

Risk and the January Effect in the Market for the U.S. Dollar

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ABSTRACT. Researchers have detected in several segments within the U.S. financial markets the presence of the January effect, which refers to the historical patterns of higher returns in January. Our research finds the existence of the January effect in the market for the U.S. dollar. We explain this phenomenon by examining the risk level in different months, as measured by the standard deviation of daily returns. The results show that the standard deviation of the returns on the dollar index is indeed higher in January during the sample period. Normalized returns adjusted for risk show continued presence of the January effect, especially during strong dollar cycles. The results indicate that higher risk provides only a partial explanation for the January effect of the dollar.

I. INTRODUCTION

An anomaly inconsistent with the concept of market efficiency in financial markets is the January effect. Researchers in finance have documented higher returns in January compared to other months in

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U.S. financial markets. For example, Rozeff and Kinney (1976), Roll (1983), and Lakanishok and Smidt (1984) reported January effect for stocks. Keim and Stambaugh (1986) found the existence of the January effect in the corporate bond market. Wilson and Jones (1990) found the January effect to be prevalent in the commercial paper market.

Recent studies in international finance indicate that the January effect extends to the market for the U.S. dollar¹ [(Angrist, 1991; Rathinasamy, Mantripragada and Loh, 1992)]. Angrist (1991) found higher returns in January of every year for the period of 1980 through 1989 except in years 1986 and 1987. Rathinasamy et al. (1992) reported the presence of the January effect in the market for the U.S. dollar over a longer sample period of 1975-1990, and during strong dollar sub-periods of 1981 through June, 1985 and 1989. They also found higher returns in January for each of the years 1977, 1979, 1981, 1988 and 1989.

Some possible reasons for the January effect of the dollar have been cited in literature. For example, treasurers of the multinational corporations base their dollar buying or selling decisions on the movements of the dollar in (early) January (Tucker, Madura and Chiang, 1991). Treasurers are likely to go long if the dollar strengthens in January and go short if the dollar depreciates in January. There could also be other reasons such as tax-related sales of dollar-denominated assets by foreigners in December and a repurchase of the same in January, causing the January effect of the dollar.

It is well known that in financial markets, higher returns and higher risk are positively correlated. It is conceivable that the observed higher returns in January may be due to higher risk in January. This paper addresses the question of differences in the variability of returns as a possible explanation for the observed January effect of the U.S. dollar. No prior study has examined differential risk as a possible cause for the January effect on the dollar.² The paper is organized as follows: in the second section, we present the data, the methodology of the study, and the hypotheses; in the third section, the results of the tests are reported and discussed; the paper ends with the summary and conclusions section.

II. HYPOTHESES, DATA, AND METHODOLOGY

a. Hypotheses

i. First, we test for the existence of the January effect in the market for the U.S. dollar by comparing the returns in January to other months. *The first null hypothesis is that the mean of daily returns in January is not significantly higher than the mean of daily returns in other months.* Rejection of this hypothesis will imply that the returns in January are significantly higher than the returns in other months, indicating the presence of the January effect in the market for the U.S. dollar.

ii. Second, we test for the higher variability in January; the risk as measured by the standard deviation of daily returns in January is compared to other months. *The second null hypothesis is that the mean January standard deviation of the daily returns of the U.S. dollar index is not significantly higher than the mean standard deviation for other months, i.e., the difference in means between the two groups will not be significantly greater than 0.* Rejection of this null hypothesis would indicate that the risk is indeed higher in January.

iii. Third, we test for a higher normalized mean return in January. The normalized returns in January are compared to the returns in other months. *The third null hypothesis is that the mean January normalized return on the U.S. dollar index is not significantly higher than the mean normalized return for other months, i.e., the difference in means between the two groups will not be significantly greater than 0.* Rejection of this null hypothesis would imply higher risk-adjusted returns in January compared to other months.

b. Data and Methodology

The data used consist of daily spot closing prices of the U.S. dollar index³ from 1975 through 1990.⁴ Since market forces would need time to adjust to the new system of free floating exchange rates, it was felt that data from the fixed rate regime in place prior to 1973 would be inappropriate.

i. The *daily returns* on the index were computed as follows:

$$DR_t = \{(DP_t - DP_{t-1}) / DP_{t-1}\} * 100 \quad (1)$$

where,

- DR_t = Daily return on the index in percent,
 DP_t = the closing price of the index for day t ,
 DP_{t-1} = the closing price of the index for day $t-1$.

