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Abnormal Returns from the Common Stock Investments of the U.S. Senate

Alan J. Ziobrowski, Ping Cheng, James W. Boyd, and Brigitte J. Ziobrowski*

Abstract

The actions of the federal government can have a profound impact on financial markets. As prominent participants in the government decision making process, U.S. Senators are likely to have knowledge of forthcoming government actions before the information becomes public. This could provide them with an informational advantage over other investors. We test for abnormal returns from the common stock investments of members of the U.S. Senate during the period 1993–1998. We document that a portfolio that mimics the purchases of U.S. Senators beats the market by 85 basis points per month, while a portfolio that mimics the sales of Senators lags the market by 12 basis points per month. The large difference in the returns of stocks bought and sold (nearly one percentage point per month) is economically large and reliably positive.

I. Introduction

Decisions made by the federal government often have serious implications for corporate profitability and are therefore of keen interest to the financial markets. U.S. Senators are among the most important participants in that decision process by virtue of their role as lawmakers and overseers of most federal agencies. Senators may also be embedded in social networks that provide them with access to valuable information. As such, Senators might be able to capitalize on this superior information through stock trading. Yet, despite their access to special information, neither federal law nor *The Senate Code of Official Conduct* places any unusual restrictions on the Senators' common stock transactions. According to the *U.S. Senate Ethics Manual*, "The strong presumption would be that

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the Member was working for legislation because of the public interest and the needs of his constituents and that his own financial interest was only incidentally related . . . ."

However, public choice theory (see Buchanan and Tollison (1984)) suggests that such a presumption is unrealistic. That people act to maximize their personal utility in their public capacities as well as their private lives is the most fundamental principle of public choice theory. Thus, voters can be expected to make choices that they anticipate will maximize benefits to them personally or minimize costs. Of more relevance to this study, their elected government officials can be expected to behave likewise. As an example, it is well documented that as a member of Congress in the 1940s and 1950s, Lyndon B. Johnson frequently used his political influence at the Federal Communication Commission to obtain licenses for his radio and television stations and to block competition from invading his markets in Texas. Johnson's influence allowed him to ultimately grow an initial investment of $17,500 into a multi-media company worth millions. [1]

There is no academic literature dealing with Congressional common stock returns. The only related literature is Boller (1995), who investigated a random sample of Congressional delegates (both Senators and Members of the U.S. House of Representatives) and found that 25% of them invested in companies that could be directly affected by ongoing legislative activity. However, this result merely suggests a potential conflict of interest. His research did not demonstrate that these investments yielded unusually large returns.

Our goal in this research is to determine if the Senators' investments tend to outperform the overall market. Such a finding would support the notion that Senators use their informational advantage for personal gain. We test whether the common stocks purchased and sold by U.S. Senators exhibit abnormal returns. Assuming returns are truly "incidental," we hypothesize that U.S. Senators should not earn statistically significant positive abnormal returns on their common stock acquisitions (the null). Rejection of the null, i.e., a finding of statistically significant positive abnormal returns, would suggest that Senators are trading stock based on information that is unavailable to the public, thereby using their unique position to increase their personal wealth.

Federal law requires all Senators to disclose their common stock transactions annually in a Financial Disclosure Report (FDR). We use an event study methodology to measure abnormal returns for common stock acquisitions and sales reported by the Senators in their FDRs during the period 1993 through 1998. The trigger events in our study are the stock purchases and sales made by the Senators. Since these transactions were not publicly reported until long after they occurred (anywhere from five to 17 months later), the subsequent returns of these stocks could not have been market reactions to the actual transactions themselves. Any statistically significant abnormal returns therefore would likely be the result of reactions to events anticipated by Senators and motivated their transactions.

We find that the behavior of common stocks purchased and sold by Senators indicates that Senators trade with a substantial informational advantage. Using the calendar-time portfolio approach with the Fama-French three-factor model

[1] See Dallek (1991) and other biographies of Lyndon B. Johnson for more details.

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and the Capital Asset Pricing Model (CAPM), a portfolio that mimics the purchases of U.S. Senators on a trade-weighted basis outperforms the market by 85 basis points per month, while a portfolio that mimics the sales of Senators underperforms the market by 12 basis points per month. For Senate stock purchase transactions, the abnormal returns are both economically large and statistically significant. When measuring cumulative daily abnormal returns we find that the cumulative daily abnormal return from common stocks purchased by Senators is more than 25% during the 12 calendar months immediately following acquisition. Common stocks sold by Senators exhibit slightly positive cumulative abnormal returns throughout the year following the sale. But during the 12 months prior to sale, the cumulative daily abnormal return is also over 25%, peaking close to the time of sale.

We also analyze the data for several subsamples to examine the sensitivity of the results to the Senators' party affiliation and seniority. When transactions made by the Senators are separated by political party, we find no statistically significant differences between the abnormal returns of Democrats and Republicans. However, seniority is a significant factor. The common stock investments of Senators with the least seniority (serving less than seven years) outperform the investments of the most senior Senators (serving more than 16 years) by a statistically significant margin.

II. Data and Research Design

Many of the Senate FDRs used in this study were obtained from the Web site www.opensecrets.org. However, the FDRs available at the site covered only current members of the Senate and only three years of data were provided at the time of data acquisition. Therefore, it was necessary to acquire additional FDRs from the Senate Printing Office.

In the FDRs, Senators identify all common stock purchases or sales, together with the date of the transactions and the approximate value of the transactions. We look only at assets not held in blind trusts since Senators do not report the holdings or transactions on any assets held in qualified blind trusts. The data have some serious limitations. First, although each report is personally signed and authenticated by the Senator, none of the FDRs are audited for accuracy by any government agency or organization outside the government. Therefore, we cannot verify the accuracy or completeness of these reports. Second, the care used to fill out these reports varies widely. Some are typed, some are handwritten, some include monthly financial statements from their brokerage firms, and some use abbreviations and terms that are impossible to decipher. Thus, extraction of the data was frequently difficult and despite our best efforts may have resulted in occasional errors. Third, the available data do not permit us to measure the magnitude of profits earned by individual Senators. Senators report the dollar volume of transactions only within broad ranges ($1,001 to $15,000, $15,001 to $50,000, $50,001 to $100,000, $100,001 to $250,000, $250,001 to $500,000, $500,001 to $1,000,000 and over $1,000,000). The broad ranges also present problems for trade-size-weighted analysis.

