INDEX PARTICIPATION UNITS AND THE STRUCTURE OF EQUITY MARKET DEMAND: EVIDENCE FROM NEW ISSUES AND REDEMPTIONS OF SPDRS

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ABSTRACT

This study examines the effects of trading in Standard and Poor's Depository Receipts on the pricing efficiency of the index options markets. Using the put-call parity model's no-arbitrage arguments, and intra-day S&P 500 index option data, three boundary conditions are formulated and tested for a total of 119,470 portfolios using intradaily data. Problems of non-synchronous prices are reduced by using intradaily data and also by considering only trades that occur at precisely the same time to the second. The tests indicate that there are significant violations of the arbitrage relations. After accounting that transactions costs including the bid-ask spread, it is apparent that the magnitude and frequency of violations of the arbitrage bounds has decreased, since the introduction of SPDRs. However, the dollar size of the violations that persist through time is substantial and may be worthy of future investigation.

In recent years, a number of derivative products have been introduced into the markets, which might be viewed as a means of facilitating basket trading. These products may in turn be expected to increase the pricing efficiency of the index derivative markets, by facilitating the arbitrage needed to restore the correct prices. One of the earliest of such instruments to trade are Standard and Poor's Depository Receipts, or SPDRs (pronounced "spiders"). SPDRs began trading on the AMEX on January 29, 1993. From they outset, SPDRs have consistently ranked among the top five most actively traded securities by dollar volume on the AMEX.[1]

SPDRs have several attractive features for index arbitrageurs that might be expected to increase market efficiency through time. First, they are priced to directly track the index: they are quoted at one-tenth the level of the S&P 500.[2] Second, they can be sold short, and are exempt from the uptick rule for common stock short sales. Third, unlike traditional mutual funds or index funds, they are available for purchase or sale during the entire trading day, rather than at closing net asset value. Fourth, the transactions costs of SPDRs are low, compared to similar products: the ongoing SPDRs' expenses of 18 basis points are cheaper than for most no-load index mutual funds, and bid/ask spreads are tight, on the order of three cents (1/32).[3] Fifth, unlike index funds,

[1] See e.g. A. Bary, *Barrons*, July 28, 1997, p. 36. The S&P 500 SPDR experienced one of the fastest fund launches in history, surpassing $1 billion by the end of 1995 - less than three years from start-up In comparison, it took Vanguard Group Index Trust 500 open-ended no load mutual fund about twelve years to reach $1 billion in assets

[2] The SPDRs' returns differ somewhat from those of the index, as well as a portfolio of the underlying stocks of the index. When holding the latter, an investor receives dividends at the time of payment, and may dispose of them in accordance with her preferences. In contrast, the SPDR trust accrues all dividends received over the course of the quarter, during which time their value is added to the unit price. When the SPDR trust goes ex-dividend at the end of the quarter, its price is reduced to the base cash price of the index.

[3] The management fee for the Vanguard Group Index Trust 500 is 20 basis points. This is about 100 basis points lower than the usual fee charged by a mutual fund. Commissions at discount brokers are on the

the holder has a redemption option: given a sufficient quantity of SPDRs' ($50,000 in market value) they may be exchanged for the underlying stocks. Sixth, unlike traditional derivative securities on the index with a short term life, SPDRs do not have a designated expiration date.

Since the introduction of SPDRS, a proliferation of such products have appeared including , WEBS, DIAMONDS, and Q's. [4] Given the novelty of index based products, research on their effects to date is limited. Switzer, Varson, and Zghidi (2000) show that the introduction of SPDRs was associated with a reduction of mispricing of S&P futures contracts, though dividend yield and time-to maturity biases remained. Elton, Gruber, Comer and Li (2000) examine the performance of SPDRs and demonstrate that SPDRs underperform the index and index funds as a consequence of management fees and the loss of return from dividend investment, which must be gauged against their trading immediacy value. Their underperformance relative to index futures must be balanced against the costs of maintenance margin of futures, the larger positions required for futures, and the lack of physical delivery for futures at expiration.

This study goes beyond the issue of market tracking behaviour of index participation units examined in other studies, and focuses on activities of market participants who actually create as well as redeem the index paticipation units (IPUs)

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order of $10 for 100 shares of SPDRs, compared to $100 at a full-service house. Total commissions for SPDRs are thus similar to those of a standard mutual fund, even when dealing with a retail broker.

[4] WEBS (World Equity Benchmark Shares) are portfolios of stocks designed to track the performance of selected Morgan Stanley Capital International (MSCI) country indexes, and began trading on March 18, 1996; DIAMONDs are a product of Dow Jones and Company were introduced on Jan. 20, 1998 and are.valued at one-hundredth of the Dow Jones Industrial Average and trade on the American Stock Exchange. QQQ's are the Nasdaq-100 Trust Series I is a pooled investment designed to provide investment results that generally correspond to the price and yield performance of the Nasdaq-100 Index®. They began trading on AMEX on March 10, 1999.

such as SPDRs, and their impact on abnormal supplies and demands in the market for not only the IPUs themselves but for the companies underlying the IPUs.

Specifically, we examines the impact of new issues and redemptions of SPDRs on the market price for SPDRs , as well as the prices of the companies comprising the Index at different moments in time. The fairly long historical experience of SPDRs provides a certain advantage in studying these issues relative to other products. In addition, our results shed new light on the literature on the structure of the demand curve for U.S. equities. Previous work examining the shape of the demand curve for equities has focused on new issues of shares by corporations as well as the effects of market index revisions. The evidence to date for these studies has been inconclusive, at best. This may in part be the result of confounding factors including company specific information effects, liquidity costs, and taxes. Since new issues/redemptions of SPDRs are not directly associated with individual company information, and SPDRs are heavily traded instruments, by focusing new issues and redemptions of these basket portfolios, we may be able to bettter capture the characteristics of the demand curve for equity, controlling for some of the potentially confounding factors inherent in earlier work..

The remainder of this paper is organized as follows. Section I provides some background detail on the issuing and redemption processes for SPDRs, outlines the main questions and hypotheses to be addressed, and includes brief review of the literature relevant to these hypotheses. Section II describes the methodology and formalizes the hypotheses for the study. Section III discusses the data employed in the analyses. In

Section IV, the empirical results are presented. The study concludes in Section V.

I. Background on the Issuing and Redemption Processes for SPDRs and Hypotheses

SPDRs represent proportionate interest in a portfolio of securities, SPDR Trust Series 1 (the Trust), consists of substantially all the securities in the S&P 500 with approximately the same weightings. [5]

The Trust is constructed by institutional investors that create and redeem SPDR units. The creation process begins with the 'Transmittal Date', the date were the order to create a SPDR is placed. Creation orders must be made in block-sizes, 'Creation Units', of 50,000 SPDRs, or multiples thereof. Following the transmittal date, the person placing the order has three business days to fulfill their part of the agreement. In order to fulfill the agreement, the ordering party must deposit with the Trusts trustee, more specifically State Street Bank and Trust, a basket of the S&P 500 as well as a cash component representing accumulated dividends. Therefore, for each creation unit, 50,000 baskets of the S&P 500 enter the Trust. Once the Trust receives the index baskets, the appropriate number of SPDRs is placed on the market.

The redemption process follows much the same steps. Once an order to redeem SPDRs is placed, the Trust has three business days to deliver to the ordering party their baskets of equity. Once the basket is delivered, the SPDR units are removed from the

[5] In cases where changes in the trust are not cost efficient, the Trust is not required to rebalance itself to follow the S&P composition precisely. An example of inexact makeup, as of September 30th, 1999, the SPDR trust included 499 of the 500 companies comprising the S&P 500. See Standard and Poor's Depository Receipts, SPDR Trust Series 1, Prospectus dated January 26, 2000.

exchange. Much like creation orders, redemption orders must be made in multiples of 50,000. It is important to note that parties redeeming units must accept delivery of the physical securities, in kind, and cannot opt to receive cash settlement.

To determine the make up of the portfolio or basket that must be delivered in either creation or redemption transactions, the Trust calculates the net asset value per Creation Unit (NAV). Baskets of portfolios can therefore have a different make up from one day to the next. The process of calculating the NAV is as follows: At the close of the market, the trustee calculated the net asset value of the Trust. This value is divided by the number of outstanding SPDRs and is multiplied by 50,000 to represent a Creation Unit. The trustee then calculates the number of shares of each of the component stocks of the S&P 500 Index that would compose the basket portfolio such that the stocks market value plus dividends would equal the NAV, while maintaining the relative weights set forth in the S&P 500.

Evidence on the effects of new issues and redemptions of SPDRs on the pricing of SPDRs and on its constituent companies can be viewed as a ***direct test*** of an hypothesis that has attracted extensive attention by financial analysts for many years: ***negatively sloped demand curves for equity***. The alternative hypothesis posits that the demand curve for any security is horizontal: the excess demand for a single security is very elastic, and the sale or purchase of a large number of shares does not affect prices. In contrast, a downward sloping demand curve for equity implies that large trading activity affects stock prices even if no new information is disseminated. To the extent that the demand curve for equity is negatively sloped, we can further distinguish between two

corollary hypotheses: (a) *the imperfect substitute hypothesis* (ISH), and (b) the *price pressure hypothesis* (PPH). The ISH assumes that securities are not close substitutes for each other, and hence, that long-term demand is less than perfectly elastic. Under this hypothesis, equilibrium prices change when demand curves shift after an event such as the purchase or sale of a large number of shares. Price reversals are not expected because the new price reflects a new equilibrium distribution of security holders. In contrast, the PPH predicts a perfectly elastic long-run demand curve where the increase in price is followed by a price decline. The PPP requires that some investors provide liquidity services to the market when they respond to immediate price drop (rise) associated with large sales (purchases). These investors are compensated for their liquidity services when prices subsequently rise (drop) to their full-information levels.

A straightforward test of the hypothesis that the demand curve for equities is negatively sloped is to determine the impact of a new issue of SPDRs on the price of the constituent companies of the S&P 500 Index. When the exchange announces a new SPDRs issue, underwriters and specialists must buy or borrow the shares of the underlying companies, which would increase the prices, to the extent that the elasticity of demand is not infinite. Since underwriters and specialists have four trading days (from the day of the announcement of the SPDRs issue until one day prior to the actual issue day) to acquire the needed shares, an appropriate event window to examine this hypothesis is [0,+3] where Day 0 is the announcement day of the SPDRs issue. A price reversal occurring after this window would support the Price Pressure Hypothesis . In contrast, a permanent price reduction would be consistent with the Imperfect Substitute Hypothesis.