The standard deviation of daily returns for each month, by year, during the sample period was also calculated.

ii. The presence of the January effect in the market for the U.S. dollar was analyzed by using a dummy variable regression approach; specifically, the following regression model was used:

$$R_{it} = \sum_{i=1}^{12} \alpha_i D_{it} + e_t \quad (2)$$

where, $D_{it} = 1$ for month i , 0 otherwise.

For the January effect to be present, the coefficient for January should be significantly positive. The coefficient was tested using a t-test. In addition, an F-test was used to test the equality of means/coefficients for January and other months.

iii. The differences in the variability of the dollar index in January vis-à-vis other months was tested by using the standard deviation⁵ of daily returns for a given month. The differences, between the means of the standard deviation of daily returns for January and the standard deviations of other months, were compared using a t-test.

iv. In addition, the differences in normalized returns in January with other months were analyzed using a t-test.

III. EMPIRICAL RESULTS

a. Test for the January Effect of the Dollar

The results of the analysis of the daily returns for January and other months for the sample period of 1975-1990 are presented in

Table 1. The table gives the coefficient (mean return) for a month and the t-statistic for the mean/coefficient. The average of daily returns on the dollar index for January is 0.0648 percent; the t-statistic for the mean/coefficient is significant at the 5 percent level. The coefficients for other months are non-significant for the most part. For some months the coefficients are significantly negative. The results from Table 1 indicate the presence of the January effect in the market for the U.S. dollar. Further, a test of equality of means of monthly returns resulted in an F-value of 1.996 significant at the 5 percent level, indicating the mean returns are different and, providing added support for significantly higher returns in January. Therefore, the null hypothesis of the returns in January being not higher than the other month returns is rejected.⁶

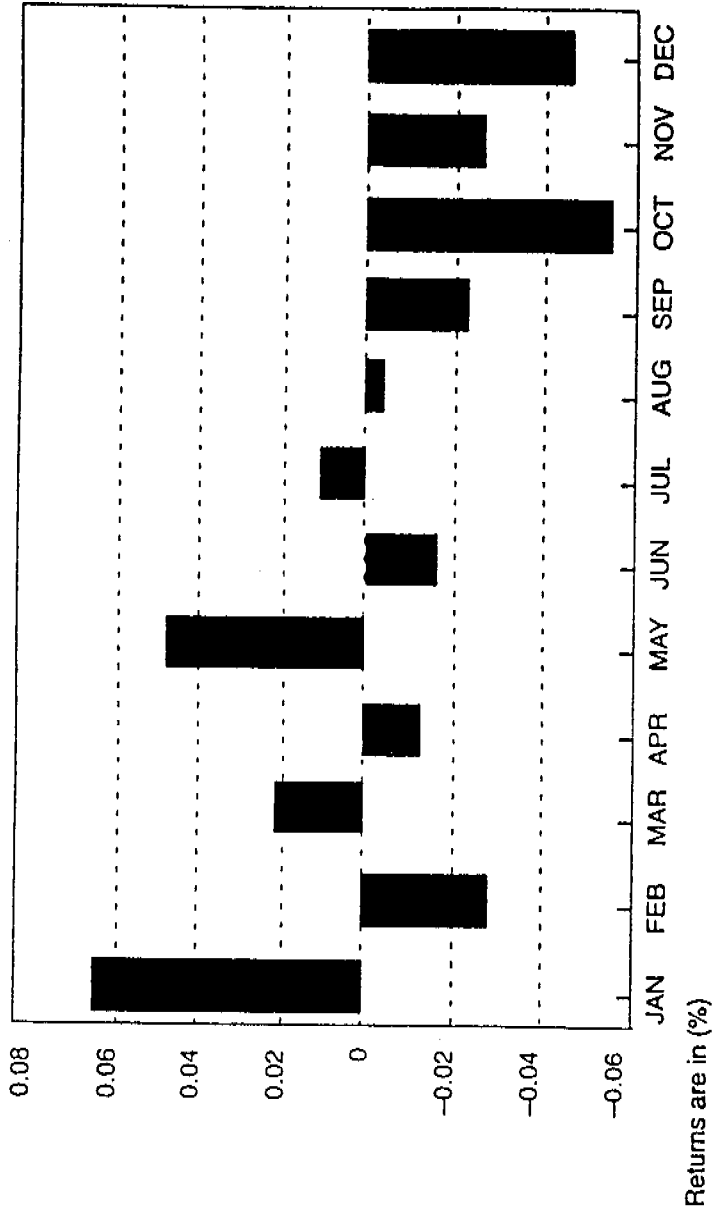
Figure 1 presents the mean daily returns for January and other months for the 1975-1990 period. An examination of the figure demonstrates the fact that the January return is the highest observed return; the returns for May, March and July are also positive; for all