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The database includes common stock transactions made by the Senators, their spouses, and their dependent children. The transactions have been recorded with the name of the Senator, the transaction date, and the approximate value of the transaction. Assets were matched by name with CUSIP numbers from the Center for Research in Security Prices (CRSP) databases.

Without knowing any details about the information the Senators may possess, we cannot assume that abnormal returns would necessarily be seen within days or even weeks of the stock purchase. Furthermore, the timing of abnormal performance is likely to vary across securities depending on the political and economic issues under discussion and the companies or industries affected. We therefore examine returns for a full calendar year (255 trading days) after the acquisition or sale of the stock. Abnormal performance is measured using the calendar-time portfolio approach with the Fama-French three-factor model and CAPM as recommended by Mitchell and Stafford (2000).

Initially, we begin with 6,052 transactions. Before analysis we apply several screens to the data. Only U.S. common stocks are included in the study. These screens eliminate, among other things, all preferred stock, ADRs, REITs, foreign stocks, and mutual funds. We also eliminate all initial public offerings (IPOs) from the sample.[2] In total, 360 observations are eliminated for the reasons given above. Among the surviving transactions, approximately 59% of the stocks are listed on the NYSE, 40% are traded on the NASDAQ, and about 1% are listed on the ASE.

After separating the transactions into purchases and sales, we begin by calculating the cumulative abnormal return, CAR, for the buy sample and sell sample on each event-day from day −255 to day +255, where $t = 0$ is the transaction day. First, daily average abnormal return for the sample transactions is calculated as

$$\text{(1)} \qquad \overline{\text{AR}} = \sum_{i=1}^{N} w_i (R_{it} - R_{mt}),$$

where N is the number of transactions in the sample (buy or sell), R_{it} is the return from sample transaction i on trading day t, R_{mt} is the return on the CRSP value-weighted market index for trading day t, and w_i is the trade weight of transaction i. As indicated previously, Senators report transaction amounts only within broad ranges. We therefore estimate the value of their trades using the midpoint of the range reported by the Senators for all transactions less than $250,000. For all transactions above $250,000, we assume a transaction size equal to $250,000. Next, we compute the cumulative abnormal returns (CAR) for day t as:

$$\text{(1a)} \qquad \text{CAR}_t = \sum_{T=-255}^{t} \overline{\text{AR}}_T,$$

where t ranges from day −255 to +255. Although we do not rely on the CARs as a basis for our main statistical inferences, they do provide an indication as to

[2]IPOs were excluded because of the possibility that Senators were allocated these shares during the IPO process. Loughran and Ritter (1995) have shown that IPOs typically earn a high return on the first trading day but under-perform the market thereafter. Thus, though they may prove to be poor long-term investments, these losses are more than likely compensated for by the large first-day returns earned by many IPOs.

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whether the Senators' portfolio outperformed the market. We compute CARs for both the buy and sell samples.

The calendar-time portfolio method for detecting long-run abnormal returns was first used by Jaffe (1974) and Mandelker (1974) and is strongly recommended by Fama (1998). To briefly explain, for each calendar day a calendar-time portfolio is constructed including all those stocks that have an event date within the prior 255 days. The portfolio return is then calculated as

$$R_{p,t} = \sum_{i=1}^{N} c_{i,t} R_{i,t} \Big/ \sum_{i=1}^{N} c_{i,t}, \tag{2}$$

where $R_{p,t}$ is the portfolio return on day t and $c_{i,t}$ is the compound value of transaction i from the event date to $t-1$. For an equal-weighted portfolio, the initial value of transaction i is set at \$1. To calculate the trade-weighted portfolio, we replace the weight of \$1 on the purchase date with the value of the trade. As before, we again estimate the value of their trades using the midpoint of the range reported by the Senators for all transactions less than \$250,000. For all transactions above \$250,000, we assume a transaction size equal to \$250,000.

We obtain daily portfolio return series for four calendar-time portfolios: an equally-weighted portfolio of the buy transactions, a trade-size-weighted portfolio of the buy transactions, an equally-weighted portfolio of the sell transactions, and a trade-size-weighted portfolio of the sell transactions. The time span of these return series is from January 1, 1993 to December 31, 1998.

To draw statistical inferences, we compound daily returns to yield monthly returns. We then calculate portfolio excess returns by subtracting the risk-free rate from the monthly return series. We regress the portfolio excess return series on two models: the CAPM and the Fama-French three-factor model. The CAPM is shown in equation (3),

$$R_{p,t} - R_{f,t} = \alpha_i + \beta_i (R_{m,t} - R_{f,t}) + \varepsilon_{p,t}, \tag{3}$$

where $R_{p,t}$ is the monthly calendar-time portfolio return at month t, $R_{m,t}$ is the monthly return on the CRSP value-weighted index at month t, $R_{f,t}$ is the risk-free rate at month t, α_i, and β_i are the regression parameters, and $\varepsilon_{p,t}$ is the error term. The intercept, α, measures the average monthly abnormal return.

The Fama-French three-factor model is shown in equation (4),

$$R_{p,t} - R_{f,t} = \alpha_i + \beta_i (R_{m,t} - R_{f,t}) + s_p \mathrm{SMB}_t + h_p \mathrm{HML}_t + \varepsilon_{p,t}. \tag{4}$$

The regression parameters for the Fama-French model are α_i, β_i, s_p, and h_p. The three factors β_i, s_p, and h_p are zero-investment portfolios representing the excess return of the market ($R_m - R_f$), the difference between a portfolio of small stocks and a portfolio of big stocks (SMB), and the difference between a portfolio of high book-to-market stocks and a portfolio of low book-to-market stocks (HML), respectively. See Fama and French (1993) for details on the construction of the factors. The intercept, α_i (Fama-French alpha), again measures the average monthly abnormal return, given the model. Data on the Fama-French three-factor model (R_{mt}, SMB, and HML) are obtained from Ken French's Web

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site (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/). Under our null hypothesis that the Senators' portfolios do not exhibit significant abnormal returns, the regression intercept (α_i) is non-distinguishable from zero for both models. Rejecting this null hypothesis would indicate that there is a non-zero abnormal return associated with the Senators' portfolio.

