Stock Volatility Reactions to Violations Subject to Investigation by the SEC

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Abstract

This study examines the impact of the number of filings investigated by the SEC Enforcement Division on stock volatility, particularly Administrative Proceedings (AP), using the implied volatility index as a benchmark. We also investigate the effectiveness of the Sarbanes-Oxley Act (SOX) and the Dodd-Frank Act (DFA) by reviewing the number of securities violations before and after the passage of each law. We reviewed approximately 24,051 cases filed by the SEC alleging public companies violated at least one of the securities laws between 1995 and 2018, regardless of the case's outcome. As displayed by Table 1, although it appears that between FY 2000 and 2004, more than approximately 70% of these cases settled in court, and from FY 2013 to 2017, the number of settlements filed increased in AP, with approximately 30% going to court, therefore it is uncertain how effective regulation can be in reducing security violations in the financial market. We find that increased SEC enforcement action due to the authority of Administrative Proceedings has a positive impact on stock volatility. Moreover, assessing the effectiveness of the new laws suggests that despite firms tending to adhere to new regulations shortly thereafter becoming effective, violations increase to an even higher level within the subsequent six months. This leads us to question the effectiveness of DFA and SOX in terms of reducing securities law violations by public companies (see Table 1).

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Introduction

One of the primary topics of scholarship in business and securities law remains the relationship between SEC enforcement investigations and security class actions, and their effects on stock prices. Prior research has primarily focused on and investigated this matter at the firm level, dealing with securities class lawsuits filed in the federal courts or investigated by the SEC, using the event study methodology. This method dedicates less time and attention to the impact of security law violations on the financial market as a whole. In this study, we attempt to fill the gap in the literature by using the Vector Autoregressive (VAR) model to address the issues that the number of security violations harm, which not only include the targeted firms, but also the financial market as a whole.

In a free financial market, prosperity and reasonable productivity build the reputation of key players in the corporate world for transparency and integrity. As such, security class actions impact stock prices (White, 2004). Several prior studies of market transparency suggest that companies must adopt policies and procedures that both achieve their goals and adhere to laws and regulations (Cole, 2015; Division of Enforcement, 2015). As the efficient market hypothesis reveals, this is a result of the market rapidly incorporating relevant information into stock prices. In this study, we specifically investigate whether the security violations impact stock volatilities in the U.S. We will also investigate if the introduction of new regulatory laws has impacted the number of securities violations and consequent class actions. We find that the stock volatility reacts significantly to publicly available information about security laws violations, due both to that information's sensitivity and the resultant lawsuits' burden on stakeholders.

The Securities Act of 1933 and the Security and Exchange Act of 1934 were introduced by the U.S. Senate to protect the public interest by regulating corporate governance. The 2002

passage of the Sarbanes-Oxley Act (hereon SOX) and the 2010 passage of the Dodd-Frank Wall Street Reform and Consumer Protection Act (hereon DFA) introduced additional measures to counteract securities violations. Nevertheless, companies have accumulated violations of previously existing securities laws at higher rates since the enactment of SOX and DFA (Bumgardner, n.d.). As noncompliant behaviors lead to class-action lawsuits, these violations ultimately impact companies' profit-sharing to a tremendous degree, and eventually harm investors. The fines levied and time spent responding to legal action prove to be expensive and economically cumbersome (Armstrong & Green, 2013). The objective of a public company's management is to perform in a way that best maximizes their stakeholders' interests (Fontaine et al., 2006). Therefore, devoting substantial time and financial resources to court matters, particularly the hiring of expensive legal counsel to assist them in the hearing process, detracts from the achievement of their goals (Malone et al., 2010). This ultimately leads to a drop-in income and EPS (earnings per share), which disappoint investors' expectations and thereby lower stock prices. Finally, it has been documented that while firms tend to violate securities and Generally Accepted Accounting Principles (GAAP) laws at lower rates immediately after the enactment of new regulations, they revert to their normal behavior patterns only shortly thereafter—even accruing violations at higher rates (Dechow et al., 1996).

The following section provides a brief introduction to the background and research questions, and also includes an overview of the SEC, SOX & DFA, and prior research on fraud and investigations. Thereafter, this study provides the sample selection and descriptive statistics and data analysis. The fourth section analyzes empirical results and findings, and the final section summarizes and concludes the study.