TABLE 1. Mean Daily Returns (%) on the Dollar Index by Month (1975-1990)

Month (1)	Mean Daily Return/ Coefficient for the Month (%) (2)	t-Statistic for the Mean/ Coefficient (3)
January	0.0648	2.63***
February	-0.0329	-1.26
March	0.0220	0.91
April	-0.0149	-0.60
May	0.0471	1.91*
June	-0.0173	-0.70
July	0.0112	0.45
August	-0.0042	-0.18
September	-0.0221	-0.88
October	-0.0548	-2.25**
November	-0.0237	-0.92
December	-0.0448	-1.79*

- *** Significant at 1% level
- ** Significant at 5% level
- * Significant at 10% level

FIGURE 1. Mean Daily Return on the Dollar Index



other months, the return is negative. There is indeed a January effect in the market for the U.S. dollar.

These findings regarding the January effect on the dollar are consistent with the results of the January effect on stocks: for example, Rozeff and Kinney (1976) in their study period of 1941-1967, report a daily mean return of 0.046 percent for January and 0.0056 percent for all months. An examination of results presented by Ritter and Chopra (1989) show that for the period 1935-1986, the January daily mean return was 0.046 percent, while the non-January daily mean return amounted to 0.01070 percent. However, Rogalski and Tinic (1986) found a considerably higher daily return of 0.3413 percent for January.

b. January Effect and Differential Risk

There is ample evidence in finance literature of a positive association between return and risk. Given the higher returns in January on the dollar index, we wish to investigate whether risk as measured by the standard deviation of returns was also higher in January. If so, the increased higher returns in January can be explained by higher risk in January. We present the results of a comparison of mean standard deviation for January with other months in Table 2. The mean standard deviation for other months and for the total non-January period of February through December appear in column (3). The t-statistics for the significance of the differences in the means for January with other months are presented in column (5). The mean standard deviation in January for the sample period of 1975-1990 is 0.4605 percent, the highest value for any given month. The standard deviation for all non-January months is well below that of the January level. The differences in the standard deviation of January returns with all other months is significant at the one percent level. Therefore, the variability of daily returns in January is, in fact, higher. A month-by-month comparison of the standard deviation of January daily returns with those of all other months shows that the difference of a given month's standard deviation from the January standard deviation is negative; further, the difference is significant at the 1 percent level for all months except May. Thus, the results of the analysis of standard deviation of daily returns provide enough evidence to reject the second null hypothe-

TABLE 2. Comparison of Means of Standard Deviation of Daily Returns (%) for January and Other Months (1975-1990)

Month (1)	Number of Monthly Observations (2)	Mean of Standard Deviation of Daily Returns (%) (3)	Difference from January Standard Deviation (4)	t-Statistic for the Difference (5)
January	16	0.4605		
February	16	0.4199	-0.0406	-2.51***
March	16	0.3642	-0.0963	-5.82***
April	16	0.4010	-0.0595	-2.88***
May	16	0.3567	-0.1038	-6.67***
June	16	0.3863	-0.0742	-4.36***
July	16	0.4114	-0.0491	-3.09***
August	16	0.4345	-0.0260	-1.63
September	16	0.4120	-0.0485	-2.89***
October	16	0.3920	-0.0685	-4.72***
November	16	0.4236	-0.0369	-2.10**
December	16	0.3990	-0.0615	-4.03***
February through December	176	0.4005	-0.0600	-4.66***

*** Significant at 1% level

** Significant at 5% level

sis. The results indicate that the risk as measured by the standard deviation of returns, in fact, is higher in January. Our findings of higher risk (standard deviation) in January on the dollar index are consistent with the findings of Rogalski and Tinic (1986) on the U.S. stock market. Using data from 1963 to 1982 and employing three different risk measures of variance, beta and residual risk, they found the risk to be higher in January compared to other months, especially for small capitalization stocks.

c. Normalized Return and the January Effect

The results reported so far indicate that both the return and risk are higher in January compared to other months. However, the question remains, is the additional return in January just adequate to

compensate the investor for the additional risk? If so, the January effect is merely a reflection of higher risk. If the return in January is significantly higher, even after adjusting for the higher risk, the January effect remains unexplained. This is tested by computing normalized returns, i.e., the returns for a given month divided by the standard deviation of returns for that month, and then comparing the normalized returns. Dividing the returns by the standard deviation of returns puts the returns on a common platform with respect to risk.