III. Results

Table 1 shows a breakdown of the common stock buy and sell transactions in the Senate sample. We divide the transactions by year showing the number of active traders each year, the mean number of transactions per trader, and the median number of transactions per trader. Only a minority of Senators buy individual common stocks, never more than 38% in any one year. The median number of buy transactions each year per trader is between three and seven, suggesting Senators do not buy common stocks often. But the average number of buy transactions each year per trader is much higher, ranging between 11 and 29 purchases per trader each year. This indicates that there is a small group of Senators who are quite active in the stock market. The vast majority of purchase transactions are less than $15,000 (71%) with 18% between $15,000 and $50,000, 4% between $50,000 and $100,000, and the remaining 7% are larger than $100,000. The sell transactions show a very similar pattern. The most active traders in descending order were Senators Claiborne Pell of Rhode Island, John Warner of Virginia, John Danforth of Missouri, and Barbara Boxer of California, who collectively accounted for nearly half of all the transactions in the sample.

TABLE 1

Frequency of Transactions by U.S. Senators

	Year					
	1993	1994	1995	1996	1997	1998
Panel A. Buy Transactions						
Total no. of transactions	721	499	553	556	355	458
No. of traders	25	26	25	36	31	38
Average no. of transactions/trader	28.9	19.2	22.1	15.5	11.5	13.9
Median no. of transactions/trader	5	3.5	3	4	7	5
Min. no. of transactions/trader	1	1	1	1	1	1
Max. no. of transactions/trader	298	187	262	304	70	165
Transactions $15,000 or less	586	400	342	341	198	373
Transactions $15,001 to $50,000	76	50	122	163	87	74
Transactions $50,001 to $100,000	25	19	24	19	17	7
Transactions more than $100,000	34	30	65	33	53	4
Panel B. Sell Transactions						
Total no. of transactions	390	542	550	459	308	295
No. of traders	22	24	25	33	34	29
Avg. no. of transactions/trader	17.8	22.6	22.0	13.9	9.1	10.2
Median no. of transactions/trader	4	3.5	8	3	3	4
Min. no. of transactions/trader	1	1	1	1	1	1
Max. no. of transactions/trader	192	239	257	237	79	88
Transactions $15,000 or less	269	402	310	317	148	187
Transactions $15,001 to $50,000	63	89	111	83	115	74
Transactions $50,001 to $100,000	23	16	44	15	19	5
Transactions more than $100,000	35	35	85	44	26	29

Table 1 shows the number of common stock buy and sell transactions made by members of the U.S. Senate during every year that was included in the final study sample. Traders for each year are the numbers of individual Senators who made one or more of the transactions included in the final sample.

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Figure 1 presents graphs of the daily CARs for the samples of buy and sell transactions. For the 12 months prior to acquisition, common stocks purchased by Senators exhibit relatively small positive CARs (3.4%). After being acquired, the CARs increase to 28.6% during the next calendar year. The CARs for the sample of sell transactions are equally interesting. The CARs after sale by the Senators are nearly zero. However, prior to sale, we see another large run-up in the CARs during the 12 months before the event-day (25.1%). These results clearly support the notion that members of the Senate trade with a substantial informational advantage over ordinary investors. The results suggest that Senators knew when to buy their common stocks and when to sell. Because of the well-documented statistical problems associated with the use of event-time abnormal returns, we do not formally test the statistical significance of the CARs. To formally test the performance of stocks bought and sold, we rely on the calendar-time portfolio returns.

FIGURE 1

Daily Cumulative Abnormal Returns for Common Stocks Bought and Sold by U.S. Senators

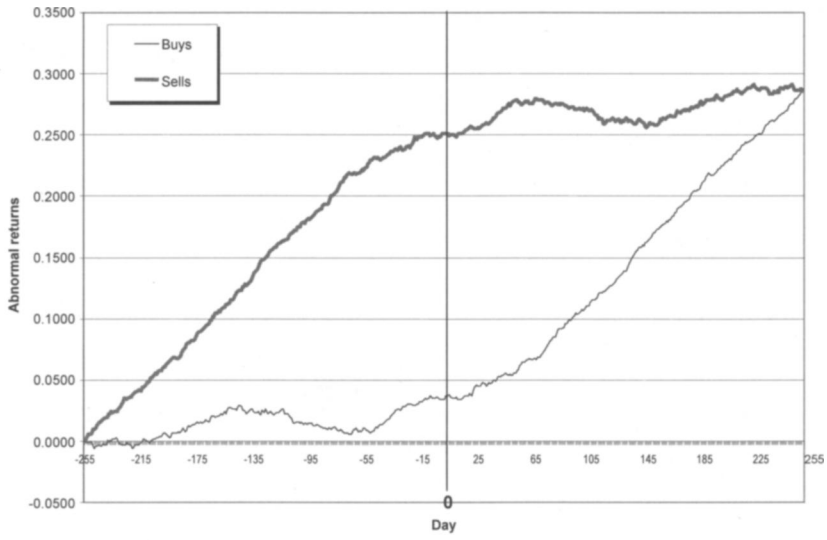

Figure 1 depicts the cumulative abnormal returns (CARs) of the buy and sell transactions of U.S. Senators during the period 255 days prior to and after the event date (day 0 on the horizontal axis). To calculate the CAR, we use the expression, $\mathrm{CAR}_t = \sum_{T=-255}^{t} \overline{\mathrm{AR}}_T$, where $\overline{\mathrm{AR}}$ is the abnormal daily return on trading day t.