Background and Research Questions

Background

SEC. Responding to the stock market crash of 1929 and the ensuing Great Depression, the U.S. Congress created the Securities and Exchange Commission (SEC) to safeguard investors' interests in the financial market. Congress then enacted the Securities Act of 1933 and the Securities and Exchange Act of 1934 to help regulate companies planning to obtain capital through the financial market (Eccles & Rogers, 2014). It is widely assumed that compliance with legislation introduced to regulate financial markets protects individual citizens, as well as the broader public interest, and ultimately increases consumer confidence (Ardic et al., 2011; Arce, 2000). Violations constituted breaches of not only the landmark 1933 and 1934 acts, but also the AAERs (Accounting and Auditing Enforcement Releases) and Act 23 of the Investment Company Act of 1940. Furthermore, in our research, we documented more high-level class action lawsuits and violations of security laws after the enactment of SOX and DFA than before, both of which are distinct laws addressing corporate governance. In reviewing the SEC's records, Table 2 provides clarity into how violations of securities laws were at their lowest extent four or five months after the enactment of SOX and DFA, and gradually increased thereafter. This finding may reflect a core belief of free market advocates: that the market should function efficiently without any interruption or supervision, as participants are intrinsically motivated to attend to investors' rights and best interests (see Table 2).

SOX & DFA. Several widely publicized mega-scandals motivated the U.S. Congress and SEC to regulate corporate governance through the enactment of the Sarbanes-Oxley and Dodd-Frank Acts. First, in July 2002, following the Enron and WorldCom scandals, Congress passed SOX; then, in July 2010, following the Global Financial Crisis of 2008 and the collapse of firms

such as Lehman Brothers, Congress passed DFA, intending to prevent or at least minimize corrupt actions by public companies' management and auditors that would diminish the public's trust in financial markets (Dibra, 2016). However, previous research has demonstrated that, even though the SEC has expanded its authority to ensure the safety of financial markets, this expansion did not lower the number of security class action lawsuits and, in fact, has negatively impacted stock prices and the financial market overall (Choi et al., 2013).

Figure 1 reveals that from 1995 to 2002, there were 1,973 violations filed with the SEC. During 2002-2010, after the passage of SOX, the recorded number of filings increased to 4,325; during 2010-2018, after the passage of DFA, it further increased to 7,071. Using Public Administrative Laws, we have reviewed a total of 7,874 cases filed with the SEC from 1996 to 2011. This data demonstrates that more cases were recorded after 2003 than in the prior period (1996-2003). The increase in the number of cases filed with the SEC shows that at least one out of eight public companies violated SEC rules after the enactment of SOX compared to prior years, regardless of the dollar amount. Under SEC violations, we count violations of the Securities Acts of 1933, 1934, and 1940, as well as of AAERs, over a company's lifetime. We have considered both Public Administrative and Cease-and-Desist Proceedings instituted following different sections of the Securities and Exchange Act and corresponding rules (AP) (see Figure 1).

SEC Investigation Process. Laws, regulations, and corporate governance rules are in place to reduce the risk of lost investor confidence and ultimately to lower the volume of litigations and lawsuits. Providing reliable information to the public permits wiser investment decisions, and honest financial reporting is intended to help enforce compliance with the Securities Acts of 1933, 1934, 1940, and more recently SOX and DFA Act 26. Our study is

based on the number of filings subject to investigation by the SEC that have been filed and then settled by management, who paid the fine agreed upon, or gone to court. In almost all of these cases, the SEC believes at least one law has been broken and that management has been responsible for that breach (Division of Enforcement, 2015). Therefore, for defendants, settlements prove much more economically suitable and less costly than court processes. At the same time, the SEC seeks and investigates potential violators with the rationale that noncompliant behavior will eventually result in harm to shareholders, either by receiving fewer dividends or losing a portion of their investment and thereby hurting the company's value. Following this rationale, compliance with laws and fair corporate governance systems will safeguard investors' interests, inducing conscious movement of the financial market to promote financial stability.

Through the apocopate process and the assistance of its Enforcement Division, the SEC pursues securities law violations, bringing the law to bear against suspected wrongdoers. After an investigation reveals a securities law violation, the SEC can pursue at least three options: (1) referring the case to the DOJ (Department of Justice), (2) referring the case to federal court, or (3) commencing an AP (administrative proceeding). APs are internally overseen by the SEC's own rules of practice, and can be assigned to administrative law judges (ALJs) when the SEC decides to do so, a decision which may depend on various factors. The Commission might try to implement several sanctions through regulatory processes. When the Commission brings a case that does not ultimately go to civil court, an ALJ independent of the Commission will be assigned to the case (Division of Enforcement, 2015).