The results of the comparison of the normalized mean returns for January with those for each of the other eleven months, separately and taken as a group, appear in Table 3. The normalized mean return for January is 0.1634, the highest value observed. For eight of the non-January months, the returns are negative. For each of the eleven months, the difference from the January normalized mean return is negative. For eight out of eleven months, the difference is significant either at the 1 percent or the 5 percent level. In addition, the difference between the normalized returns of January and February through December as a group, is -0.1833 , which is significant at the 1 percent level. Based on these results, it may be concluded that the risk-adjusted January return is significantly higher than the returns for other months. Therefore, higher risk in January does not completely explain the higher return in January. The higher return in January is more than what is warranted by the higher risk in January.

d. Dollar Cycle and the Normalized Daily Returns

The U.S. dollar has undergone discernible cycles of strength and weakness during 1975-1990. Specifically, the dollar was weakening during the six-year period of 1975 through 1980; and it strengthened from 1981 through June 1985. It went through a devaluation phase from July 1985 through 1988. The dollar had a strong 1989 and a fairly weak 1990. The January effect and the risk as measured by the standard deviation could be influenced by the dollar cycle. It would be of interest to know whether the normalized returns are higher in January both in strong as well as weak dollar cycles. To test for this, separate t-tests were run for the *normalized daily returns* for the following sub-periods:⁷

TABLE 3. Comparison of Means of Daily Normalized Returns for January and Other Months (1975-1990)

Month (1)	Number of Daily Observations (2)	Mean of Normalized Daily Returns ¹ (3)	Difference from January Normalized Return (4)	t-Statistic for the Difference (5)
January	335	0.1634		
February	298	-0.0714	-0.2348	-2.95***
March	352	0.1138	-0.0496	-0.65
April	338	-0.0073	-0.1707	-2.21**
May	337	0.1200	-0.0434	-0.56
June	336	-0.0624	-0.2258	-2.91***
July	333	0.0614	-0.1020	-1.30
August	354	-0.0139	-0.1773	-2.34**
September	325	-0.0586	-0.2220	-2.86***
October	343	-0.1105	-0.2739	-3.53***
November	305	-0.0652	-0.2286	-2.87***
December	328	-0.1439	-0.3073	-3.95***
February through December	3649	-0.0199	-0.1833	-3.19***

Daily return divided by the standard deviation of daily returns for a given month.

*** Significant at 1% level

** Significant at 5% level

- a. from 1975 through 1980—a weak dollar cycle;
- b. from 1981 through June 1985—a strong dollar cycle;
- c. from July 1985 through 1988—a weak dollar cycle;
- d. for the year 1989—a strong dollar year; and
- e. for the year 1990—a weak dollar year.

The results of the analysis of the normalized returns in January and other months over strong dollar cycles are presented in Table 4. Over the strong dollar cycle of 1981-June 1985, the normalized return in January is 0.2505, the highest return observed for any given month. The differences in normalized returns between January and all the other eleven months are negative, with the February,

TABLE 4. Dollar Cycle and the Means of Normalized Daily Returns for January and Other Months Strong Dollar

Month (1)	1981-June 1985 (Strong \$)				1989 (Strong \$)			
	Number of Daily Observa- tions (2)	Mean of Normalized Daily Returns (3)	Difference from January Normalized Return (4)	t-statistics for the Difference (5)	Number of Daily Observa- tions (6)	Mean of Normalized Daily Returns (7)	Difference from January Normalized Return (8)	t-statistics for the Difference (9)
Jan.	104	0.2505	-0.3269	-2.27**	21	0.3825	-0.6820	-2.15**
Feb.	92	-0.0764	-0.2216	-1.63	19	-0.2995	0.0140	0.05
Mar.	111	0.0289	-0.1682	-1.21	21	0.3968	-0.7595	-1.34
Apr.	108	0.0823	-0.1309	-0.95	20	-0.3770	-0.1973	-0.65
May	105	0.1196	-0.1176	-0.86	22	0.1852	-0.5827	-1.89*
Jun.	107	0.1329	-0.0398	-0.27	21	-0.2002	-0.5170	-1.65
Jul.	85	0.2107	-0.3033	-2.11**	20	-0.1345	-0.1213	-0.40
Aug.	89	-0.0528	-0.2351	-1.60	23	0.2612	-0.6898	-2.21**
Sept	82	0.0154	-0.2908	-1.98**	20	-0.3073	-0.3758	-1.23
Oct.	83	-0.0403	-0.2688	-1.77*	22	0.0067	-0.5500	-1.78*
Nov.	75	-0.0183	-0.2659	-1.83*	21	-0.1675	-0.7084	-2.27**
Dec.	86	-0.0154			20	-0.3259		
Feb. through Dec.	1023	0.0394	0.2111**	2.05**	229	-0.0479	-0.4304	-1.88*