The expected price reaction of a redemption of SPDRs on the shares of the constituent companies is ambiguous. One possibility is that underwriters and specialists sell the shares of the constituent companies after the settlement of SPDRs for Baskets of shares. In this case, with a downward sloping demand curve for equity, the share price of the constituent companies should decrease decrease on or surrounding the settlement date.

Finally, to the extent the demand curve for equity is negatively sloped, we would expect the price of SPDRs to decrease on issue days. A new issue of SPDRs (e.g., 8,331,540 units on May 3, 1991) represents an increase in supply, which should give rise to a decrease in price. By the same token, we expect the price of SPDRs to increase on the settlement day following a decrease in the number of SPDRs outstanding.

Our strategy for using new issues/redemptions of SPDRs to capture the shape of the demand curve for equities is in the spirit of the two traditional approaches taken in the literature concerning the demand structure of equity markets. The first approach involves examining the price reactions to stock market index composition changes. For example, Shleifer (1986), Harris and Gurel (1986), Dhillon and Lamouroux and Wansley (1987), Jain (1987), Pruitt and Wei (1989), and Dhillon and Johnson (1991) find evidence supportive of the downward sloping demand curve hypothesis, using inclusions/exclusions of firms from the S&P 500 Index. Of these studies, Shleifer (1986) , Jain (1987), and Dhillon and Johnson (1991) support the imperfect substitutes variation of the negatively sloped demand curve hypothesis, whereas Harris and Gurel (1986) and Lamouroux and Wansley (1987) support the price pressure hypothesis. In contrast,

Beneish and Gardner (1995) find evidence conflicting with the downward sloping demand hypothesis, using firms affected by revisions to the Dow Jones Industrial Average.

The second approach in the literature for ascertaining the structure of the demand curve for equity involves examining price and volume changes at the time of new stock offerings. Along this vein, Marsh (1979), Hess and Baghat (1985), Mikkelson and Partch (1986), suggest that there is no significant price-issue size relationship for new stock offerings. Contrasting evidence is presented by Smith (1977), Asquith and Mullins (1986), Masulis and Korwal (1986), Hansen (1988), and Loderer and Zimmerman (1988). Kalay and Shimrat (1987) dispute the latter evidence, claiming that it ignores information effects and wealth distribution effects. However, Loderer, Cooney, and Van Drunen (1991) conclude that finite price elasticities can explain the negative price reaction to announcements of primary stock offerings, after taking into account information about future cash flows.

On the whole, evidence concerning the empirical shape of the demand curve for equity from previous work, is mixed at best. These mixed findings may in part be the result of confounding factors, including unrelated informational effects, liquidity costs, and taxes. Since new issues/redemptions of SPDRS need not be associated with company specific informational effects, and SPDRS are heavily traded instruments, by focusing on such events, we may be able to shed new light on the empirical characteristics of the demand curve for equity, holding constant company specific information effects and liquidity effects.

III METHODOLOGY

Price reactions to new issues/redemptions SPDRs are examined using the standard event study approach. Following Eckbo (1990), the benchmark for the analysis is of the form:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \sum_{k=1}^{K} \gamma_{ik} * d_k + \epsilon_{it} \quad (5)$$

where

R_{it} = return on stock i on day t

R_{mt} = return on value-weighted market index on day t

α_i = intercept for stock i

β_i = estimated beta for stock i

d_k = event dummy which equals one on day k and zeros otherwise

γ_{ik} = the measure of abnormal return on day k for stock i, or AR_{ik}

ϵ_{it} = estimated error term for stock i on day t, which is assumed to be normally distributed with mean zero and constant variance

The average abnormal return for day k, AAR_k, is determined as

$$AAR_k = [1/N] \sum_{i=1}^{N} AR_{ik} \quad (6)$$

where N is the number of stocks, and AR_{ik} is the measure of the abnormal return on day k for stock i.

The cumulative average abnormal return ($CAAR_{dt}$) is calculated as

$$CAAR_{dt} = \sum_{k=t1}^{t2} AAR_k \quad (7)$$

where dt is the time interval $[t_1, t_2]$.

If the issues and redemptions of TIPs events do not affect the firm returns, both AAR_k and $CAAR_{dt}$ should equal zero. In order to detect whether they are significantly different from zero, the average standardized abnormal return (ASARk) and the average standardized cumulative abnormal return ($ASCAR_{dt}$) are calculated as

$$ASAR_k = [1/N] \sum_{i=1}^{N} [AR_{ik} / S_{ik}] \quad (8)$$

$$ASCAR_{dt} = \sum_{k=t1}^{t2} ASAR_t \quad (9)$$

where, for stock i on event day k, S_{ik} is the estimated standard deviation of $\gamma_{ik.}$

Tests of significance are based on the computed Z-statistics

$$Z(AAR_k) = ASAR_k \cdot N^{1/2} \quad (10)$$

$$Z(CAAR_{dt}) = ASCAR_{dt} \cdot N^{1/2} / (t_2-t_1+1)^{1/2} \quad (11)$$

which are based on the assumptions that the standardized abnormal returns are normally and independently distributed across securities and time.

Data

The SPDR Trust commenced operations on January 29th, 1993 upon with an initial issuance of 150,000 SPDRs . Following this event, the next creation took place on January 3rd, 1994. Our study will span the period from January 29th, 1993 to September 29th, 2001.

The most important data for this study are the dates and amounts of SPDR of creations and redemptions . These data are not public information, but were obtained for this study from the SPDR trustee, State Street Bank and Trust.

.Price information for SPDRs were collected from the Bloomberg Data Base., along with prices for the S&P 500.This hypothesis, as well as the next one, also required price information on the S&P 500. The index composition and company weightings as of were purchased from Standard & Poor's. Additions and deletions to the index, running from 1993 to 2001, were also purchased from Standard & Poor's. The additions and deletions were used to determine index composition on individual event dates. The return information for individual companies was obtained from the Center for Research in Security Prices (CRSP) for January 1993 to December 2000. Data for the year 2001 were obtained from Bloomberg.

Using their terminology, we define the creation or redemption day as the 'event day'. We designate our 'estimation period' as encompassing 160 days (-120 through –11 and +11 through +60). Our 'event period' is composed of the 21 remaining days (-10 through +10).

Results

Results of Events on SPDR Returns

We begin by looking at all event dates for the entire period. We should note that, as per Switzer & Zoghaib (2000), when events were performed within five business days of themselves, we chose the largest one and ignored the others.

For both creations and redemptions, use of the entire sample, with no limitations as to the size of the event, resulted in very mediocre results. Table #4 highlights the detailed results of the event study on the entire creation sample. As we can see by looking at the z-statistic, solely day –1 has results that are significant and that only at a 10% level. For the redemptions sample on the entire period, results are insignificant surrounding event day 0 (Table # 5).

Results of Events on SPDR Returns with Volume Limitation

Seeing the disappointing results obtained for the entire sample, we began placing certain selection criteria on the sample. Asquith & Mullins (1986) found that larger equity offerings lead to more significant negative returns. Taking this theory and transposing it on our study provided interesting results. Table #6 highlights the findings when we set a $5 million limitation on our event periods. With this limitation in place, we now observe significant results in the desired period from (-3,0). Table #7 provides us with the Z-statistic results for various limit levels. We can see that as we increase the dollar limitation, the significance in turn increases from at 5% for the sample of three million and higher to a 1% level for the five million dollar sample. For the redemption

sample, solely the five million dollar level post significant results, and these at a 5% level (Table #8). All other levels are deemed insignificant (Table #9).

It is important to note, that as various selection criteria are placed on the sample, the number of events under study are reduced. For the creation sample 53 events exist for the $2 million sample, and 8 events for the $5 million sample.

As important as finding significant results, the results shown support our hypothesis that creations of SPDRs will lead to negative returns due to the over abundance of supply. There is therefore support for the downward sloping demand curve theory in the creation sample. The significant results at the $5 million level in the redemption sample however, provides us with a negative result, as opposed to the hypothesized positive return.

Results of Events on SPDR Returns with Period Limitation

The market for creations and redemptions of SPDRs has greatly changed over the years. In Table #10 we see the great disparity between the volumes in years prior to 1998 and years following 1998. Seeing this prompted us to split our sample in pre and post 1998. We also performed, for a matter of completeness, pre-1997. For the two subsections pre-1998 and pre-1997 we looked at dollar limitations of 750,000 and 1 million. For the redemption sample we also used dollar limitation of 2 million for the pre-1998 sample. Our reasoning for doing this is that the post-1998 period is marked with a

large number of these transactions, in other words, supply and demands changes due to these transactions may no longer be abnormal. However in the period of pre-1998, although the events have much smaller dollar values, the number of creations and redemptions is drastically less. It can thus be argued that since the transactions are few and far between, abnormal demand and supply will exist even for lesser amounts.

In Table #11 through Table #13 we find support for the notion that significant results may exist in the creation sup-periods were transactions occur less frequently. For of the sub periods, we find negative abnormal returns as hypothesized.

Table #14 through Table #16 set forth the findings for the redemption samples for both periods, pre-1997 and pre-1998. As shown, within these sub-period samples, as dollar value per transaction increases, so does the level of significance. The significance levels and positive signs in this case are very supportive of our hypothesis, i.e. with redemptions comes positive returns due to diminishing supplies.

Results of Events on S&P 500 Companies with Volume Limitations

Because of its shear size, using the entire S&P 500 index was a task outside of our reach. Due to this limitation, our study focuses of the top 50% of the index, which represents thirty-seven companies. We were then forced to eliminate certain candidates due to their unavailability in the CRSP database. Our final sample includes thirty-four companies representing 47.83%. For certain event dates, the full thirty-four companies where not used since they were not included in the index as of yet. An example of this is

that Microsoft was only added to the index on 6/6/94, and thus events prior to this did not include it (Table #17).

As shown by the Z-Statistic results in Table #18, only the redemption sample with a $4 million limitation has a significant level of returns (Table #19). Furthermore, the sign is positive. This positive sign would indicate that investors are redeeming the SPDRs to hold the underlying securities, however, results are too sporadic to set forth a definite finding. We also performed with a $5 million limitation, event studies on the top 25% of the S&P index, 11 companies, but the results are found to be insignificant.

Results of Events on S&P 500 Companies with Period Limitations

Much in the manner of the previous section, we constructed a table for the top 50% and 25% of the S&P 500 companies but now with sub samples pre-1998 and pre-1997. In Table #20 we find that the most significant results within days –3 to 0 exist in the redemption sample, and highest level of significance is found in the pre-1998 $2 million sub-sample (Table #21). For each of the significant results in the redemption sample, we observe positive returns much like we observed in Table #19 and as we observe when looking at the top 25% of the S&P 500 for the pre-1997 sample. These findings both support the idea that investors opt to hold the underlying baskets of securities and not to liquidate them are exercising redemptions of SPDRs. Since the baskets are not being liquidated, an excess supply of the securities are not hitting the markets and depressing the price.