Table 2 shows the results of the calendar-time portfolio analysis for both the buy and the sell samples. Both the equal- and trade-weighted buy portfolios produce positive mean market-adjusted returns. The mean annualized return for the equal-weighted Senate buy portfolio is 25.8% vs. 21.3% for the market portfolio. The mean annualized return for the trade-weighted Senate buy portfolio is 34.1%, suggesting that the Senators invested more money in the stocks that ultimately performed best.

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TABLE 2

Calendar-Time CAPM and Fama-French Three-Factor Portfolio Regressions of the Senate Buy Sample, Sell Sample, and a Hedged Portfolio for Years 1993–1998 (12-month holding period)

	Buys		Sells		Hedged Portfolio	
	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted
Mean return	1.932	2.476	1.594	1.504	1.961	2.595
Std. dev.	4.748	6.354	5.233	5.800	1.883	3.620
Market-adj. return	0.311	0.854	−0.028	−0.118	0.339	0.973
Coefficient estimates on:						
Jensen Alpha (CAPM)	0.115	0.508	−0.316	−0.336	0.432**	0.844**
Fama-French Alpha	0.323**	0.849**	−0.012	−0.196	0.334	1.045***
$R_m - R_f$	1.008****	1.001****	0.987****	1.060****	0.021	−0.059
SMB	0.296****	0.342**	0.319****	0.135	−0.023	0.207
HML	−0.263****	−0.554****	−0.482****	−0.232	0.219***	−0.322**
Adj. R^2	0.920	0.666	0.908	0.592	0.084	0.086

Dependent variables are event portfolio returns, R_p, in excess of the one-month Treasury bill rate, R_f, observed at the beginning of the month. Each month, we form equal- and trade-weighted portfolios of all sample firms that have completed the event within the previous year. The event portfolio is rebalanced monthly to drop all companies that reach the end of their one-year period and add all companies that have just executed a transaction. For the CAPM regression, we use R_{pt}, to estimate the regression parameters α_i and β_i in the expression $R_{pt} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it}$. The intercept, α, measures the average monthly abnormal return, given the model. For the Fama and French three-factor model we use R_{pt}, to estimate the regression parameters α_i, β_i, s_p, and h_p in the expression $R_{p,t} - R_{f,t} = \alpha_i + \beta_i(R_{m,t} - R_{f,t}) + s_p\text{SMB}_t + h_p\text{HML}_t + \varepsilon_{p,t}$. The three factors are zero-investment portfolios representing the excess return of the market, $R_m - R_f$; the difference between a portfolio of small stocks and big stocks, SMB; and the difference between a portfolio of high book-to-market stocks and low book-to market stocks, HML. See Fama and French (1993) for details on the construction of the factors. The intercept, α, again measures the average monthly abnormal return, given the model.

****, ***, **, and * indicate significance at the 0.5%, 2.5%, 5.0%, and 10% levels, respectively.

Regressing the two buy portfolios on the market risk premium alone (CAPM), the Jensen alpha is positive although not statistically significant in either case. However, when we regress the buy portfolios on the Fama-French three-factor model, the Fama-French alphas are both positive and statistically significant in each case, indicating a substantial informational advantage. The Fama-French alpha was much higher for the trade-weighted buy portfolio supporting our earlier contention that Senators tend to invest more funds in the better performing stocks. In looking at the other coefficients generated by the Fama-French regressions, we find that the beta coefficients for both buy portfolios are relatively close to one, suggesting that the Senators tilted toward stocks with average market risk. Coefficients associated with the size factor, SMB, are positive and statistically different from zero, suggesting that Senators favored smaller companies. Coefficients associated with the value/growth factor, HML, are negative and significantly different from zero indicating that Senators also favored growth stocks with low book-to-market value ratios.

The market-adjusted returns are negative for both the equal- and trade-weighted sell portfolios. Although the Jensen alphas and Fama-French alphas are negative for these portfolios, neither is significantly different from zero. As with the buy portfolios, the results suggest that Senators tended to sell stocks of smaller companies with average market risk and higher book-to-market value ratios.

To combine the effects of the buy transactions with the sell transactions, we analyze a hedged portfolio in which we hold the purchase transactions long and short the sell transactions. The results of this analysis are also presented in Ta-

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ble 2. The Jensen alphas are positive and statistically significant for both the equal- and trade-weighted portfolios. The Fama-French alphas are positive for both the equal- and trade-weighted portfolios but statistically significant only in the case of the trade-weighted portfolio. These results indicate substantial informational advantage. Again the trade-weighted alphas are much higher suggesting that Senators invested much more heavily in the most profitable transactions. As we would expect for a hedged portfolio, the beta coefficient is not significantly different from zero indicating little market risk. Coefficients associated with the size factor, SMB, are not significantly different from zero indicating that the Senators' buy transactions and sell transactions involve similarly sized firms. The coefficient associated with the value/growth factor, HML, is positive and statistically significant on an equal-weighted basis suggesting Senators' buys involve more growth firms than their sells. The negative and statistically significant HML coefficient in the trade-weighted regression indicates that on a value-weighted basis, Senators invest more money in value stocks than they sell.

Taken collectively, the results of these analyses are economically very significant. Barber and Odean (2000) measured common stock returns for 66,465 randomly selected households in the U.S. from 1991 to 1996 and found that the average household underperformed the market by approximately 12 basis points per month. Jeng, Metrick, and Zeckhauser (2001) examined the returns to corporate insiders when they traded shares of their respective company's common stock during the period 1975 to 1996 and found that insiders earned an economically significant positive abnormal return of 50 basis points per month. In comparison, we find that members of the U.S. Senate outperformed the market by almost 100 basis points per month. Although some of the abnormal returns measured for the Senate portfolios are not statistically significant, we are somewhat hampered by the short time-series of monthly returns, which invariably lowers the power of our statistical tests.[3] Nonetheless, the economic returns earned by the Senators are extraordinarily large.