For civil lawsuits filed in federal court, the SEC usually produces an LR (Litigation Release), an official SEC document of a settlement or trial responding to an alleged breach of

one or more sections or rules of the securities laws. Usually, LRs require more drastic breaches of securities laws than APs. Recently, the SEC's hostile pursuit of securities violations through APs has created resentment, particularly among institutional investors. They are presently engaged in legal battles against the SEC's Division of Enforcement, claiming it has been bestowed with too many powers, and an increasing number of cases charged in APs have inspired broad legal objections (Division of Enforcement, 2015).

Prior Research on Fraud Investigations. The first known research into fraud investigation was conducted by Janet Cooper Alexander (1991). Since then, many researchers have investigated the effect of securities law violations on stock prices. Some have focused on SEC investigations, whereas others have focused more on securities class action lawsuits and private investigations. Patricia M. Dechow, Richard G. Sloan and Amy P. Sweeney (1996) investigated firms subject to violation actions by the SEC for breaches of GAAP (Generally Accepted Accounting Principles), and found that substantial capital costs are imposed on firms when fraudulent financial activity by management is revealed. Like Feroz, Park, and Pastena (1991), they also found that the initial announcement of wrongdoing or violation by management steeply decreases stock prices.

Stephen J. Choi & A.C. Pritchard (2012) found that the stock market reacts negatively both to investigations by the SEC and securities fraud class action filings. However, they found that stock prices respond more negatively to class action filings, as opposed to SEC enforcement actions (Pritchard & Choi, 2016).

Meanwhile, building on the research by Feroz, et. al. (1991), Christensen, Paik, and Williams (2010) find that, although the stock market is more sensitive to the initiation of SEC filing than the day in which an investigation is announced, the stock market still reacts negatively

to the announcement of a violation. However, Nourayi (1994) found that stock prices respond less negatively to the SEC's enforcement action than to the SEC's official announcement, and to the degree of seriousness of the violations announced. Palmrose, Richardson, and Scholz (2004) examine the restatement announcements of 403 firms between 1995 and 1999, and found an adverse market reaction to GAAP violations.

Aggarwal and Rohan Williamson (2006) discuss how modern corporate scandals have led to the introduction of new corporate governance rules by the U.S. Congress, as well as the SEC. Their study examines changes in corporate governance practices between 2001 and 2005, covering the period before and after the passage of SOX. They analyze a comprehensive set of 64 organizational governance attributes in more than 5,200 firms. Their research demonstrates that, during this period, many firms instituted new governance rules and applications exceeding those mandated by SOX. When they control for size and industry, they find a significant correlation between governance and firm value. The variables also have a positive relationship, demonstrating that companies that adopted the new laws early hold a higher value. In this sense, Aggarwal and Williamson's findings indicate that new regulations did, in fact, target relevant corporate governance attributes. However, their analysis also indicates that markets already rewarded firms that had better governance. Finally, they assert that the positive correlation between governance rules and market value could not entirely be attributed to the presence of new regulations, as values remained stable even in the post-regulatory period. This supports an argument for the impact of the quality of governance on firm value.

Gerald J. Lobo and Jian Zhou (2010) investigated the changes in managerial discretion over financial reporting following SOX. They recorded the substantial expansion of documentation contained in financial reporting after SOX, conforming to a requested outcome

by the SEC, in which CEOs and CFOs were newly required to certify the firms' financial statements. First, the number of accrual transactions and activities decreased following SOX, compared to the period prior. Second, according to Basu's (1997) measure of conservatism, they found that firms tended to record losses faster than gains in income statements and balance sheets before the passage of SOX. Their findings reveal that management's discretionary reporting moved towards more conservative behavior after the passage of SOX, conforming to suggested empirical evidence. They used alternative estimation and management approaches by controlling likely confounding variables. Although their findings are consistent with the idea that more aggressive behavior by the SEC equates to less misconduct by management for a short time after regulations are enacted, the increase in the number of filings subject to violations shows that there is a trend of misbehavior resuming or even increasing.

