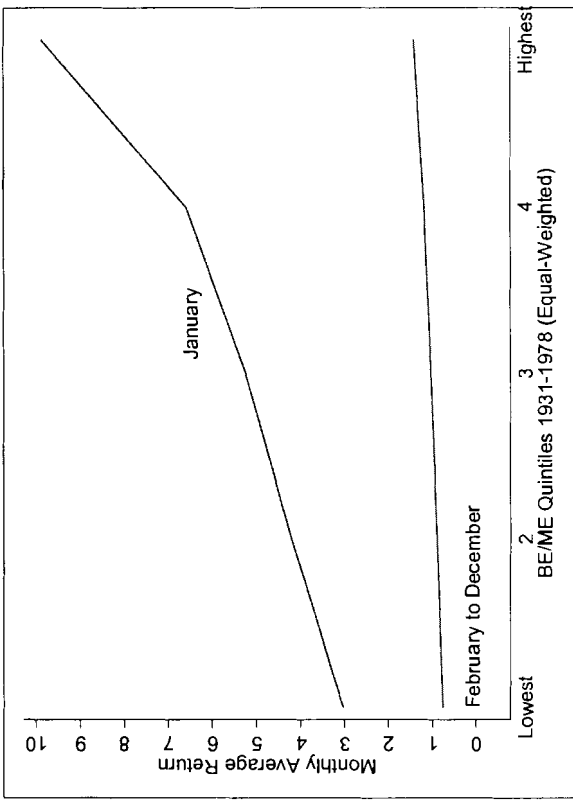
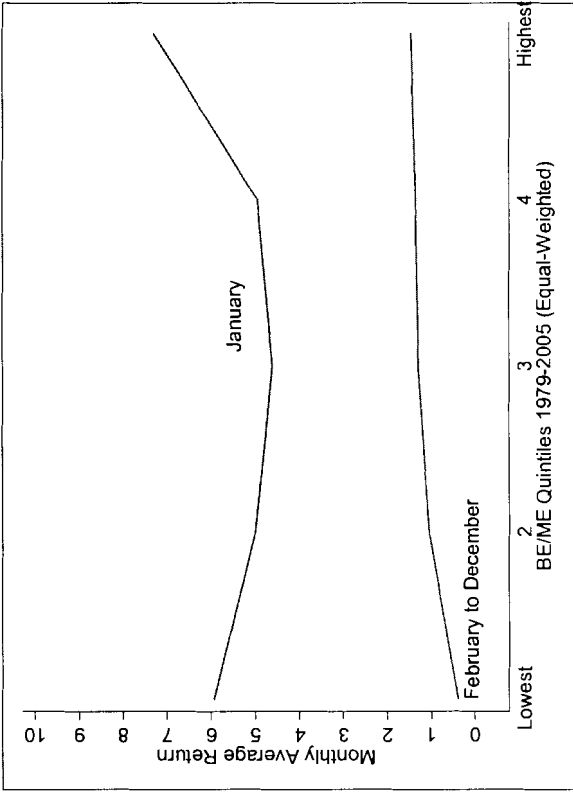


Figure 24: Average Returns for January and the Rest of the Year by BE/ME Quintiles 1979-2005 (Equal-Weighted)



4.5 The January Effect in Size and Book-to-Market Ratio Sorted Portfolios

Since I observe more significant January effect for small firms and also for firms with high BE/ME ratio, now I want to do an analysis for the January effect by examining the 25 portfolios formed on size and book-to-market ratio. Table 4, Table 5 and Table 6 report the results of dummy OLS regressions $R_{it} = a_{0i} + a_{1i}Jan_t + e_{it}$ for both value-weighted and equal-weighted 25 portfolios formed on size and book-to-market ratio for 1931 to 2005, 1931 to 1978 and 1979 to 2005 time periods separately. R_{it} is the monthly return on portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, a_{1i} stands for the difference between January average return and average return for the rest of the year for portfolio i . P-values for the t-test are also reported. In the regression, a_{0i} stands for the average return on quintile portfolio i from February to December, but is not reported in the table due to space limit.