Because a few Senators purchased a disproportionately large number of stocks, it is necessary to address concerns that a few high volume traders might seriously bias our results. To do this, we calculate a calendar-time portfolio for each Senator and then we average the returns across Senators on each calendar day. Analyzing the data in this fashion gives each Senator's calendar-time portfolio equal weight in the analysis. Assuming only a few high volume traders were responsible for the abnormal returns found in the full sample, the abnormal returns should disappear with this analysis. On the other hand, the persistence of positive statistically significant abnormal returns would suggest that trading with an informational advantage is reasonably widespread among Senators who trade.

Table 3 presents the results of this analysis. When we equally weight the returns of each Senator, the buy portfolio earns a compound annual rate of 28.6% on an equal-weighted basis and 31.1% on a trade-weighted basis compared to 21.3% for the market. Both Jensen alphas for the buy portfolio are positive, but only the trade-weighted Jensen alpha is statistically significant. The Fama-French alphas for the buy portfolio are positive and statistically significant on both an

[3]Financial Disclosure Forms of the Senators are only retained six years by law. After six years, they are destroyed.

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equal- and trade-weighted basis. On the sell side, we see no evidence of abnormal returns with Jensen alphas being slightly negative and Fama-French alphas being slightly positive, none of which are statistically significant.

TABLE 3

Calendar-Time CAPM and Fama and French Three-Factor Portfolio Regressions of the Senate Buy Sample and Sell Sample for Years 1993–1998, Analyzed as Portfolios of Stocks Held by Individual Senators (12-month holding period)

	Buys		Sells		Hedged Portfolio	
	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted
Mean return	2.115	2.285	1.799	1.868	1.937	2.039
Std. dev.	4.981	4.905	5.209	5.119	2.391	2.445
Market-adj. return	0.494	0.664	0.178	0.247	0.315	0.417
Coefficient estimates on:						
Jensen Alpha (CAPM)	0.232	0.444*	−0.132	−0.042	0.364	0.486*
Fama-French Alpha	0.489*	0.568***	0.118	0.181	0.271	0.387
$R_m - R_f$	1.107****	1.104****	1.043****	1.040****	0.064	0.064
SMB	0.267****	0.253****	0.238****	0.181***	0.029	0.071
HML	−0.163**	−0.095	−0.416****	−0.399***	0.253**	0.304***
Adj. R^2	0.882	0.848	0.900	0.891	0.033	0.058

Dependent variables are event portfolio returns, R_p, in excess of the one-month Treasury bill rate, R_f, observed at the beginning of the month. Each month, we form equal- and trade-weighted portfolios of all sample firms that have completed the event within the previous year. The event portfolio is rebalanced monthly to drop all companies that reach the end of their one-year period and add all companies that have just executed a transaction. For the CAPM regression, we use R_{pt}, to estimate the regression parameters α_i and β_i in the expression $R_{pt} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it}$. The intercept, α, measures the average monthly abnormal return, given the model. For the Fama and French three-factor model, we use R_{pt}, to estimate the regression parameters α_i, β_i, s_p, and h_p in the expression $R_{p,t} - R_{f,t} = \alpha_i + \beta_i(R_{m,t} - R_{f,t}) + s_p\text{SMB}_t + h_p\text{HML}_t + \varepsilon_{p,t}$. The three factors are zero-investment portfolios representing the excess return of the market, $R_m - R_f$; the difference between a portfolio of small stocks and big stocks, SMB; and the difference between a portfolio of high book-to-market stocks and low book-to market stocks, HML. See Fama and French (1993) for details on the construction of the factors. The intercept, α, again measures the average monthly abnormal return, given the model.

****, ***, **, and * indicate significance at the 0.5%, 2.5%, 5.0%, and 10% levels, respectively.

Comparing Table 2 (whole sample) to Table 3 (weighing the Senators equally) we find that the results obtained from the buy portfolios are very similar. The sell portfolios also behave similarly in that neither case produces evidence of statistically significant returns. We therefore conclude that our results are not biased by the heavy trading volume of some Senators and that trading with an informational advantage is common among Senators.

Positions of power within the Senate (committee memberships and chairmanships) are generally determined on the basis of political party and seniority. To explore the impact of party affiliation and seniority on stock performance, Senate stock transactions are grouped by party (Table 4) and then by seniority (Table 5).

We find that our analyses of the calendar-time portfolios of Democratic Senators produced similar results to our analyses of the total sample. Both the equal- and trade-weighted buy portfolios of Democratic Senators produce significant market-adjusted mean returns with the trade-weighted market-adjusted returns being approximately twice as large as the equal-weighted adjusted returns, again suggesting larger investments in the best performing stocks. The equal- and trade-weighted Democratic buy portfolios produced higher annualized returns than the Senate sample as a whole, with returns of 28.6% and 36.1%, respectively. In each case, the Jensen alphas are positive but not statistically significant. Both Fama-

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TABLE 4

Calendar-Time CAPM and Fama and French Three-Factor Portfolio Regressions of the Senate Buy Sample, Sell Sample, and a Hedged Portfolio for Years 1993–1998 (12-month holding period), Grouped by Political Party and a *t*-Test for Significance of Party