In a transparent and harmonized economy, the public will rely on genuinely skilled professionals to carry out their duty of running corporate entities in ways that result in the most valid and legitimate benefits to stakeholders (Bloomfield & O'Hara, 1999). At the same time, the government has a responsibility to supervise the transparency of public corporations through agencies such as the SEC (Klock, 2010).

Alexander I. Platt (2011) argues that the SEC enforcement actions, particularly aggressive prosecution, have not deterred or prevented violations of securities laws and regulations. As well, Andrew J. Pincus and Mayer Brown (2014) find that securities class actions have not substantially prevented or reduced future violations or sufficiently prevented misdeeds. At the same time, they argue that these class actions are costly and harm shareholders' income, and that company employees tend to report violations to the SEC even before wrongdoing is uncovered by enforcement actions (Pincus, 2014). After comparing and contrasting securities

class action filings with investigations by the SEC, Pincus and Brown found evidence that the stock market reacts more negatively to class actions than to SEC investigations (Pritchard & Choi, 2016).

Research Questions

We aim to answer two research questions. First, we will investigate the impact of the number of securities violations filed with the SEC on stock volatility. As we know, the concept of semi-strong market efficiency implies that security prices incorporate all publicly available information about the market. If a company is experiencing enforcement actions from the SEC and the consequent negative publicity, its stock price should proportionally reflect the number of actions taken against it. This negative publicity leads stock prices to fluctuate, creating market volatility. As demonstrated by the various researchers mentioned in the previous section through the event study methods, the market hypothesis states that external occurrences are reflected in the stock price during an event window. This phenomenon is important to address, as financial theory and the concept of market fluctuation suggest that the cost of settlements and legal or professional fees resulting from SEC actions have a significant impact on companies' income, earnings per share, and ultimately, stock prices (Anderson, 2011). Although available evidence indicates that more than 80% of these cases settled and only less than 20% eventually went to court (Velikonja, 2016), Jonathan M. Karpoff, D. Scott Lee, and Gerald S. Martin (2017) find that SEC enforcement actions imposed an average of $23.5 million on 585 firms that were the subject of legal action for fraudulent financial misrepresentation between 1978 and 2002. Disregarding so-called "mega-lawsuits," if the cost of lawsuits is proportionally or incrementally related to the number of lawsuits, we hypothesize that having security violations and lawsuits ultimately cost companies more capital. Therefore, as the number of securities violations and

resulting lawsuits directed at firms increase, we can infer that stock volatility would be more heavily impacted.

RQ1: Do security violations lead to volatility of the stock market?

Subsequently, we aim to determine whether or not corporate governance regulations implemented over the past two decades have lowered the number of filings subject to investigation by the SEC's Division of Enforcement. We infer that these new regulations indeed did target relevant governance attributes (Gerald J. Lobo and Jian Zhou, 2010). However, our analysis according to Figure 2 has also indicated that markets were already rewarding firms with better governance. As such, it is unclear to what degree regulations can reduce security violations in our financial markets. Therefore, we will employ information publicly available on the SEC's website to analyze the effectiveness of new regulations—SOX and DFA, in particular. Information publicly available on the SEC's website might be a valuable source of information for ordinary public investors, as more sophisticated and/or institutional investors have a variety of tools to learn new information about public companies and financial markets, whether via financial statements or through skilled compensated intermediators (see Figure 2).

RQ2: Did SOX and DFA reduce securities violations and the consequent lawsuits?

Sample Selection and Descriptive Statistics

In this study, the sample is drawn from the enforcement database of all securities violations filed with the SEC between 1995 and 2018 (Division of Enforcement, 2018). The database records 24,051 violations in this period, subdivided by the form of legal action taken by the SEC against them: APs (administrative proceedings), ALJs (administrative law judges), and

LR (litigation releases). The SEC updates this record on its website every month. APs are biased assessments of guilt that might assign penalties for a violator's wrongful actions. Whether the Commission decides to bring a violation case before an administrative law judge depends on various factors. As the Commission can seek a variety of sanctions through the regulatory proceeding process, cases brought by the SEC that do not go to civil court can be heard by an ALJ who is independent of the Commission. LRs concern civil lawsuits brought by the Commission in federal court. An LR is an official SEC document detailing a settlement or trial scheduled before a civil court judge in response to the alleged crime of breaching one or more sections or rules of the securities laws. Usually, an LR requires a more drastic breach of securities laws than an administrative proceeding (see Table 3).