First of all, the results for the whole period from 1931 to 2005 are shown in Table 4. Take value-weighted portfolio for example, the coefficients for the January dummy a_{1i} , which represent the difference between January return and return for the rest of the year, are more statistically significant for firms with small size or high BE/ME ratio, as shown in the first two rows and last two columns. For firms with the same level of size in the same row, the higher the BE/ME ratio, the greater the coefficient for January dummy. For firms with the same level of BE/ME ratio in the same column, the smaller the size, the greater the coefficient for January dummy. This implies that the January effect is more significant for

firms with smaller size and higher BE/ME ratio. But this result does not apply to the smallest firm in the first row, which can be explained as size effect outweighs BE/ME ratio effect here.

Secondly, the same results can be obtained from the equal-weighted portfolio. By comparing the value-weighted and equal-weighted portfolios, there are more statistically significant January dummy coefficients in the table. For those statistically significant coefficients, all of them are positive and greater than the counterparts of the value-weighted portfolio. For value-weighted portfolio, the greatest difference between January return and return for the rest of the year is 8.40%, while the greatest difference is 10.30% for equal-weighted portfolio. Since equal-weighted portfolio weights more on small firms, this implies that the January effect is more significant for small firms.

Thirdly, I also compute the regression for periods from 1931 to 1978 and from 1979 to 2005 respectively, the results are shown in Table 5 and Table 6. The main result is the same as for the whole period from 1931 to 2005, the January effect represented by the positive coefficient of January dummy is greater and more significant for firms with small size and high BE/ME ratio. Also, for equal-weighted portfolio representing small firms, the January effect is more significant. By comparing the periods before and after 1978, the result is that: on the one hand, more coefficients are statistically significant for the period from 1931 to 1978, for the period from 1979 to 2005 the January effect is only significant in the first row representing the smallest firms and the last column representing firms with the highest BE/ME ratio. On the other hand, for those

coefficients that show statistical significance, the positive difference between January return and return for the rest of the year from 1931 to 1978 is greater than the counterparties from 1979 to 2005. For example, for value-weighted portfolio, the greatest difference between January return and return for the rest of the year is 10.40% from 1931 to 1978 but only 4.85% from 1979 to 2005; for equal-weighted portfolio, the greatest difference is 10.88% from 1931 to 1978 but only 9.27% from 1979 to 2005. Thus for the period from 1931 to 1978, the January effect is more significant for both value-weighted and equal-weighted indices. The January effect is decreasing in recent years.

Table 4: Test for the January Effect by 25 Portfolios Formed on Size and BE/ME 1931-2005

		Value-Weighted										
$a_{1,t}$ (Jan) (1931 to 2005)		Low-BM	BM2	BM3	BM4	High-BM	P-Value	Low-BM	BM2	BM3	BM4	High-BM
Small-ME		8.40	4.86	5.16	4.88	6.64	Small-ME	0.00	0.00	0.00	0.00	0.00
ME2		2.67	2.69	2.60	3.46	4.92	ME2	0.01	0.01	0.00	0.00	0.00
ME3		1.65	1.73	1.78	2.38	4.11	ME3	0.08	0.03	0.03	0.00	0.00
ME4		0.19	1.00	1.36	1.86	2.69	ME4	0.80	0.18	0.08	0.03	0.02
High-ME		-0.18	0.26	0.95	1.86	1.81	High-ME	0.78	0.68	0.17	0.03	0.18
		Equal-Weighted										
$a_{1,t}$ (Jan) (1931 to 2005)		Low-BM	BM2	BM3	BM4	High-BM	P-Value	Low-BM	BM2	BM3	BM4	High-BM
Small-ME		10.30	7.46	7.06	6.81	9.16	Small-ME	0.00	0.00	0.00	0.00	0.00
ME2		3.73	3.18	3.29	3.94	5.64	ME2	0.00	0.00	0.00	0.00	0.00
ME3		2.34	2.04	2.13	2.65	4.46	ME3	0.02	0.01	0.01	0.00	0.00
ME4		0.58	1.22	1.73	2.22	3.13	ME4	0.45	0.12	0.03	0.01	0.01
High-ME		0.24	0.53	1.33	2.08	1.76	High-ME	0.72	0.45	0.08	0.02	0.20

Note: This table reports the results of dummy OLS regressions $R_{it} = a_{0,t} + a_{1,t}Jan_t + e_{it}$ for both value-weighted and equal-weighted 25 portfolios formed on size and book-to-market ratio for 1931 to 2005 time period. R_{it} is the monthly return on portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, $a_{1,t}$ stands for the difference between January average return and average return for the rest of the year for portfolio i . P-values for the t-test are also reported.