	Buys		Sells		Hedged Portfolio	
	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted
Panel A. Democratic Party						
Mean return	2.119	2.604	1.844	1.775	1.898	2.451
Std. dev.	5.131	6.916	6.529	6.616	3.424	3.790
Market-adj. mean return	0.498	0.982	0.222	0.153	0.276	0.829
Coefficient estimates on:						
Jensen Alpha (CAPM)	0.242	0.625	−0.246	−0.153	0.488	0.777*
Fama-French Alpha	0.480**	0.976*	0.286	0.275	0.194	0.702
$R_m - R_f$	1.037****	1.003****	0.944****	0.895****	0.093	0.108
SMB	0.349****	0.363*	0.538****	0.414***	−0.190	−0.052
HML	−0.293***	−0.563***	−0.858****	−0.705****	0.565****	0.142
Adj. R^2	0.868	0.569	0.860	0.637	0.259	−0.022
Panel B. Republican Party						
Mean return	1.727	1.741	1.356	1.296	2.009	2.067
Std. dev.	4.923	5.106	4.564	4.826	3.049	4.426
Market-adj. mean return	0.105	0.120	−0.266	−0.325	0.387	0.445
Coefficient estimates on:						
Jensen Alpha (CAPM)	−0.116	0.014	−0.311	−0.261	0.161	0.275
Fama-French Alpha	0.120	0.232	−0.241	−0.303	0.328	0.535
$R_m - R_f$	0.973****	1.000****	1.091****	1.047****	−0.121	−0.047
SMB	0.180****	0.138	0.191***	−0.013	−0.028	0.151
HML	−0.430****	−0.380***	0.003	0.086	−0.405****	−0.466**
Adj. R^2	0.895	0.757	0.831	0.603	0.113	0.073
Panel C. t-Test for Significance of Difference in Party Affiliation						
Mean return : Democrats	2.119	2.604	1.844	1.775	1.898	2.451
Mean return : Republicans	1.727	1.741	1.356	1.296	1.822	2.067
Mean D−Mean R	0.392	0.862	0.488	0.479	0.076	0.383
Pooled std.	5.028	6.084	5.639	5.796	3.242	4.106
t-test stat.	0.506	0.916	0.559	0.534	−0.223	0.613
Significance (p-value)	0.614	0.361	0.577	0.594	0.824	0.540

Dependent variables are event portfolio returns, R_p, in excess of the one-month Treasury bill rate, R_f, observed at the beginning of the month. Each month, we form equal- and trade-weighted portfolios of all sample firms that have completed the event within the previous year. The event portfolio is rebalanced monthly to drop all companies that reach the end of their one-year period and add all companies that have just executed a transaction. For the CAPM regression, we use R_{pt}, to estimate the regression parameters α_i and β_i in the expression $R_{pt} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it}$. The intercept, α, measures the average monthly abnormal return, given the model. For the Fama and French three-factor model, we use R_{pt}, to estimate the regression parameters α_i, β_i, s_p, and h_p in the expression $R_{p,t} - R_{f,t} = \alpha_i + \beta_i(R_{m,t} - R_{f,t}) + s_p\text{SMB}_t + h_p\text{HML}_t + \varepsilon_{p,t}$. The three factors are zero-investment portfolios representing the excess return of the market, $R_m - R_f$; the difference between a portfolio of small stocks and big stocks, SMB; and the difference between a portfolio of high book-to-market stocks and low book-to market stocks, HML. See Fama and French (1993) for details on the construction of the factors. The intercept, α, again measures the average monthly abnormal return, given the model.

****, ***, **, and * indicate significance at the 0.5%, 2.5%, 5.0%, and 10% levels, respectively.

French alphas are positive and statistically significant. Consistent with the full sample, Democratic Senators leaned toward smaller growth firms with average market risk.

Stocks purchased by Republican Senators did not perform as well as those purchased by Democrats. Stocks purchased by Republicans have smaller positive market-adjusted returns with average annualized returns of 22.8% for the equal-weighted calendar-time portfolio and 23.0% for the trade-weighted portfolio. Furthermore, neither the Jensen alphas nor the Fama-French alphas are statistically different than zero. However, when analyzed for statistical differences between the buy portfolios of the two parties using a t-test, the returns from the buy portfolios of Democrats and Republicans are not statistically different.

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Analyses of the Democratic sell portfolios indicate no abnormal returns after sale. The equal-weighted Democratic sell portfolio yields a raw mean average annual return of 24.5% with a small positive market-adjusted mean return. The trade-weighted Democratic sell portfolio yields a mean average annual return of 23.5%. For both Democratic sell portfolios, the regression analyses calculate a negative Jensen alpha and a positive Fama-French alpha with none of the alphas being significantly different from zero.

Common stocks sold by Republican Senators underperformed the market during the calendar year after sale. The mean annual return is 17.5% for the equal-weighted Republican sell portfolio and 16.7% for the trade-weighted Republican sell portfolio. The lower return for the trade-weighted portfolio suggests that Republican Senators sold off a higher volume of those stocks that would do worst

TABLE 5

Calendar-Time CAPM and Fama and French Three-Factor Portfolio Regressions of the Senate Buy Sample, Sell Sample, and Hedged Portfolio for Years 1993–1998 (12-month holding period), Grouped by Seniority, and a Nested Test for Significance of Seniority

	Buys		Sells		Hedged Portfolio	
	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted
Panel A. Seniority Less Than 7 Years						
Mean return	1.911	2.581	1.359	0.861	2.175	3.343
Std. dev.	5.066	6.034	5.640	5.660	3.132	5.793
Market-adj. mean return	0.290	0.960	−0.263	−0.761	0.553	1.721
Coefficient estimates on:						
Jensen Alpha (CAPM)	0.071	0.712	−0.586*	−0.775	0.657*	1.487***
Fama-French Alpha	0.323	0.991***	−0.342	−0.818*	0.665*	1.808***
$R_m - R_f$	0.970****	0.968****	1.038****	1.004****	−0.068	−0.036
SMB	0.255***	0.262*	0.147	−0.229	0.108	0.491**
HML	−0.408****	−0.467***	−0.478****	−0.086	0.070	−0.381
Adj. R^2	0.870	0.624	0.772	0.450	−0.017	0.104
Panel B. Seniority between 7 and 16 Years						
Mean return	2.049	1.817	1.347	1.086	2.341	2.366
Std. dev.	4.806	5.641	4.996	5.108	2.703	3.394
Market-adj. mean return	0.427	0.196	−0.275	−0.535	0.719	0.744
Coefficient estimates on:						
Jensen Alpha (CAPM)	0.197	0.041	−0.347	−0.506	0.559*	0.561
Fama-French Alpha	0.306	0.062	−0.112	−0.493	0.476	0.587
$R_m - R_f$	1.096****	1.038****	0.988****	1.003****	0.113	0.038
SMB	0.105	−0.286*	0.273***	−0.120	−0.136	−0.149
HML	−0.180***	−0.290*	−0.304***	−0.133	0.073	−0.186
Adj. R^2	0.885	0.580	0.769	0.575	0.008	−0.002
Panel C. Seniority More Than 16 Years						
Mean return	2.023	2.209	1.879	2.050	1.768	1.776
Std. dev.	4.860	6.734	5.372	7.620	2.526	4.194
Market-adj. mean return	0.402	0.587	0.258	0.428	0.146	0.154
Coefficient estimates on:						
Jensen Alpha (CAPM)	0.289	0.297	0.114	0.163	0.170	0.130
Fama-French Alpha	0.534**	0.644	0.447	0.649	0.128	0.059
$R_m - R_f$	0.922****	0.996****	1.012****	1.026****	−0.086	−0.024
SMB	0.383****	0.548****	0.476****	0.670	−0.071	−0.087
HML	−0.282****	−0.396*	−0.353****	−0.540****	0.036	0.088
Adj. R^2	0.815	0.570	0.795	0.507	0.005	−0.025