Event studies were also performed for each of the individual companies representing the top 25% of the index to see whether there were some consistent trends (Table # 22). Event Studies were also performed on each individual event date for the top 50% of the companies to see whether there were seasonal trends (Table # 23). In both cases, lack of consistency inhibited further findings.

Results of Events on S&P 500 Companies Adjusted for Company Specific News

When looking at the results for the sample built from the S&P 500 underlying companies, we obtain significant results in the two above mentioned samples, namely the redemption sample with $4 million limit, and redemption pre-1998 sample with $2 million limit. With these results we concluded that our hypotheses that redemptions of SPDRs will affect the underlying companies was indeed correct. Furthermore, with the positive returns observed, we further conclude that redeeming parties are not liquidating there the received baskets and are therefore redeeming for other reasons. One problem still exists. We mentioned that as per Switzer & Zoghaib (1999), IPUs are a useful tool to use in event studies since they are void of company specific information. However, when gauging the effects on the underlying companies, the results may be tainted by company specific information that must be accounted for.

In their paper, Switzer & Zoghaib (1999) account for the possible skewness brought forth by company specific information. We will use much the same methodology in that we will eliminate any event date were company specific news existed two business

days prior or two business days after. This will account for both information leakage and delayed investor reaction.

We gathered company specific information using the Lexis-Nexis Database. Taking the advise of Roll (1987), we limited our search to major newspapers such as the Wall Street Journal and the New York Times. The reasoning behind the use of the major papers, as explained by Roll, is that any information that is not large enough to be covered in these papers will not have any major impact of the stock price. Table #24 and Table #25 set forth the event days that we eliminated for specific companies. The 'Event Type' refers to the company specific information that we felt warranted elimination due to its possible effect on stock prices. Typical information that warranted event date deletion was announcement relating to financial statements.

We opted to look at the two samples. The first was chosen because it had the highest level of significance out of all the volume limitation sub-samples as shown by Table #18. The second was chosen because it posted the highest significance levels in the period limitation sample of the top 50% of the S&P 500.

In the redemption pre-1998 sub-sample, adjusted for company specific information, the significance level is eliminated (Table # 26). In this sample, only 15 event days were deleted, leaving a sample of 205. With the small amount of events taken away and the drastic change in return significance, the possibility that one event had an extremely large effect exists.

The redemption sample with $4 million limitation provides with much more interesting results. First of all, a larger number of event days are eliminated (events are reduced from 437 to 361). Second, positive abnormal returns persist, once again supporting earlier findings.

Summary and Conclusion

This study had as a main objective to support or reject the notion that the downward sloping demand curve exists. If support for the downward sloping demand curve does indeed exists, using IPUs provide the finance field with new and more robust insight since they are free of company specific information. Using findings in previous finance pieces we set forth certain hypotheses.

Using theories by Mikkelson & Partch (1986), Loderer & Zimmermann (1988), related to abnormal changes in supply, our first set of hypotheses addressed the effect that creations and redemption in the SPDRs market has on their underlying prices. Using the entire sample, our findings were less than mediocre. Taking the notion of Asquith & Mullins (1986) in which large equity offerings produced more significant results, we opted to place certain selection criteria on our sample. In both the creation and redemption cases, once selection criteria with regards to size and time period were placed on the sample, we obtained significant results that supported the hypotheses that with SPDR creations (redemptions), supply increased (decreased), and returns decreased (increased).

Our second set of hypotheses relied on the notion that with abnormal changes in demands come abnormal changes in returns. Works by Pruitt & Wei (1989) and Harris & Gurrel (1986), which looked at increases in demand due to company inclusion into the S&P 500, allowed us to formulate these hypotheses. This section looked at the results that creations and redemptions of SPDRs has on the returns of the S&P 500 underlying

companies, or more specifically the top 50%. The hypothesis that redemptions affect the company returns was strongly supported, however the sign of the returns was counter intuitive. The significant returns observed in the redemption sample were positive, implying that redeeming parties were redeeming the trust baskets not for liquidation purposes but rather to maintain the holdings. When studying the $4 million sample, the findings persist even when company specific information is accounted for.

Our findings support the idea of the downward sloping demand curve. But supporting this more evidence now exists to contradict the efficient market hypothesis since our findings imply that if investors have access to timely information regarding creations and redemptions of SPDRs, they can successfully obtain abnormal returns.

With the proliferation of the IPU market both in Canada and the United States, it would be interesting to see whether the results found here and in Switzer & Zoghaib (1999) hold true throughout the IPU market.

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Table 1: SPDR Bid/Ask Spread Distribution

(for the year 1999) [6]

Range	% of Total
1/64 - 1/16	0.83%
5/64 - 1/8	10.41%
9/64 - 3/16	67.15%
13/64 - 1/4	20.99%
17/64 - 5/16	0.36%
21/64 - 3/8	0.14%
>25/64	0.12%
Total	100.00%

[6] Source: Standard & Poor's Depositary Receipts, SPDR Trust Series 1, Prospectus Dated January 26, 2000

Table 2: Frequency Distribution for SPDR Trust: Closing Price Vs. Net Asset Value

(From inception of Trust through 12/31/99)

	Closing Price on AMEX Above Trust NAV		Closing Price on AMEX Below Trust NAV	
Range	**Frequency**	**% of Total**	**Frequency**	**% of Total**
0 - .25%	755	88.62%	739	83.22%
.25 - .5%	89	10.45%	124	13.96%
.5 - 1%	7	0.82%	25	2.82%
1 - 1.5%	1	0.12%	0	0.00%
1.5 - 2%	0	0.00%	0	0.00%
2 - 2.5%	0	0.00%	0	0.00%
2.5 - 3%	0	0.00%	0	0.00%
3 - 3.5%	0	0.00%	0	0.00%
> 3.5%	0	0.00%	0	0.00%
Total	852	100.00%	888	100.00%

Note: The closing price on the AMEX equaled the NAV on nine days.[7]

[7] Source: Standard & Poor's Depositary Receipts, SPDR Trust Series 1, Prospectus Dated January 26, 2000

Table 3: SPDRs as a Hedging Tool

1. S&P 500 Tracking Error and Absolute Tracking Error of SPDRS

(January 29, 1993 - September 29, 2000)

	Tracking Error	Absolute Tracking Error
Average	0.000695%	0.202394%
Median	0.005290%	0.143285%
Maximum	3.098584%	3.098584%
Minimum	-2.890001%	0.000012%
Skewness	0.35162531	4.45806740
Kurtosis	16.5258202	39.0016789

2. Unit Root Test Statistics for the SPDRs and the S&P 500 Index

	Levels				Differences			
Data Series	DF	DFT	PP	PPT	DF	DFT	PP	PPT
SPDR	-0.33802	-3.24197	-0.27167	-3.02933	-366.00010	-365.63359	-401.72527	-401.37151
S&P 500	-0.27341	-3.04816	-0.24556	-2.97204	-632.74694	-632.11263	-659.12107	-658.55001
95% Critical Value	-3.37	-3.8	-3.37	-3.8	-3.37	-3.8	-3.37	-3.8

3. Cointegration Regressions for the SPDRs and the S&P 500 Index

		X - Y			
X	Y	DF	DFT	PP	PPT
SPDR	S&P 500	-31.7007*	-31.6927*	-32.8825*	-32.8752*
S&P 500	SPDR	-31.7023*	-31.6943*	-32.884*	-32.8768*
95% Critical Value		-3.37	-3.8	-3.37	-3.8

*p < .05

Table 4: Market Model Abnormal Returns for SPDRs For Entire Creation Sample

(113 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z
-10	-0.0297%	0.0001%	-0.8112%	0.6309%	-0.0297%	50.44%	-1.0277
-9	0.0038%	-0.0177%	-0.8039%	1.2500%	-0.0259%	46.90%	-0.0339
-8	-0.0624%	0.0051%	-2.8900%	0.6444%	-0.0883%	50.44%	-1.5313
-7	0.0456%	-0.0107%	-1.3100%	2.8600%	-0.0428%	48.67%	0.6798
-6	0.0250%	0.0130%	-0.8879%	1.0500%	-0.0177%	53.10%	1.3707
-5	0.0049%	0.0384%	-2.9000%	0.8298%	-0.0128%	58.41%	0.6442
-4	0.0552%	0.0288%	-0.8389%	2.8400%	0.0424%	54.87%	0.9009
-3	-0.0403%	-0.0364%	-0.9607%	0.9210%	0.0021%	44.25%	-0.6678
-2	0.0215%	0.0374%	-1.1200%	0.9336%	0.0236%	51.33%	0.8809
-1	-0.0493%	-0.0160%	-1.4200%	1.0100%	-0.0257%	45.13%	-1.6911*
0	0.0088%	0.0055%	-0.8541%	0.9341%	-0.0169%	51.33%	0.4656
1	-0.0165%	-0.0041%	-2.8900%	0.8512%	-0.0334%	48.67%	-0.3249
2	0.0363%	0.0364%	-1.7000%	2.8500%	0.0029%	53.98%	0.7146
3	0.0080%	-0.0199%	-1.4700%	3.2100%	0.0108%	47.79%	0.4509
4	-0.0183%	-0.0041%	-0.9189%	1.8300%	-0.0075%	48.67%	-0.5775
5	0.0623%	0.0362%	-0.6039%	1.2400%	0.0548%	53.98%	1.9743**
6	-0.0395%	-0.0240%	-0.7396%	0.7682%	0.0153%	45.13%	-1.3025
7	-0.0224%	-0.0121%	-1.4300%	0.8757%	-0.0071%	47.79%	-0.5303
8	0.0055%	-0.0085%	-0.9560%	1.1400%	-0.0016%	47.79%	0.2796
9	-0.0014%	0.0473%	-2.8900%	0.8519%	-0.0029%	56.64%	0.0700
10	0.0413%	0.0426%	-1.4900%	2.8500%	0.0384%	56.64%	1.3174