Table 5: Test for the January Effect by 25 Portfolios Formed on Size and BE/ME 1931-1978

$\alpha_{1,t}$ (Jan) (1931 to 1978)	Value-Weighted										
	Low-BM	BM2	BM3	BM4	High-BM	P-Value	Low-BM	BM2	BM3	BM4	High-BM
Small-ME	10.40	5.56	6.38	5.90	8.14	Small-ME	0.00	0.00	0.00	0.00	0.00
ME2	3.30	3.63	3.68	5.05	6.54	ME2	0.01	0.01	0.00	0.00	0.00
ME3	2.28	2.46	2.78	3.37	5.58	ME3	0.07	0.02	0.02	0.00	0.00
ME4	0.25	1.41	1.94	2.73	3.96	ME4	0.79	0.17	0.08	0.03	0.02
High-ME	-0.53	0.07	1.16	2.30	1.69	High-ME	0.54	0.93	0.23	0.06	0.41
$\alpha_{1,t}$ (Jan) (1931 to 1978)	Equal-Weighted										
Low-BM	BM2	BM3	BM4	High-BM	P-Value	Low-BM	BM2	BM3	BM4	High-BM	
Small-ME	10.88	7.68	7.92	7.69	10.47	Small-ME	0.00	0.00	0.00	0.00	
ME2	4.22	4.12	4.51	5.61	7.36	ME2	0.00	0.00	0.00	0.00	
ME3	2.82	2.80	3.21	3.73	5.96	ME3	0.03	0.01	0.01	0.00	
ME4	0.60	1.73	2.43	3.22	4.51	ME4	0.54	0.10	0.03	0.01	
High-ME	-0.01	0.53	1.82	2.83	1.82	High-ME	0.99	0.58	0.08	0.03	

Note: This table reports the results of dummy OLS regressions $R_{it} = a_{0i} + a_{1i}Jan_t + e_{it}$ for both value-weighted and equal-weighted 25 portfolios formed on size and book-to-market ratio for 1931 to 1978 time period. R_{it} is the monthly return on portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, a_{1i} stands for the difference between January average return and average return for the rest of the year for portfolio i . P-values for the t-test are also reported.

Table 6: Test for the January Effect by 25 Portfolios Formed on Size and BE/ME 1979-2005

α_{it} (Jan) (1979 to 2005)	Value-Weighted										
	Low-BM	BM2	BM3	BM4	High-BM	P-Value	Low-BM	BM2	BM3	BM4	High-BM
Small-ME	4.85	3.61	2.98	3.09	3.97	Small-ME	0.00	0.01	0.01	0.00	0.00
ME2	1.56	1.03	0.69	0.63	2.05	ME2	0.30	0.37	0.48	0.51	0.05
ME3	0.52	0.41	0.01	0.63	1.50	ME3	0.70	0.70	0.99	0.49	0.13
ME4	0.09	0.29	0.34	0.31	0.43	ME4	0.94	0.78	0.73	0.72	0.66
High-ME	0.44	0.59	0.58	1.08	2.03	High-ME	0.65	0.53	0.52	0.20	0.03
α_{it} (Jan) (1979 to 2005)	Equal-Weighted										
Low-BM	BM2	BM3	BM4	High-BM	P-Value	Low-BM	BM2	BM3	BM4	High-BM	
Small-ME	9.27	7.07	5.54	5.26	6.83	Small-ME	0.00	0.00	0.00	0.00	
ME2	2.85	1.53	1.11	0.98	2.58	ME2	0.07	0.20	0.27	0.31	
ME3	1.48	0.68	0.20	0.72	1.78	ME3	0.31	0.53	0.83	0.44	
ME4	0.55	0.31	0.49	0.43	0.67	ME4	0.66	0.77	0.62	0.64	
High-ME	0.70	0.52	0.44	0.73	1.64	High-ME	0.52	0.60	0.63	0.39	

Note: This table reports the results of dummy OLS regressions $R_{it} = a_{0i} + a_{1i}Jan_t + e_{it}$ for both value-weighted and equal-weighted 25 portfolios formed on size and book-to-market ratio for 1979 to 2005 time period. R_{it} is the monthly return on portfolio i in month t , Jan_t is the January dummy which is 1 for January and 0 for the rest of the year. In the table, a_{it} stands for the difference between January average return and average return for the rest of the year for portfolio i . P-values for the t-test are also reported.