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TABLE 5 (continued)

Calendar-Time CAPM and Fama and French Three-Factor Portfolio Regressions of the Senate Buy Sample, Sell Sample, and Hedged Portfolio for Years 1993–1998 (12-month holding period), Grouped by Seniority, and a Nested Test for Significance of Seniority

Panel D. t-Test for Significance of Difference in Seniority

	Buys		Sells		Hedged Portfolio	
	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted	Equal-Weighted	Trade-Weighted
Mean return—seniority < 7 years (G1)	1.911	2.581	1.359	0.861	2.175	3.343
Mean return—seniority 7–16 years (G2)	2.049	1.817	1.347	1.086	2.341	2.366
Mean return—seniority > 16 years (G3)	2.023	2.209	1.879	2.050	1.768	1.776
Mean return G1—mean return G2	−0.138	0.764	0.012	−0.226	−0.166	0.976
Pooled std.	4.938	5.841	5.330	5.393	2.925	4.748
t-test stat.	−0.181	0.848	0.015	−0.270	−0.367	1.333
Significance (*p*-value)	0.857	0.398	0.988	0.787	0.714	0.184
Mean return G2—mean return G3	0.026	−0.391	−0.533	−0.963	0.572	0.590
Pooled std.	4.833	6.211	5.188	6.487	2.616	3.815
t-test stat.	0.035	−0.408	−0.662	−0.957	1.368	0.952
Significance (*p*-value)	0.972	0.684	0.509	0.340	0.173	0.342
Mean return G1—mean return G3	−0.112	0.372	−0.521	−1.189	0.407	1.567
Pooled std.	4.964	6.393	5.509	6.706	2.845	5.057
t-test stat.	−0.146	0.378	−0.611	−1.145	0.880	1.970
Significance (*p*-value)	0.884	0.706	0.542	0.254	0.380	0.051*

Dependent variables are event portfolio returns, R_p, in excess of the one-month Treasury bill rate, R_f, observed at the beginning of the month. Each month, we form equal- and trade-weighted portfolios of all sample firms that have completed the event within the previous year. The event portfolio is rebalanced monthly to drop all companies that reach the end of their one-year period and add all companies that have just executed a transaction. For the CAPM regression, we use R_{pt}, to estimate the regression parameters α_i and β_i in the expression $R_{pt} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it}$. The intercept, α, measures the average monthly abnormal return, given the model. For the Fama and French three-factor model, we use R_{pt}, to estimate the regression parameters α_i, β_i, s_p, and h_p in the expression $R_{p,t} - R_{f,t} = \alpha_i + \beta_i(R_{m,t} - R_{f,t}) + s_p\text{SMB}_t + h_p\text{HML}_t + \varepsilon_{p,t}$. The three factors are zero-investment portfolios representing the excess return of the market, $R_m - R_f$; the difference between a portfolio of small stocks and big stocks, SMB; and the difference between a portfolio of high book-to-market stocks and low book-to-market stocks, HML. See Fama and French (1993) for details on the construction of the factors. The intercept, α, again measures the average monthly abnormal return, given the model.

****, ***, **, and * indicate significance at the 0.5%, 2.5%, 5.0%, and 10% levels, respectively.

in the coming year. The Jensen alphas and Fama-French alphas are negative for both Republican sell portfolios although neither is statistically significant. The regression coefficients suggest that the stocks Republicans sold were firms with average market risk, average size, and average book-to-market value. As with the party buy portfolios, when comparing the mean returns for the respective party sell portfolios in a *t*-test, we find no statistically significant differences between the two political parties.

To examine the influence of seniority, we form three groups with approximately the same number of Senators in each group: those with less than seven years in the Senate, those with seven to 16 years in the Senate, and those with more than 16 years. Stocks purchased by all three groups yield positive market-adjusted mean returns. Stocks purchased by Senators with the least seniority earned an annualized mean return of 25.5% on an equal-weighted basis and 35.8% on a trade-weighted basis in comparison to those purchased by Senators with middle seniority that earned 27.6% (EW) and 24.1% (TW) and those purchased by Senators with the longest seniority with 27.2% (EW) and 30.0% (TW). The CAPM regression analysis of the buy portfolios produces positive equal- and trade-weighted Jensen alphas for all three groups although only the Jensen alpha of the equal-weighted buy portfolio of the group with most seniority is statistically significant. Using the three-factor model, all the buy portfolios also yield positive

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Fama-French alphas. The Fama-French alpha is only statistically significant for the trade-weighted buy portfolio of Senators with the least seniority. Comparison of the mean returns from the buy portfolios of the three seniority groups with a *t*-test shows no statistical differences between the groups.

Regression analyses of the sell portfolios for Senators with the least seniority and Senators with middle seniority produce all negative Jensen and Fama-French alphas, although only the sell portfolios of Senators with the least seniority produce statistically significant alphas. The equal-weighted sell portfolio of Senators with the least seniority yields a statistically significant negative Jensen alpha and their trade-weighted sell portfolio yields a significant negative Fama-French alpha. Analyses of the sell portfolios of Senators with the most seniority produce positive market-adjusted mean returns and positive alphas, none of which are statistically significant. Again, a *t*-test reveals no significant differences among the mean returns of the sell portfolios for the three groups.