** p < .05, * p < .10

Table 5: Market Model Abnormal Returns for SPDRs For Entire Redemption Sample

(83 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	-0.0256%	0.0307%	-2.8900%	0.9189%	-0.0256%	56.63%	-0.4087
-9	0.0499%	-0.0177%	-0.7290%	3.1500%	0.0244%	48.19%	0.7700
-8	-0.0078%	0.0121%	-1.0200%	1.1500%	0.0166%	50.60%	-0.2626
-7	0.0276%	0.0376%	-1.4900%	0.9397%	0.0442%	57.83%	0.7781
-6	-0.0413%	-0.0510%	-0.9523%	1.1300%	0.0029%	45.78%	-1.4785
-5	0.0340%	0.0356%	-0.6092%	0.9276%	0.0369%	55.42%	0.7102
-4	-0.0540%	-0.0441%	-1.4700%	0.6927%	-0.0171%	35.40%	-1.3407
-3	0.0539%	0.0310%	-0.8035%	1.1500%	0.0368%	55.42%	1.0974
-2	-0.0136%	0.0208%	-1.6100%	0.9842%	0.0232%	54.22%	0.0233
-1	-0.0147%	-0.0148%	-0.8067%	1.4400%	0.0086%	46.99%	-1.1346
0	-0.0017%	0.0034%	-0.7778%	1.1400%	0.0069%	50.60%	0.3045
1	-0.0292%	-0.0210%	-1.1300%	0.8732%	-0.0223%	48.19%	-0.9504
2	-0.0407%	-0.0031%	-2.8800%	1.0000%	-0.0630%	49.40%	-0.7227
3	0.0721%	0.0279%	-0.4847%	2.8600%	0.0091%	53.01%	1.2318
4	-0.0289%	0.0162%	-1.4200%	0.9819%	-0.0198%	51.81%	-0.4509
5	-0.0392%	-0.0443%	-1.7000%	0.9218%	-0.0590%	38.55%	-1.2661
6	0.0591%	0.0403%	-0.6051%	3.2000%	0.0002%	56.63%	1.6187
7	-0.0226%	-0.0257%	-0.9081%	1.2300%	-0.0225%	44.58%	-0.3042
8	0.0189%	0.0504%	-1.3600%	0.6840%	-0.0036%	48.19%	0.9158
9	0.0215%	-0.0099%	-1.1400%	1.8400%	0.0180%	42.17%	-0.2473
10	-0.0893%	-0.0447%	-2.9000%	1.0100%	-0.0714%	45.78%	-1.9272*

* p < .10, ** p < .05 , *** p < .01

Table 6: Market Model Abnormal Returns for SPDRs For Creation Sample with $5 Million Volume Limit

(8 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	0.0259%	0.0575%	-0.3097%	0.2568%	0.0259%	62.50%	0.3390
-9	0.0138%	0.0148%	-0.1745%	0.1851%	0.0398%	50.00%	0.0495
-8	0.1249%	0.0838%	-0.2129%	0.3939%	0.1646%	87.50%	0.7234
-7	-0.0136%	0.0751%	-1.2500%	0.9161%	0.1511%	50.00%	0.1599
-6	-0.0715%	-0.1050%	-0.8836%	1.0400%	0.0795%	37.50%	-0.5864
-5	-0.3113%	-0.2780%	-0.5626%	-0.0654%	-0.2318%	0.00%	-2.1208**
-4	0.2611%	0.2850%	-0.2333%	0.9556%	0.0293%	75.00%	1.7455*
-3	-0.2672%	-0.2360%	-0.9541%	0.3712%	-0.2379%	25.00%	-2.0300**
-2	0.1696%	0.3550%	-1.7000%	1.2500%	-0.0682%	75.00%	1.8258*
-1	0.2048%	-0.0381%	-1.4700%	3.2000%	0.1366%	50.00%	1.3164
0	0.1603%	0.1680%	-0.7338%	1.1500%	0.2969%	75.00%	1.0186
1	0.0097%	0.0068%	-0.5212%	0.9758%	0.3066%	50.00%	-0.1096
2	-0.1108%	-0.0948%	-0.5768%	0.4430%	0.1958%	50.00%	-0.7433
3	0.0697%	0.0891%	-0.2625%	0.6412%	0.2656%	62.50%	0.7291
4	-0.0038%	0.1160%	-0.7125%	0.3308%	0.2617%	62.50%	-0.2772
5	-0.0817%	-0.1420%	-0.5893%	0.4451%	0.1800%	25.00%	-0.5379
6	0.1367%	0.1770%	-0.6554%	0.8221%	0.3167%	62.50%	0.7487
7	0.0071%	0.0259%	-0.8528%	0.6849%	0.3239%	62.50%	0.1365
8	-0.1989%	-0.1390%	-0.9571%	0.1421%	0.1249%	62.50%	-1.2342
9	-0.0685%	-0.0933%	-0.3745%	0.3115%	0.0564%	37.50%	-0.6607
10	0.1221%	0.0673%	-0.1583%	0.5508%	0.1786%	62.50%	0.8691

* p < .10, ** p < .05 , *** p < .01

Table 7: Z-Statistic Results for Abnormal Returns on SPDRs Surrounding Creation Days with Volume Limitations

For entire sample

$ Limit	none	$2 million	$3 million	$4 million	$5 million
Events	113	53	28	19	8
Day					
-10	-1.0277	-0.49922	0.9643	0.46808	0.33899
-9	-0.03391	0.18599	-1.16649	-0.9627	0.04953
-8	-1.53131	-0.66944	0.73208	0.60724	0.72337
-7	0.67983	1.25366	-0.38386	0.08523	0.15991
-6	1.37067	0.61336	0.43387	-0.08325	-0.58637
-5	0.6442	-1.99184**	-1.57804	-1.56528	-2.12083**
-4	0.90087	0.79076	1.18127	1.24254	1.74549*
-3	-0.66779	-0.52321	-1.69668*	-1.86861*	-2.03**
-2	0.88087	-0.71677	0.52293	1.11762	1.82581*
-1	-1.69109*	1.44561	1.59641	1.29214	1.31635
0	0.46562	-0.46268	-0.70649	-0.36807	1.01859
1	-0.32493	0.26296	0.28521	0.47624	-0.10964
2	0.71456	-0.46442	-0.78717	-0.43298	-0.74325
3	0.45094	-1.57824	-0.94133	-0.61318	0.72913
4	-0.57746	1.08184	0.72312	0.95118	-0.27722
5	1.97432**	-0.75848	-0.85371	-1.64904	-0.53793
6	-1.30248	0.12884	0.75056	1.3859	0.74868
7	-0.53029	2.16138**	1.12237	0.79658	0.13647
8	0.27958	-2.05235**	-1.47614	-1.60598	-1.23422
9	0.07003	0.48444	-0.10341	0.65567	-0.66072
10	1.31736	-1.05617	-0.38936	-0.92083	0.86914

* p < .10 , ** p < .05

Table 8: Market Model Abnormal Returns for SPDRs For Redemption Sample with $5 Million Volume Limit

(7 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	-0.3251%	-0.1280%	-1.7000%	0.3259%	-0.3251%	28.57%	-1.7432*
-9	0.5609%	0.2300%	-0.1482%	3.2000%	0.2358%	57.14%	3.3849***
-8	-0.2204%	-0.3630%	-0.9496%	1.1500%	0.0153%	28.57%	-2.0633**
-7	0.2215%	0.2900%	-0.4571%	0.6630%	0.2369%	71.43%	1.5862
-6	-0.2742%	-0.1490%	-0.9615%	0.2658%	-0.0373%	28.57%	-1.4371
-5	0.1598%	0.1800%	-0.2747%	0.5712%	0.1225%	85.71%	1.0591
-4	0.0507%	0.1240%	-0.3777%	0.3285%	0.1731%	57.14%	0.3287
-3	-0.0585%	-0.1330%	-0.4463%	0.4590%	0.1146%	28.57%	-0.5323
-2	0.2133%	0.2250%	-0.4273%	0.7607%	0.3280%	71.43%	1.2186
-1	-0.4062%	-0.3200%	-0.8520%	-0.0248%	-0.0782%	0.00%	-2.5158**
0	0.1324%	0.1250%	-0.1739%	0.4457%	0.0542%	85.71%	1.0609
1	-0.0591%	-0.0179%	-0.6469%	0.2248%	-0.0050%	42.86%	-0.5434
2	0.0817%	0.0270%	-0.4811%	0.5494%	0.0767%	57.14%	0.6368
3	-0.0396%	-0.0884%	-0.5504%	0.5782%	0.0371%	42.86%	-0.2310
4	-0.2483%	-0.1640%	-0.8550%	0.1411%	-0.2112%	14.29%	-1.7209*
5	0.0886%	0.1400%	-0.4829%	0.6200%	-0.1226%	57.14%	0.6702
6	0.1525%	0.2570%	-0.2397%	0.5809%	0.0299%	71.43%	0.8252
7	-0.2347%	-0.2860%	-0.8255%	0.2557%	-0.2047%	28.57%	-1.1856
8	0.2642%	0.2360%	-0.3986%	0.8434%	0.0594%	28.57%	1.6081
9	-0.1556%	0.0441%	-1.6100%	0.4216%	-0.0962%	57.14%	-1.2626
10	0.1052%	-0.2170%	-0.4214%	1.4400%	0.0090%	42.86%	0.8729

* p < .10, ** p < .05 , *** p < .01

Table 9: Z-Statistic Results for Abnormal Returns on SPDRs Surrounding Redemption Days with Volume Limitations

For entire sample

$ Limit	none	$2 million	$3 million	$4 million	$5 million
Events (#)	83	42	24	13	7
Day					
-10	-0.4087	-1.59517	-1.67957*	-1.28294	-1.74317*
-9	0.76995	1.28112	3.40814***	2.557**	3.3849***
-8	-0.26256	0.24434	-1.11666	-1.79537*	-2.06331**
-7	0.77813	0.233	0.00661	0.25694	1.58617
-6	-1.4785	-1.33497	-0.97259	-1.62696	-1.43713
-5	0.71017	0.36162	0.19876	0.93187	1.05909
-4	-1.34066	0.08178	1.34385	1.02389	0.32868
-3	1.09737	0.63254	0.49469	-0.14891	-0.53233
-2	0.02332	-0.30958	-1.0335	-0.63006	1.21863
-1	-1.13464	-0.93945	-0.42307	0.11227	-2.51584**
0	0.30448	0.14828	1.29136	0.36054	1.06091
1	-0.95039	0.61665	-1.24305	-0.71073	-0.54344
2	-0.72265	0.82634	1.53358	0.57281	0.63682
3	1.23176	-0.71139	-1.22032	-0.42385	-0.23097
4	-0.45094	-0.03135	0.43923	-0.28853	-1.72087*
5	-1.26605	-0.11152	0.67616	0.13055	0.67017
6	1.61865	0.66657	-0.08873	0.32982	0.82521
7	-0.30421	-1.75272*	-2.24016**	-1.78744*	-1.18564
8	0.91577	0.99803	0.75677	1.09085	1.60805
9	-0.24725	-0.03847	0.7396	0.36164	-1.26255
10	-1.92719*	0.56572	-1.04	0.21547	0.87291