*** Significant at 1% level

** Significant at 5% level

* Significant at 10% level

August, and October differences being significant at the 5 percent level, while the November and December differences are significant at the 10 percent level. For the strong dollar year of 1989, the normalized January return is 0.3825, the second highest return observed. The differences between January and the remaining months' normalized returns are negative for all months except for March. The differences for February, September and December are significant at the 5 percent level; the differences for June and November are significant at the 10 percent level. The difference in the normalized return for January and the months of February through December as a group is -0.4304 , significant at the 10 percent level.

The results of the analysis of the normalized returns in January and other months over weak dollar cycles are presented in Table 5. With regard to the weak dollar cycles, the normalized January return is negative for two out of three cycles, viz. for 1975-1980, and 1990. For the most part, the negative differences are not significant. With regard to the weak dollar cycle of 1975-1980, the normalized January return of 0.1855 is the second highest. The differences of normalized returns with respect to the January return are negative for six out of eleven months; the differences are significant at the 1 percent level for June and December, at the 5 percent level for September and October, and at the 10 percent level for February. The difference between January and the months of February through December as a group is -0.1857 , significant at 5 percent level. For the most part, during weak dollar cycles, the normalized January return is not any higher than the returns in other months. However, during the weak dollar cycle of 1975-1980, the normalized January return is significantly higher compared to at least some non-January months. Based on the results of the analysis of normalized returns over strong and weak dollar cycles, it can be concluded that the normalized returns are significantly higher in January over strong dollar cycles.

IV. SUMMARY AND CONCLUSIONS

This study examined the January effect in the market for the U.S. dollar, by comparing the daily returns in January to other month returns. Returns in January on the dollar were indeed, higher in January, indicating the presence of the January effect. In a quest to

explain the observed higher January returns in the market for the U.S. dollar, the risk of the daily returns, was analyzed. The standard deviation of daily returns in January was found to be significantly higher vis-à-vis other months over the sample period. When the analysis was extended to cover different strong and weak dollar cycles, the standard deviation in January was still higher, for the most part. As higher risk requires higher return, the observed January effect of the dollar may be explained in terms of higher risk in January. However, the results from comparing the normalized returns in January to those from other months indicated that the normalized returns were higher for January than for other months, especially over the strong dollar cycles. Therefore, even on a risk-adjusted basis, the return in the market for the dollar was higher in January, the higher risk thus providing only a partial explanation of the higher returns in January.

ENDNOTES

1. Given the symmetry on return computations, if the rate of return on the dollar in January is positive, the rate of return on other non-dollar currency/currencies will be negative and the magnitudes will be very close, if not the same. We like to emphasize the fact that in this paper, we have focused on increased risk in January as a possible cause for the January effect of the *U.S. dollar*. Subject to data availability, we would like to investigate the flip side of the January effect of the U.S. dollar on other currencies in a separate paper.

2. See endnote 1.

3. The U.S. dollar index consists of the following currencies, with the weight for each currency in parentheses: West German Mark (20.8%), Japanese Yen (13.6%), French Franc (13.1%), British Pound (11.9%), Canadian dollar (9.1%), Italian Lira (9.0%), Netherlands Guilder (8.3%), Belgian Franc (6.4%), Swedish Krona (4.2%) and Swiss Franc (3.6%). These weights have been constant over time. The calculation of the U.S. dollar index involves measuring the change in exchange rates relative to the base period of 1973. FINEX, a Division of New York Cotton Exchange, is the source for our data.

4. The returns for December, 1990 are through December 13, 1990.

5. Since we have used an index, we decided to use the standard deviation as a risk measure.

6. For more details on the January effect of the U.S. dollar, please see Rathinamsamy, Mantripragada and Loh (1992).

7. See *Global Corporate Finance* by S. H. Kim, 1991, page 84.

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