Combining the buy transactions with the sell transactions in hedged portfolios, we find that the hedged portfolios of Senators with the least seniority substantially outperform the other two seniority groups. For Senators with the least seniority, the Jensen alphas and Fama-French alphas are positive and statistically significant when transactions are both equal- and trade-weighted. The Jensen alphas and Fama-French alphas are also all positive for the middle seniority group, but only the Jensen alpha for the equal-weighted portfolio is statistically significant. The hedged portfolios of Senators with the most seniority exhibit small positive Jensen and Fama-French alphas, none of which are significant. We also find that the mean return of the hedged trade-weighted portfolio of Senators with the least seniority is statistically higher than the mean return of the hedged trade-weighted portfolio of Senators with the most seniority.

As a final analysis, we divide the sample by years and measure cumulative abnormal returns on an annual basis. We find that, during the years 1993 through 1996, the pattern of cumulative abnormal returns for both the buy and the sell samples looks remarkably similar to the sample as a whole. In these four years, the buy samples all show moderate to low positive CARs prior to purchase followed by a strong positive surge after the event date. In 1993, 1994, 1995, and 1996, the daily CARs for the buy samples rise 39.6%, 21.6%, 43.6%, and 42.4%, respectively, during the 12 calendar months after acquisition on a trade-weighted basis. Sale samples from this same time period also behave consistently with the combined sell sample. For 1993 though 1996, we find a consistent pattern of very strong positive daily CARs in the year preceding the sale that peak just prior to sale. There were no abnormal returns after stocks were sold during these four years.

However in 1997 and 1998, we see very different results. In both of these years, we find little evidence of abnormal returns for either the buy samples or the sell samples, suggesting that something dramatic occurred between 1996 and 1997 that curtailed the Senators' normal trading habits. We also observe that trading activity slowed considerably during these two years with Senatorial stock purchases falling 36% from 1996 to 1997 and sales falling 33% during the same period. The retirement of and failure to re-elect some Senators who were high volume traders (e.g., Senator Pell retired at the end of 1996) could have caused

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the sudden drop in trading activity in 1997. The sudden change in trading habits is more difficult to explain since we find no changes in the law that would likely cause such a reaction. Besides changes in the law, other explanations seem plausible. For example, Boller's (1995) work received considerable publicity in the print media and on television. Boller may have created some concern among Senators that researchers were actively investigating their trading activities.

IV. Conclusions

Members of the U.S. Senate have obvious access to valuable information by virtue of their government position and social contacts. Our goal in this research is to determine if the Senators' investments tend to outperform the overall market, which would support the notion that Senators use their informational advantage for personal gain as suggested by public choice theory. We test whether common stocks purchased and sold by U.S. Senators exhibit abnormal returns.

Cumulative abnormal returns for the portfolio of stocks bought by Senators are near zero for the calendar year prior to the date of purchase. After acquisition, the cumulative abnormal return rises over 25% within one calendar year after the purchase date. The cumulative abnormal returns for the portfolio of stocks sold by the Senators are near zero for the calendar year after the date of sale. However, these same stocks saw a cumulative abnormal positive return of 25% during the year immediately preceding the event date. These results suggest that Senators knew appropriate times to both buy and sell their common stocks.

Regressing the calendar-time portfolio returns of the entire sample on the Fama-French three-factor model, we find that stocks purchased by U.S. Senators earn statistically significant positive abnormal returns outperforming the market by 85 basis points per month on a trade-weighted basis as a further indication that Senators use their informational advantage. That Senators use an informational advantage is additionally evidenced by the fact that the trade-weighted portfolio of purchased stocks outperforms the equal-weighted portfolio suggesting that Senators made much heavier investments in those stocks that ultimately performed best. After being sold by Senators, stocks underperform the market by 12 basis points per month on a trade-weighted basis although the abnormal returns after sale are not statistically significant. Combining the buy transactions with the sell transactions in a hedged portfolio we find that Senators outperform the market by 97 basis points (nearly 1%) per month on a trade-weighted basis. Abnormal returns from the hedged portfolio are statistically significant when we use either the CAPM or the Fama-French three-factor model. Regression coefficients of the Fama-French three-factor model suggest that Senators favor the common stocks of smaller growth firms with average market risk.

We find no reliable differences between the returns earned by Democrats and Republicans but seniority appears to be important. Senators with the least seniority (in their first Senatorial term) earn statistically higher returns than those Senators with the longest seniority (over 16 years in the Senate).

When we examine the trades on an annual basis, the return patterns of common stocks bought and sold by Senators for years 1993 through 1996 appear very

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similar to the patterns observed for the entire sample. However, in 1997 and 1998, we find significantly reduced trading volume and no evidence of abnormal returns.

It should be noted that these results should not be used to infer illegal activity. Current law does not prohibit Senators from trading stock on the basis of information acquired in the course of performing their normal Senatorial functions. Nor can we speculate on the magnitude of profits earned on these transactions because of limitations in the data. However, it seems clear that Senators have demonstrated a definite informational advantage over other investors although the specific source(s) and nature of that information remain unknown.

Until now, the primary focus of ethical concern with respect to legislative activity has been on campaign finance reform. Some Senators, most notably John McCain of Arizona, have expressed a strong belief that the methods currently used to fund political campaigns inherently cause agency problems. However, our results suggest that the problems may extend beyond campaign financing. Political power confers many benefits. Among those benefits are privileged access to information, the power to influence legislation, and the power to influence the application of regulatory jurisdiction by administrative agencies. It makes sense that politicians would use such powers for personal gain and also that they compete for any rents that arise from such influence. Our results are consistent with the hypothesis that such rents exist.

The results of this study warrant further investigation. Senate committees can be studied for abnormal returns and examined to determine if Senators serving on committees disproportionately invest in companies under their committee's jurisdiction. Membership on certain key committees may provide Senators with better investment opportunities than other committees. Connections between campaign contributions and common stock transactions also seem like fertile ground for further study. We recommend that the financial transactions of members of the U.S. House of Representatives, high-ranking officials of the Federal executive branch, and Federal judges should all be examined and tested in future research.

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