* p < .10 , ** p < .05 , *** p < .01

Table 10: Trust Transactions in SPDRs

	Year Ending 1999	Year Ending 1998	Year Ending 1997	Year Ending 1996
SPDRs Created	136,600,000	123,400,000	23,800,000	15,750,000
SPDRs Redeemed	113,200,000	86,900,000	8,150,000	4,900,000[8]

[8]Source: Standard & Poor's Depositary Receipts, SPDR Trust Series 1, Prospectus Dated January 26, 2000

Table 11: Market Model Abnormal Returns for SPDRs for Creation Pre-1997 Sample with $.75 Million Volume Limit

(21 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.	
-10	-0.0092%	0.0350%	-0.6298%	0.3688%	-0.0092%	57.14%	-0.2011	
-9	-0.0260%	-0.0550%	-0.6120%	0.2833%	-0.0353%	38.10%	-0.6332	
-8	0.0349%	0.0266%	-0.1856%	0.2806%	-0.0003%	57.14%	0.8537	
-7	-0.1047%	-0.0503%	-1.1000%	0.2358%	-0.1050%	28.57%	-2.7660	***
-6	0.1172%	0.0843%	-0.2811%	0.6209%	0.0122%	76.19%	2.8622	***
-5	0.0261%	0.0342%	-0.1553%	0.2880%	0.0383%	57.14%	0.7417	
-4	-0.0092%	0.0090%	-0.5080%	0.4812%	0.0291%	57.14%	-0.4046	
-3	-0.0778%	-0.0447%	-0.6304%	0.2003%	-0.0488%	33.33%	-2.1032	**
-2	0.0210%	0.0490%	-0.3122%	0.2613%	-0.0277%	61.90%	0.5811	
-1	0.0663%	0.0597%	-0.1823%	0.3520%	0.0385%	66.67%	1.6330	
0	-0.0228%	-0.0204%	-0.4773%	0.6108%	0.0158%	42.86%	-0.5518	
1	-0.0929%	-0.0642%	-0.7248%	0.2586%	-0.0771%	33.33%	-2.2074	**
2	-0.0877%	-0.0363%	-0.7553%	0.2624%	-0.1648%	28.57%	-2.2455	**
3	0.0559%	0.0085%	-0.1821%	0.5115%	-0.1090%	52.38%	1.3958	
4	-0.0310%	0.0356%	-0.7993%	0.3076%	-0.1399%	57.14%	-0.7869	
5	-0.0164%	0.0616%	-0.5926%	0.2842%	-0.1563%	57.14%	-0.4543	
6	0.0568%	0.0212%	-0.4372%	0.7418%	-0.0995%	66.67%	1.5459	
7	-0.0565%	-0.0203%	-0.6305%	0.0915%	-0.1560%	47.62%	-1.4939	
8	0.0294%	-0.0210%	-0.2415%	0.8080%	-0.1266%	47.62%	0.4795	
9	0.0692%	0.0532%	-0.2008%	0.3521%	-0.0574%	71.43%	1.8656	*
10	-0.1181%	-0.1150%	-0.8157%	0.2676%	-0.1755%	33.33%	-2.7963	***

* p < .10, ** p < .05 , *** p < .01

Table 12: Market Model Abnormal Returns for SPDRs for Creation Pre-1998 Sample with $.75 Million Volume Limit

(35 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	-0.0290%	0.0047%	-0.7674%	0.6016%	-0.0290%	51.43%	-0.6705
-9	-0.0468%	-0.0551%	-0.8062%	0.4717%	-0.0758%	42.86%	-1.1205
-8	0.0170%	0.0466%	-0.7213%	0.2885%	-0.0588%	60.00%	0.5465
-7	-0.0078%	-0.0118%	-1.1000%	0.3496%	-0.0666%	45.71%	-0.9653
-6	0.1061%	0.1050%	-0.3667%	0.6214%	0.0396%	77.14%	2.9294***
-5	-0.0466%	-0.0034%	-0.5542%	0.2880%	-0.0070%	45.71%	-0.7321
-4	0.0670%	0.0187%	-0.5086%	1.0800%	0.0600%	62.86%	1.2541
-3	-0.0910%	-0.0443%	-0.7274%	0.3739%	-0.0310%	40.00%	-2.5289**
-2	0.0044%	0.0315%	-0.5667%	0.5273%	-0.0265%	51.43%	0.2986
-1	0.0791%	0.1020%	-0.3898%	0.8294%	0.0526%	65.71%	2.0640**
0	-0.0698%	-0.0624%	-0.5274%	0.6113%	-0.0172%	40.00%	-1.6499
1	-0.0398%	-0.0210%	-0.7253%	0.4220%	-0.0570%	45.71%	-1.3729
2	-0.0394%	-0.0350%	-0.8039%	1.0800%	-0.0964%	34.29%	-1.4033
3	-0.0140%	-0.0076%	-0.7342%	0.5117%	-0.1103%	42.86%	0.0722
4	0.0063%	0.0311%	-0.7984%	0.4031%	-0.1040%	60.00%	-0.0829
5	-0.0217%	0.0609%	-0.6279%	0.4643%	-0.1257%	60.00%	-0.5977
6	0.0750%	0.0680%	-0.4363%	0.7413%	-0.0508%	68.57%	2.0258**
7	-0.0265%	0.0083%	-0.6301%	0.5710%	-0.0772%	51.43%	-0.9601
8	0.0140%	-0.0208%	-0.4400%	0.9086%	-0.0632%	51.43%	0.2813
9	0.0230%	0.0461%	-0.3607%	0.4421%	-0.0402%	54.29%	1.0276
10	-0.0825%	-0.0636%	-0.8154%	0.3804%	-0.1226%	42.86%	-2.3896**

* p < .10, ** p < .05 , *** p < .01

Table 13: Z-Statistic Results for Abnormal Returns on SPDRs Surrounding Creation Days with Period Limitations

$ Limit	$.75m	$1m	$.75m	$1m
Period	pre-1998	pre-1998	pre-1997	pre-1997
Event (#)	35	18	21	7
Day				
-10	-0.67051	-1.41751	-0.20109	-0.44509
-9	-1.12045	-1.18228	-0.6332	-1.04409
-8	0.54649	0.03503	0.85369	0.61491
-7	-0.96534	-0.4249	-2.766***	-2.9056***
-6	2.92941***	2.27377**	2.86223***	1.97086**
-5	-0.73211	-0.95994	0.74174	0.25732
-4	1.25411	2.4081	-0.4046	1.40304
-3	-2.52887**	-1.99439**	-2.10323**	-1.15793
-2	0.29863	0.17977	0.58109	0.55508
-1	2.06399**	1.41481	1.63297	0.05446
0	-1.64986	-1.5439	-0.55183	0.12998
1	-1.37289	-0.3421	-2.20737**	-1.58617
2	-1.40328	-1.40059	-2.24553**	-2.15319**
3	0.07222	0.15608	1.3958	1.10256
4	-0.08289	0.70746	-0.78694	0.72977
5	-0.59767	-0.62048	-0.45433	0.02816
6	2.02575**	1.04529	1.5459	-0.2673
7	-0.96008	-1.03648	-1.49385	-1.11311
8	0.28127	1.42235	0.47947	1.49262
9	1.02764	0.09412	1.86559*	1.03895
10	-2.38959**	-1.70474*	-2.79629***	-1.79892*

* p < .10 , ** p < .05 , *** p < .01

Table 14: Market Model Abnormal Returns for SPDRs for Redemption Pre-1997 Sample with $1 Million Volume Limit

(7 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	-0.0371%	0.0255%	-0.6295%	0.3727%	-0.0371%	71.43%	-0.5922
-9	0.0618%	-0.0236%	-0.2387%	0.5001%	0.0247%	42.86%	0.8301
-8	0.0266%	0.0605%	-0.3181%	0.2267%	0.0514%	57.14%	0.4305
-7	-0.0872%	-0.0310%	-0.4607%	0.0696%	-0.0359%	14.29%	-1.2778
-6	-0.0615%	-0.0425%	-0.2813%	0.0875%	-0.0974%	42.86%	-0.9147
-5	-0.0320%	-0.0232%	-0.1513%	0.0973%	-0.1293%	42.86%	-0.4180
-4	-0.0279%	-0.0100%	-0.1847%	0.2643%	-0.1572%	28.57%	-0.3426
-3	-0.1275%	-0.0611%	-0.7628%	0.1743%	-0.2847%	28.57%	-1.6243
-2	-0.0235%	-0.0146%	-0.5635%	0.5148%	-0.3082%	42.86%	-0.3969
-1	0.2251%	0.1450%	-0.2753%	0.7128%	-0.0830%	85.71%	3.1036***
0	-0.1064%	-0.0594%	-0.7984%	0.2827%	-0.1894%	42.86%	-1.4389
1	-0.0364%	-0.0373%	-0.1572%	0.0638%	-0.2258%	42.86%	-0.5252
2	0.1013%	0.1160%	-0.1599%	0.3909%	-0.1245%	85.71%	1.3794
3	-0.0876%	-0.0832%	-0.2268%	0.0350%	-0.2121%	14.29%	-1.2439
4	0.0749%	0.0701%	-0.1385%	0.4839%	-0.1373%	57.14%	1.1363
5	0.0670%	0.0421%	-0.0898%	0.2766%	-0.0703%	71.43%	0.9010
6	-0.0099%	-0.0127%	-0.2681%	0.2256%	-0.0802%	42.86%	-0.1896
7	-0.0259%	-0.0472%	-0.3000%	0.2673%	-0.1061%	42.86%	-0.4613
8	-0.0178%	-0.0851%	-0.1631%	0.3452%	-0.1238%	42.86%	-0.2044
9	0.0544%	0.0461%	-0.2637%	0.3140%	-0.0694%	71.43%	0.7715
10	-0.1524%	-0.0122%	-0.8047%	0.1900%	-0.2218%	28.57%	-2.0258**

* p < .10, ** p < .05 , *** p < .01

Table 15: Market Model Abnormal Returns for SPDRs for Redemption Pre-1998 Sample with $2 Million Volume Limit