5. Conclusion

From the analyses in this paper, I have five main conclusions:

First, for the time period from 1931 to 2005, January return is higher than return for the rest of the year for dividend quintiles, size quintiles and book-to-market ratio quintiles, thus the January effect exists.

Second, for firms with dividend yields, the January effect is increasing in the size of the dividend yield. This result is reasonable. Since in the U.S. dividend income is subject to a higher marginal tax rate than capital gains, by tax-loss selling hypothesis, rational taxable investors will prefer a dollar of pretax capital gains to a dollar of dividends. Thus keeping other things equal, the higher a stock's dividend yield, the higher the pretax return a taxable investor will require to compensate for the tax liability incurred (see Keim (1986)). Tax year starts in January in the U.S., thus portfolios with higher dividend yields will provide higher returns in January. However, the result that the average return on non-dividend portfolio is higher than returns on other dividend yield portfolios suggests that the relationship between dividend yield and return is not linear, thus the simple tax-related model may not explain this relationship.

Third, the January effect is decreasing in firm size. This result is also reasonable. Since returns for small firms are more volatile than for large firms, the possibility of having negative returns is higher for small firms. Thus by tax-loss selling hypothesis, investors are more likely to sell small stocks in the year's end to realize capital losses to reduce tax liability. After the year's end, this price

pressure is relieved, thus the returns for these small stocks will increase to their normal values (see Roll (1983)).

Fourth, the January effect is increasing in book-to-market ratio. A possible explanation for this effect is portfolio rebalancing by investors. By window dressing hypothesis, institutional investors will sell value stocks for good performance of their portfolios, and as soon as December 31 passes they will reinvest in more speculative value stocks, thus the return for high book-to-market stocks can have higher returns in the early January (see Ritter and Chopra (1989)).

Fifth, the January effect is more significant for the period from 1931 to 1978 than for the period from 1979 to 2005, thus the January effect is decreasing in recent years. This is consistent with some recent studies. In Anthony's studies (2003), the January effect is declining in both U.S. and U.K. in recent years, but none of the factors such as GDP growth, inflation, market return, variance of market return, which are used to explain the January effect in the whole literature, shows a declining trend in these years. So it seems that there are some other important factors which may explain the January anomaly. One possible explanation is the growing of derivative markets, another explanation is the increasing trading volume by institutional investors who have faster information and lower transaction costs. And some further studies on the explanatory factors might be helpful to explain both the existence and declining of the January effect.

REFERENCE LIST

- Athanassakos, George, 2002, "The Scrutinized-Firm Effect, Portfolio Rebalancing, Stock Return Seasonality, and the Pervasiveness of the January Effect in Canada", *Multinational Finance Journal*, 6, 1-27.
- Branch, Ben, and Chang Kyungchun, 1990, "Low Price Stocks and the January Effect", *Quarterly Journal of Business and Economics*, 29, 3.
- Branch, Ben, 1977, "A Tax Loss Trading Rule", *Journal of Business*, 50, 198-207.
- Chen, Honghui and Vijay Singal, 2004, "All Things Considered, Taxes Drive the January Effect", *Journal of Financial Research*, 27 (3), 351-372.
- Constantinides, G. M., 1984, "Optimal Stock Trading with Personal Taxes", *Journal of Financial Economics*, 13, 65-89.
- Cox, Don R. and Ken Johnston, 1998, "The January Effect is Not Driven by Tax Loss Selling", *Journal of Investing*, 7, 105-111.
- Dyl, E., 1977, "Capital Gains Taxation and Year-End Stock Market Behaviour", *Journal of Finance*, 32, 165-175.
- Fountas, Stilianos and Konstantinos N. Segredakis, 2002, "Emerging Stock Markets Return Seasonalities: the January Effect and the Tax-Loss Selling Hypothesis", *Applied Financial Economics*, 12, 291-299.
- Gu, Anthony Yanxiang and John T. Simon, 2003, "Declining January Effect-Experience in the United Kingdom", *American Business Review*, 21, 117-121.