(7 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	-0.0411%	0.0314%	-0.6295%	0.3727%	-0.0411%	71.43%	-0.6091
-9	-0.0257%	-0.0684%	-0.2387%	0.2831%	-0.0669%	28.57%	-0.2614
-8	0.1191%	0.1480%	-0.0873%	0.2871%	0.0523%	71.43%	1.2468
-7	-0.1362%	-0.1230%	-0.4607%	0.0938%	-0.0839%	14.29%	-1.6957*
-6	-0.1484%	-0.2060%	-0.3703%	0.0875%	-0.2324%	28.57%	-1.6532*
-5	0.0486%	0.0053%	-0.1088%	0.2534%	-0.1837%	71.43%	0.3270
-4	0.0427%	0.0287%	-0.1847%	0.2655%	-0.1410%	57.14%	0.4130
-3	0.0242%	0.0815%	-0.2911%	0.3213%	-0.1168%	57.14%	0.1958
-2	-0.0728%	-0.0146%	-0.5635%	0.3267%	-0.1897%	42.86%	-1.0394
-1	0.1792%	0.1450%	-0.3154%	0.7128%	-0.0105%	85.71%	2.5834***
0	-0.1550%	-0.0630%	-0.7984%	0.4182%	-0.1655%	28.57%	-2.1172*
1	0.0005%	-0.1260%	-0.5637%	1.0800%	-0.1650%	28.57%	-0.1226
2	-0.0439%	0.0550%	-0.7270%	0.3909%	-0.2088%	71.43%	0.0408
3	-0.0527%	-0.0832%	-0.2268%	0.3174%	-0.2615%	28.57%	-0.8511
4	0.1327%	0.1120%	-0.0484%	0.4839%	-0.1288%	85.71%	1.7472*
5	0.0222%	0.0408%	-0.1206%	0.1625%	-0.1066%	57.14%	0.2500
6	-0.0233%	-0.0100%	-0.2681%	0.1278%	-0.1299%	42.86%	-0.4722
7	-0.0473%	-0.0472%	-0.3000%	0.2673%	-0.1772%	42.86%	-0.7119
8	-0.0620%	-0.0521%	-0.3552%	0.3452%	-0.2392%	42.86%	-0.4102
9	0.1180%	0.1040%	-0.2637%	0.3952%	-0.1212%	85.71%	1.1141
10	0.0147%	-0.0122%	-0.1540%	0.2012%	-0.1065%	28.57%	0.1877

* p < .10, ** p < .05 , *** p < .01

Table 16: Z-Statistic Results for Abnormal Returns on SPDRs For Redemption Days with Period Limitations

$ Limit	$.75m	$1m	$2m	$.75m	$1m
Period	pre-1998	pre-1998	pre-1998	pre-1997	pre-1997
Events	18	14	7	9	7
Day					
-10	-0.10901	-0.13304	-0.60913	-0.58237	-0.59219
-9	0.09336	0.31999	-0.26144	0.18417	0.83009
-8	1.42675	1.32618	1.24679	1.05193	0.43046
-7	-0.7377	-0.83551	-1.6957*	-1.1941	-1.27778
-6	-2.02372**	-1.8273*	-1.65322*	-1.08688	-0.91472
-5	0.45644	0.24997	0.32697	-0.12457	-0.41799
-4	0.52338	0.44734	0.413	-0.48924	-0.34263
-3	-1.46189	-1.0637	0.19575	-1.99007**	-1.6243
-2	0.53542	0.27183	-1.03944	0.1498	-0.3969
-1	0.96532	1.25966	2.58342***	2.39583*	3.10362***
0	-0.41114	-0.48746	-2.11721*	-1.003	-1.43887
1	1.19805	0.547	-0.12257	-0.2105	-0.52522
2	-0.52692	-0.10648	0.0408	1.006	1.37942
3	-0.81313	-1.26457	-0.85106	-1.0794	-1.24388
4	1.32125	1.26471	1.74718*	1.24357	1.13631
5	0.83231	0.93841	0.24995	1.2992	0.90099
6	0.671	-0.25133	-0.47215	-0.1742	-0.18962
7	-0.22647	0.47081	-0.71193	-0.35201	-0.46127
8	-0.47197	-0.52744	-0.4102	-0.416	-0.2044
9	0.17836	0.23973	1.11413	0.58287	0.7715
10	-0.47308	-0.1211	0.18766	-2.57393**	-2.02581**

* p < .10 , ** p < .05

Table 17: Standard & Poor's 500 Composite Index

As of Friday September 29, 2000

Rank	Ticker	Company	%	Cumulative	Addition to Index
1.	GE	General Electric	4.53	4.53	
2.	CSCO	Cisco Systems	3.11	7.64	
3.	MSFT	Microsoft Corp.	2.51	10.15	6/6/94
4.	XOM	Exxon Mobil Corp.	2.46	12.61	
5.	PFE	Pfizer, Inc.	2.25	14.86	
6.	INTC	Intel Corp.	2.21	17.07	
7.	C	Citigroup Inc.	1.93	19	
8.	ORCL	Oracle Corp.	1.76	20.76	
9.	AIG	American Int'l. Group	1.75	22.51	
10.	EMC	EMC Corp.	1.71	24.22	3/27/96
11.	WMT	Wal-Mart Stores	1.7	25.92	
12.	IBM	International Bus. Machines	1.57	27.49	
13.	SUNW	Sun Microsystems	1.47	28.96	
14.	NT	Nortel Networks Corp. Hldg. Co	1.41	30.37	
15.	MRK	Merck & Co.	1.36	31.73	
16.	SBC	SBC Communications Inc.	1.34	33.07	
17.	KO	Coca Cola Co.	1.08	34.15	
19.	JNJ	Johnson & Johnson	1.03	35.18	
20.	RD	Royal Dutch Petroleum	1.02	36.2	
21.	AOL	America Online	0.98	37.18	
22.	HD	Home Depot	0.97	38.15	
23.	BMY	Bristol-Myers Squibb	0.89	39.04	
24.	T	AT&T Corp.	0.87	39.91	
25.	TWX	Time Warner Inc.	0.82	40.73	
26.	MWD	Morgan Stanley, Dean Witter &	0.81	41.54	
28.	HWP	Hewlett-Packard	0.77	42.31	
29.	LLY	Lilly (Eli) & Co.	0.73	43.04	
30.	VIA.B	Viacom Inc.	0.7	43.74	9/29/94
32.	PG	Procter & Gamble	0.69	44.43	
33.	TYC	Tyco International	0.69	45.12	
34.	GLW	Corning Inc.	0.69	45.81	
35.	WCOM	WorldCom Inc.	0.69	46.5	3/29/96
36.	BAC	Bank of America Corp.	0.68	47.18	3/30/98
37.	TXN	Texas Instruments	0.65	47.83	

Table 18: Z - Statistic for Abnormal Returns on the S&P 500 Underlying Companies with Volume Limitations

	Top 50% of S&P 500				Top 25% of S&P 500	
	creation	creation	redemp	redemp	creation	redemp
$ Limit	$4m	$5m	$4m	$5m	$5m	$5m
Events (#)	646	272	437	238	88	77
Day						
-10	0.276564	0.65619	0.7883	0.16886	0.99153	0.99522
-9	-1.15063	0.84129	0.3757	0.61835	-0.21859	-0.00919
-8	0.3011	1.29613	0.51112	0.57105	2.36854**	-0.20205
-7	0.64096	0.07834	0.99282	0.79619	0.64306	2.03363**
-6	-1.43834	-1.36539	0.90577	0.96868	-1.14723	1.20143
-5	-0.24017	-0.57875	1.10892	0.9371	-0.64368	0.15918
-4	-0.93044	0.17101	-1.40561	-1.03658	0.00439	-1.5546
-3	-1.20594	-1.30127	0.12655	-0.11238	0.32793	1.46079
-2	-0.08891	-0.10587	2.06459**	0.84584	0.74846	-0.56718
-1	-0.30011	0.25279	-0.33543	-0.32981	0.91393	-0.14128
0	1.34741	0.60635	0.20923	-0.35938	-0.40669	-1.00153
1	0.97533	-0.05981	1.0854	0.49519	-1.12749	-0.83541
2	0.49949	0.47942	0.00862	0.25365	1.95923*	0.38957
3	1.13312	1.16042	-1.12966	-0.87544	-0.1216	0.36472
4	0.94053	-0.41317	-1.40657	-0.32893	-1.26708	-0.04675
5	-0.61346	-0.90857	0.01993	-0.56897	0.01133	0.16805
6	0.02623	0.7558	0.85046	1.83015*	-0.18955	0.60752
7	-1.14564	-1.65967	0.22097	0.22516	0.81388	1.21038
8	-1.08669	-0.83221	0.28424	1.0477	0.46424	-0.50971
9	-0.62128	0.04039	-1.04422	-0.73732	-0.44977	0.42587
10	-0.5794	-0.0418	0.41487	0.02079	-0.67035	-0.72318

* p < .10 , ** p < .05

Table 19: Market Model Abnormal Returns for Companies Representing Top 50% of S&P 500 For Redemption Sample With $4 Million Volume Limit

(437 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	0.0709%	-0.0384%	-14.8100%	13.2200%	0.0709%	47.83%	0.7883
-9	0.1070%	-0.1310%	-6.5800%	16.2800%	0.1779%	48.05%	0.3757
-8	0.1001%	-0.1840%	-8.5900%	41.3400%	0.2780%	48.51%	0.5111
-7	0.0788%	0.0231%	-28.9000%	10.6700%	0.3568%	50.57%	0.9928
-6	0.0159%	0.0608%	-6.9100%	9.3300%	0.3727%	50.80%	0.9058
-5	0.1979%	-0.1610%	-10.7600%	10.7400%	0.5706%	46.68%	1.1089
-4	-0.1083%	-0.3740%	-6.6400%	12.5300%	0.4622%	43.71%	-1.4056
-3	0.0276%	-0.0973%	-9.0600%	15.4200%	0.4898%	47.14%	0.1266
-2	0.2372%	0.0727%	-7.2400%	8.9000%	0.7270%	52.17%	2.0646**
-1	-0.0287%	-0.1810%	-9.9900%	17.1500%	0.6984%	47.14%	-0.3354
0	0.0048%	-0.0622%	-11.2900%	9.5900%	0.7032%	48.28%	0.2092
1	0.1424%	0.0108%	-6.6100%	9.0400%	0.8456%	50.57%	1.0854
2	0.0340%	-0.0735%	-7.6900%	8.7200%	0.8796%	46.91%	0.0086
3	-0.2054%	-0.2890%	-8.0000%	9.8500%	0.6742%	43.25%	-1.1297
4	-0.1446%	-0.1050%	-7.4000%	9.0200%	0.5295%	48.74%	-1.4066
5	-0.0390%	0.0028%	-8.0800%	8.6100%	0.4906%	50.11%	0.0199
6	0.1030%	0.0166%	-9.6800%	7.2400%	0.5936%	50.34%	0.8505
7	0.0285%	0.0100%	-6.2900%	9.4200%	0.6220%	50.11%	0.2210
8	0.0455%	-0.1400%	-12.7100%	11.3000%	0.6676%	50.11%	0.2842
9	-0.1308%	-0.1100%	-8.8900%	10.5600%	0.5368%	45.54%	-1.0442
10	0.0254%	-0.0777%	-8.4100%	11.2900%	0.5622%	47.37%	0.4149

* p < .10, ** p < .05 , *** p < .01

Table 20: Z- Statistic for Abnormal Return of S&P 500 Underlying Companies with Period Limitations

	Top 50 % of S&P 500				Top 25% of S&P 500		
	Creation		Redemption		Creation	Redemption	
$ Limit	$1m	$1m	$1m	$2m	$1m	$1m	$2m
Period	pre-1997	pre-1998	pre-1997	pre-1998	pre-1997	pre-1997	pre-1998
Events	217	580	216	220	70	70	72
Day							
-10	-1.10459	-0.43477	0.70648	1.57361	-1.27563	1.05204	0.99854
-9	0.16732	0.4597	3.15283***	1.35286	-0.99191	2.24477**	1.04816
-8	0.14205	0.56623	-0.09293	-0.54231	0.84688	-1.35629	0.18198
-7	-1.69953*	-0.88533	-0.27477	-1.97207**	-1.39751	0.16283	-0.99677
-6	0.95015	-0.86163	1.86084*	1.93955*	1.78633*	1.32202	0.40147
-5	1.50433	0.95872	1.12011	0.90026	-0.7616	-0.50622	-0.09056
-4	0.5858	0.6792	-1.14923	-2.2184**	0.81001	-1.23169	-2.52407**
-3	-0.5568	-1.36131	-1.07083	1.64746	-0.0688	-0.70859	1.55689
-2	0.31701	0.74269	0.65543	2.23177**	0.16053	0.21237	1.76939*
-1	0.49149	1.81737*	1.76898*	1.37945	0.21497	2.83322***	1.43518
0	-1.384	-1.53025	0.39495	0.10767	0.56271	1.3185	1.20068
1	-0.05916	0.25661	-1.42643	-1.20142	-0.44607	0.55747	-0.69049
2	-1.1725	-1.08659	-0.92805	0.65772	-0.49096	-1.07468	-1.36391
3	0.33577	0.67071	1.74436*	0.22523	-0.54214	0.98714	0.3287
4	0.59431	-0.76082	0.85611	-0.23713	0.12857	-0.90524	-2.04581**
5	-0.43536	-0.80329	0.15139	-0.78171	-1.82732*	0.04706	-0.82114
6	-0.93048	-0.33099	-1.2816	-1.51177	-0.41451	-0.75957	-1.88202*
7	-0.16904	-1.15916	-1.07233	-1.50598	-0.10918	-1.46972	-2.01951**
8	1.31956	-0.28884	-0.05719	-0.72944	0.21273	0.38936	0.06725
9	0.60145	2.06272**	-0.61462	-1.52748	1.15481	0.54189	-0.39543
10	0.04689	0.6418	1.46251	1.50844	0.07048	0.16041	1.59739

* p < .10 , ** p < .05 , *** p <.01

Table 21: Market Model Abnormal Returns for Companies Representing Top 50% of S&P 500 For Redemption Pre-1998 Sample with $2 Million Volume Limit

(220 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	0.1104%	-0.0030%	-7.8300%	7.2800%	0.1104%	49.55%	1.5736
-9	0.2196%	0.0529%	-7.8200%	9.7500%	0.3300%	50.91%	1.3529
-8	-0.0552%	-0.0782%	-5.1800%	8.5900%	0.2748%	46.82%	-0.5423
-7	-0.2128%	-0.2650%	-10.0600%	5.9400%	0.0620%	42.27%	-1.9721**
-6	0.2404%	0.1940%	-5.9000%	11.8500%	0.3024%	53.18%	1.9396*
-5	0.0925%	0.0697%	-10.7600%	10.1400%	0.3949%	51.82%	0.9003
-4	-0.2862%	-0.3820%	-6.2100%	6.7400%	0.1088%	42.27%	-2.2184**
-3	0.0679%	0.0621%	-10.2800%	6.3300%	0.1766%	51.36%	1.6475
-2	0.3728%	0.0645%	-4.6800%	10.8200%	0.5494%	51.82%	2.2318**
-1	0.2324%	0.0714%	-8.3100%	11.2200%	0.7819%	52.27%	1.3795
0	-0.0577%	-0.0213%	-16.8400%	6.1900%	0.7241%	49.09%	0.1077
1	-0.1592%	-0.1930%	-9.9300%	4.4600%	0.5649%	42.73%	-1.2014
2	0.1148%	-0.0371%	-9.6200%	11.0000%	0.6797%	47.73%	0.6577
3	-0.0120%	-0.0736%	-6.5100%	12.6900%	0.6677%	48.18%	0.2252
4	-0.0392%	-0.1670%	-4.1900%	7.7200%	0.6285%	45.00%	-0.2371
5	-0.0900%	-0.0759%	-6.5600%	4.9800%	0.5385%	48.18%	-0.7817
6	-0.3774%	-0.0400%	-28.0500%	6.8400%	0.1612%	49.55%	-1.5118
7	-0.3465%	-0.0547%	-10.0500%	4.2400%	-0.1853%	48.64%	-1.5060
8	-0.1088%	-0.0474%	-12.7100%	9.9800%	-0.2941%	48.64%	-0.7294
9	-0.2693%	-0.1210%	-9.1100%	6.1800%	-0.5634%	43.64%	-1.5275
10	0.1831%	0.1720%	-5.8200%	9.6200%	-0.3803%	53.64%	1.5084

* p < .10, ** p < .05 , *** p < .01

Table 22. 1:Z- Statistic for Abnormal Returns on the Top 10 Companies In the S&P 500 Index for Creation Dates for Entire Period With $5 Million Limitation

Comp.	CSCO	MSFT	XOM	PFE	INTC	C	ORCL	AIG	EMC
%	3.11	2.51	2.46	2.25	2.21	1.93	1.76	1.75	1.71
Ev.(#)	8	8	8	8	8	8	8	8	8
Day									
-10	1.99348**	0.54684	-1.10995	-1.31455	1.38236	-1.31334	-0.87759	0.49437	4.22952***
-9	-0.36709*	-1.15884	0.48684	-0.90135	-1.08742	1.16231	0.17961	0.51976	-1.78979*
-8	0.35907	1.29818	1.49737	2.29735**	-1.05242	0.28631	1.87288*	0.41111	0.39807
-7	0.24614	-0.21171	0.69781	0.39446	-0.49278	0.27079	-0.92373	0.93345	-0.7431
-6	-1.02357	-0.27178	1.06709	-1.32766	-1.05087	-0.24766	-0.87642	1.75553*	-1.98552**
-5	-0.31513	-0.36123	-2.21374**	-0.59022	0.81741	-0.1586	1.01427	0.06718	0.53072

-4	-0.34719	-0.0734	-0.58269	0.2675	-0.58697	0.88466	-1.93475*	0.43264	0.88961
-3 *	0.42943	2.51034**	-0.05898	-1.07441	0.41012	0.1906	-1.03421	-0.99179	0.11409
-2	0.80073	1.04064	-0.42854	1.28439	-1.02757	1.90541*	0.80666	-1.46223	-0.72867
-1	-0.23126	-1.09248	-1.30769	0.13849	0.84054	-0.32697	-0.32781	1.0293	1.58212
0	2.01165**	0.31236	-1.55779	-1.26003	2.41979**	-2.5901**	2.6607**	-1.29146	1.08958
1	0.03585	-0.9233	0.64633	-0.65757	-0.29815	-0.27188	0.0554	-0.1987	-0.19643
2	1.16697	-1.00363	0.66581	-0.19647	1.40753	2.32769**	-0.22458	0.52436	0.62466
3	-2.12136**	-0.61882	1.94727*	0.74709	-0.55826	-2.12705**	1.18009	0.30752	-0.23436

4	-1.98877**	-0.50293	-0.45909	-2.19878**	0.6597	-0.05819	-0.27697	0.9477	-1.5825
5	1.23277	0.78446	-1.32894	-1.31069	0.26	-0.77867	0.9821	-0.18802	-0.50721
6	0.46414	-1.21743	1.68531	-0.74794	-0.52404	-0.10444	0.1457	-1.57678	1.4939
7	-0.19191	1.01095	2.04145**	-0.75328	1.03181	-1.66315	2.09378**	0.2938	1.72424
8	* 0.47606	0.91892	0.04777	0.85157	0.06944	-1.27774	2.17188**	-0.41546	1.68907
9	* 1.03298	1.82144*	0.87006	0.4115	-0.16918	-0.69753	-0.57905	-1.07463	-1.04553
10	0.27715	1.07215	-1.96466**	-0.90828	0.28719	-0.81738	1.19947	-2.91247***	1.62638

Table 23. 1:Z- Statistic for Abnormal Returns for Top 50% of Companies Underlying S&P 500 for Redemptions Dates

Date	7/12/99	8/3/99	1/21/00	3/16/00	5/16/00
Obs.	34	34	34	34	34
$	4.200m	4m	7.2m	9m	6m
Day					
-10	0.24917	0.05913	-2.16414**	1.38423	0.16618
-9	0.18378	-11703	3.65939***	-1.21589	0.19216
-8	-0.86162	-0.41045	2.50724**	-0.87914	-0.18424
-7	1.2386	0.4153	-0.0827	-0.35659	-0.26196
-6	0.28215	-0.62659	-0.20168	0.62827	0.1838
-5	-0.29064	-1.08216	0.74803	0.12449	-0.1539
-4	-0.00497	0.06119	-0.41743	-0.92402	-0.09578
-3	0.33955	0.3033	1.09687	-0.71042	-0.99113
-2	0.77216	0.49361	1.10953	0.19832	0.47327
-1	-0.70172	-1.11244	0.33248	-0.33355	-0.3083
0	0.14929	1.1897	-0.1016	-1.65672	-0.2531
1	0.33199	-0.33201	-0.16803	0.53007	-0.16242
2	-0.42753	-0.36843	0.20036	1.21663	-0.56393
3	-0.19595	-0.03461	0.20511	-1.09721	0.32864
4	-1.05793	-0.75375	0.11977	0.03819	-0.34497
5	0.45536	1.2163	0.35058	-0.63697	-0.84014
6	0.30841	-0.36977	0.07971	-0.3148	0.30096
7	-0.17157	0.21947	-1.48098	-0.71084	0.11715
8	-0.33154	0.07603	0.63182	0.4927	-0.06217
9	0.46295	0.54511	-0.98382	0.14871	0.40767
10	-0.53542	-0.18783	0.07229	-0.44073	0.51289