- Gu, Anthony Yanxiang, 2003, "The Declining January Effect: Evidences from the U.S. Equity Markets", *The Quarterly Review of Economics and Finance*, 43, 395-404.
- Jones, Charles P., Douglas K. Pearce and Jack W. Wilson, 1987, "Can Tax-Loss Selling Explain the January Effect? A Note", *Journal of Finance*, 42(2), 453-461.
- Kato, Kiyoshi and James S. Schallheim, 1985, "Seasonal and Size Anomalies in the Japanese Stock Market", *Journal of Financial and Quantitative Analysis*, Vol. 20, No. 2, June 1985.
- Keim, Donald B. 1983, "Size-Related Anomalies and Stock Return Seasonality, Further Empirical Evidence", *Journal of Financial Economics*, 12 (1983) 13-32.
- Keim, Donald B. 1985, "Dividend Yields and Stock Returns, Implication of Abnormal January Returns", *Journal of Financial Economics*, 14 (1985) 473-489.
- Keim, Donald B. 1986, "The CAPM and Equity Return Regularities", *Financial Analysts Journal*, May-June.
- Keim, Donald B. 1989, "Trading Patterns, Bid-Ask Spreads, and Estimated Security Returns, The Case of Common Stocks at Calendar Turning Points", *Journal of Financial Economics*, 25 (1989) 75-97.
- Lee, Chen-few, David C. Porter and Daniel G. Weaver, 1998, "Indirect Tests of the Haugen-Lakonishok Small-Firm/January Effect Hypotheses: Window

- Dressing versus Performance Hedging”, *The Financial Review*, 33, 177-194.
- Mehdian, Seyed and Mark J. Perry, 2002, “Anomalies in US Equity Markets: A Re-examination of the January Effect”, *Applied Financial Economics*, 12, 141-145.
- Nejat, Seyhun H., 1988, “January Effect and Aggregate Insider Trading”, *Journal of Finance*, 43, 129-141.
- Pettengill, Glenn N., 1986, “A Non-Tax Cause for the January Effect? Evidence from Early Data”, University of Missouri, Columbia.
- Pietranico, Paul-Charles A. and Mark W. Riepe, 2004, “The January Effect Revisited”, *Journal of Financial Planning*, 12, 26-28.
- Ritter, Jay R. and Navin Chopra, 1989, “Portfolio Rebalancing and the Turn-of-the-Year Effect”, *Journal of Finance*, 44 (1989), 149-166.
- Roll, Richard, 1983, “Was ist das? The Turn-of-the-Year Effect and the Return Premia of Small Firms”, *the Journal of Portfolio Management*, 10, 18-28.
- Rozeff, Michael S. and William B. Kinney, Jr., 1976, “Capital Market Seasonality: The Case of Stock Returns”, *Journal of Financial Economics*, pp. 379-402.
- Schultz, Paul, March 1985, “Personal Income Taxes and the January Effect: Small Firm Stock Returns Before the War Revenue Act of 1917: A Note”, *Journal of Finance*, 40, 333-343.
- Seyhun, H. Nejat, 1993, “Can Omitted Risk Factors Explain the January Effect? A Stochastic Dominance Approach”, *Journal of Financial and Quantitative Analysis*, Vol. 28, No. 2, June 1993.

Thaler, Richard H., 1987, "Anomalies: The January Effect", *the Journal of Economic Perspectives*, 1, 197-201.

Theodor, Kohers and Kohli Raj K., 1991, "The Anomalous Stock Market Behaviour of Large Firms in January: The Evidence from the S&P Composite and Component Indexes", *Quarterly Journal of Business and Economics*, 30, 14-32.

Wachtel, Sidney, 1942, "Certain Observation on Seasonal Movements in Stock Prices", *Journal of Business*, pp. 184-193.