* p < .10 , ** p < .05 , *** p < .01

Table 24: Company Specific Information on Particular Event Dates

Entire Redemption Sample with $4 Million Volume Limit

Date	Company Name	Event Type
6/28/94	Oracle Corp.	Increase in Earnings (Fourth Quarter)
9/18/97	Microsoft Corp.	Delay in Product Launch
	Oracle Corp.	Decrease in Sales (First Quarter)
	Home Depot	Legal Settlement (Against)
4/27/98	Pfizer Inc.	New Product Development
	Citigroup Inc.	Merger
	American Int'l Group	Merger Rumors
	Johnson & Johnson	Legal Settlement (In Favor of)
	Hewlett-Packard	Credit Rating Change (In Favor of)
	Proctor & Gamble	Increase in Earnings (Third Quarter)
8/4/98	Cisco Systems	Increase in Profits (Fourth Quarter)
	SBC Communications	Merger Rumors
	America Online	Increase in Earnings (Year)
	AT & T	Acquisition
	Hewlett-Packard	Decrease in Earnings
	Proctor & Gamble	Increase in Earnings (Year)
	WorldCom Inc.	Bond Sale
11/2/98	Cisco Systems	Increase in Earnings (First Quarter)
	Citigroup Inc.	Management Departure
	Sun Microsystems	Increase in Earnings
	Merck & Co.	Increase in Profits
	SBC Communications	Merger
	WorldCom Inc.	Reported Loss (Third Quarter)
11/18/98	Cisco Systems	Credit Rating Change (In Favor of)
	Microsoft Corp.	Legal Settlement (Against)
	Sun Microsystems	Legal Settlement (In Favor of)
	America Online	Merger Rumors
	Home Depot	Increase in Profits (Third Quarter)
	Bristol-Myers Squibb	Legal Settlement (Against)
	AT & T	Increase in Expenses
	Time Warner Inc.	Credit Rating Change (In Favor of)
	Hewlett-Packard	Increase in Earnings (Fourth Quarter)
	Lilly (Eli) & Co.	Sale of Subsidiary
1/14/99	Intel Corp.	Increase in Profits (Fourth Quarter)
	International Business Machines	Awarded Contract
	Time Warner Inc.	Merger Rumors
	WorldCom Inc.	Awarded Contract

Table 24: Company Specific Information on Particular Event Dates

Entire Redemption Sample with $4 Million Volume Limit

Date	Company Name	Event Type
2/2/99	General Electric	Acquisition
	Cisco Systems	Increase in Profits (Second Quarter)
	EMC Corp.	Increase in Profits (Fourth Quarter)
	Nortel Networks	Awarded Contract
	SBC Communications	Merger Rumors
	America Online	Acquisition
	Morgan Stanley, Dean Witter…	Acquisition
7/12/99	General Electric	Increase in Earnings (Second Quarter)
	Wal-Mart Stores	Increase in Sales
	International Business Machines	Acquisition
	Coca Cola Co.	Increase in Expenses
	Hewlett-Packard	Awarded Contract
8/3/99	Sun Microsystems	New Product Development
	Nortel Networks	Awarded Contract
	Coca Cola Co.	Acquisition
1/21/00	General Electric	Increase in Profits (Fourth Quarter)
	Cisco Systems	Acquisition
	Microsoft Corp.	Decrease in Earnings (Second Quarter)
	Citigroup Inc.	Acquisition
	International Business Machines	Decrease in Profits (Fourth Quarter)
	America Online	Increase in Income (Second Quarter)
	Time Warner Inc	Acquisition
	Proctor & Gamble	Acquisition Rumors
	Tyco International	Stock Repurchase
3/16/00	Cisco Systems	Acquisition
	Intel Corp.	Acquisition
	American International Group	Stock Repurchase
	Nortel Networks	Acquisition
	America Online	Acquisition
	Corning Inc.	Increase in Earnings (First Quarter)
	WorlCom Inc.	Merger
5/16/00	Cisco Systems	Acquisition
	Pfizer Inc.	Merger
	Intel Corp.	Increase in Dividends
	Citigroup Inc.	Acquisition
	Coca Cola Co.	Decrease in Profits (Year)
	America Online	Strategic Alliance
	Home Depot	Decrease in Profits (First Quarter)
	Hewlett-Packard	Increase in Earnings (Second Quarter)

Table 25: Company Specific Information on Particular Event Dates
Pre-1998 Redemption Sample with $2 Million Volume Limit

Date	Company Name	Event Type
4/4/94	American Int'l Group	Stock Repurchase
	Sun Microsystems	Decrease in Revenues (Year)
	America Online	Takeover Speculations
	Bristol-Myers Squibb	Legal Settlement (Against)
5/5/94	Time Warner Inc.	Takeover Speculations
	Corning Inc.	Company Acquisition
6/28/94	Oracle Corp.	Increase in Earnings (Fourth Quarter)
9/20/96	Intel Corp.	Increase in Revenues (Third Quarter)
	Coca Cola Co.	Decrease in Sales
	Worldcom Inc.	Company Acquisition
9/18/97	Microsoft Corp.	Delay in Product Launch
	Oracle Corp.	Decrease in Sales (First Quarter)
	Home Depot	Legal Settlement (Against)
10/30/97	Microsoft Corp.	Decrease in Earnings (First Quarter)
	International Business Machines	Stock Repurchase

Table 26: Market Model Abnormal Returns for Companies Representing Top 50% of S&P 500 for Redemption Pre-1998 Sample With $2 Million Volume Limit Adjusted for Company Specific Information

(205 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	0.1515%	0.0062%	-7.8300%	7.2800%	0.1515%	50.24%	1.8759*
-9	0.2368%	0.0717%	-7.8200%	9.7500%	0.3883%	51.22%	1.5800
-8	-0.0701%	-0.0788%	-5.1800%	8.5900%	0.3183%	46.34%	-0.4942
-7	-0.2523%	-0.2400%	-10.0600%	5.5300%	0.0659%	42.93%	-2.1248**
-6	0.2332%	0.2190%	-5.9000%	7.3900%	0.2991%	53.66%	2.0011**
-5	0.0951%	0.0073%	-10.7600%	10.1400%	0.3942%	50.73%	0.6182
-4	-0.2482%	-0.3270%	-6.2100%	6.7400%	0.1459%	43.41%	-2.0208**
-3	0.0574%	0.0596%	-10.2800%	6.3300%	0.2033%	51.22%	1.4368
-2	0.2638%	0.0466%	-4.6800%	8.3600%	0.4671%	50.73%	1.2190
-1	0.2683%	0.0727%	-5.1100%	11.2200%	0.7354%	52.68%	1.4568
0	0.0342%	-0.0133%	-7.8000%	6.1900%	0.7696%	49.27%	0.7715
1	-0.1366%	-0.1900%	-9.9300%	4.4600%	0.6330%	42.44%	-0.9338
2	0.1670%	-0.0162%	-9.6200%	11.0000%	0.8000%	48.29%	0.9813
3	-0.0679%	-0.1020%	-6.5100%	7.1700%	0.7322%	47.32%	-0.1232
4	-0.0386%	-0.1450%	-4.1900%	7.7200%	0.6935%	45.37%	-0.1434
5	-0.0815%	-0.0530%	-6.5600%	4.9800%	0.6121%	48.29%	-0.7538
6	-0.3897%	-0.0398%	-28.0500%	6.8400%	0.2224%	49.76%	-1.6499
7	-0.3073%	-0.0112%	-10.0500%	4.2400%	-0.0849%	49.76%	-1.0066
8	-0.1470%	-0.0291%	-12.7100%	6.7100%	-0.2319%	49.76%	-0.6745
9	-0.2823%	-0.1280%	-9.1100%	6.1800%	-0.5142%	42.93%	-1.6724
10	0.2103%	0.1730%	-5.8200%	9.6200%	-0.3040%	54.15%	1.6192

* p < .10, ** p < .05 , *** p < .01

Table 27: Market Model Abnormal Returns for Companies Representing Top 50% of S&P 500 For Redemption Sample With $4 Million Volume Limit Adjusted for Company Specific Information

(361 Event Days)

Day	AAR	Median	Minimum	Maximum	CAAR	% Positive	Z-Stat.
-10	0.1024%	-0.0317%	-14.8100%	13.2200%	0.1024%	49.55%	1.0304
-9	0.2235%	0.0201%	-6.5800%	16.2800%	0.3260%	50.91%	1.3568
-8	-0.0458%	-0.2530%	-8.5900%	14.8300%	0.2801%	46.82%	-0.6637
-7	0.0386%	-0.0062%	-28.9000%	10.6700%	0.3187%	42.27%	0.3501
-6	0.0812%	0.0745%	-6.1100%	9.3300%	0.4000%	53.18%	1.0542
-5	0.1741%	-0.1690%	-10.7600%	10.7400%	0.5741%	51.82%	0.7888
-4	-0.0725%	-0.3510%	-6.6400%	12.5300%	0.5016%	42.27%	-0.9903
-3	-0.0751%	-0.1180%	-9.0600%	13.6000%	0.4265%	51.36%	-0.6984
-2	0.2438%	0.0845%	-6.7700%	8.5900%	0.6703%	51.82%	2.0053**
-1	0.0349%	-0.1810%	-9.9900%	17.1500%	0.7051%	52.27%	-0.0154
0	0.1249%	-0.0133%	-6.2900%	8.3400%	0.8300%	49.09%	1.0927
1	0.1379%	0.0096%	-6.6100%	9.0400%	0.9679%	42.73%	0.9844
2	0.0821%	-0.0404%	-7.6900%	8.7200%	1.0500%	47.73%	0.3252
3	-0.2036%	-0.2890%	-8.0000%	6.7400%	0.8464%	48.18%	-1.0307
4	-0.2734%	-0.1950%	-7.4000%	4.3400%	0.5730%	45.00%	-2.0938**
5	-0.0219%	-0.0847%	-7.3300%	8.6100%	0.5511%	48.18%	0.1751
6	0.1603%	0.0928%	-9.6800%	7.2400%	0.7114%	49.55%	1.1627
7	0.0777%	0.0320%	-6.2900%	9.4200%	0.7891%	48.64%	0.6384
8	0.0427%	-0.0498%	-12.7100%	11.3000%	0.8318%	48.64%	0.3541
9	-0.0589%	-0.1010%	-8.8900%	10.5600%	0.7729%	43.64%	-0.6486
10	0.0826%	-0.0750%	-8.4100%	11.2900%	0.8556%	53.64%	0.7132

* p < .10, ** p < .05 , *** p < .01