Data Analysis. Table 4 shows all 24,051 records contained an amount of information sufficient to determine whether violations and consequent SEC actions had any impact on stock prices in the overall market during the period of study. The number of annual violations in this data set ranges from 297 in 2018, to 32 in 1995 addressed via AP; from 121 in 2018, to 157 in 1995 associated with an LR; and from 29 in 2018, to 8 in 1995 addressed via ALJ. These data were divided by the number of public companies listed on NYS Stock Exchange and NASDAQ to calculated the monthly ratio of the number of violations. Data on listed US public companies come for word bank data and Federal Reserve Bank and data on stock market volatility comes from the Chicago Board Options Exchange (CBOE), resulting in two volatility indexes, one concerning the S&P 500 (VIX) and the other, the S&P 100 (VXO). These data were converted from daily to monthly using a weighted average method, so as to ensure consistency with the number of security violations subject to investigation by the SEC's Enforcement Division, updated monthly on the SEC's website (see Table 4).

In contrast with numerous prior studies on this topic, we will not use the event study methodology; we instead use the VAR model to determine if the number of violations filed by the SEC impacts stock volatility. To measure the effect of the number of filings on stock market volatility, we use the DFA test to run a unit test root, which determines whether or not the data is ready for examination via time series models analysis. Using the Augmented Dickey-Fuller Test (ADFT), we performed a unit test on our three independent variables (APs, ALJs, and LRs), and both dependent variables (VXO and VIX), we employed the first difference, transforming the data such that they could be used for our analysis at the first difference (see Table 5).

Empirical Results

Vector Autoregression (VAR)

As shown in Figures 5-9, we examine our hypothesis using Vector Autoregression (VAR) followed by the Impulse-Response Function (IRF) for all models. We find that A one SD shock (innovation) to AP initially increases VIX rapidly over the next period. This positive response very slowly rises from the first period until the third period, when it starts decreasing until the sixth period, where hits its steady state value. From there, it remains in the positive region until approximately the tenth period, albeit with describing tendencies. This means that when additional filings appear, an increase in AP therefore has a positive impact on VIX after one period, which explains more volatility of the stock market when there are more APs. However, we find no such impact on VXO from APs. Similarly, we did not find any effect of ALJ and LR on either VIX or VXO, because when information becomes public in the AP filing, process investors react immediately and not in the ALJ and LR stages as the negative news had already dissipated (see Figures 5, 6, 7, 8, 9).

Table 6 shows the result of the Wald Test, which examines the effect of the short-term relationship between the joint independent variable (AP) and the dependent variable (VIX). In sum, there is a causality running from independent variables to the dependent variable in the short run. Therefore, we can infer that if the number of violations filed by the SEC escalates, it has a positive impact on the stock volatility, increasing VIX in the short run. However, unlike AP, none of the other independent variables show any result over either VIX or VXO in the short run (see Table 6).

This is a learning-curve effect consistent with our assumptions of a flow of public information impacting the market and semi-strong market efficiency. Our findings are aligned with Cornerstone Research's Securities Class Action Filings 2010 Year in Review, in which they studied data from the Stanford Law School Securities Class Action Clearinghouse to review 3,227 federal securities class action filings between January 1, 1996 and December 31, 2010. From this review, they found that securities litigation activity can be correlated with stock market volatility. In particular, they pointed out that the fourth quarter of 2008 and fourth quarter of 2006, where VIX was respectively at its highest and lowest levels, corresponded to the high and low number of filings in those quarters (S. & C., 2011).

Regression Analysis

As shown in Table 7, we used a dummy variable for DFA, a dummy variable for SOX, and ran on AP, ALJ, and LR. It showed that the passing of SOX and DFA actually increased the numbers of AP, ALJ, and SOX. However, this occurrence may be due to the endogeneity problem. Due to SOX and DFA, more AP, ALJ, and LR are being filed than before. Therefore, we cannot firmly distinguish that SOX and DFA "caused" more AP/ALJ/LR, however they are evidently correlated (see Table 7).

The efficient markets hypothesis, which suggests that the market rapidly factors relevant information into stock prices, informs our research method. This study aims to address the question of SOX and DFA's effectiveness by examining the number of securities violations filed by the SEC against companies, rather than the number of securities class-action lawsuits. In our view, financial markets' reaction to SEC investigations of a company encompasses stock prices' immediate reactions to announcements of investigations, as well as market fluctuations following a filing by the SEC's Enforcement Division. We empirically examine the impact of the SEC and corporate governance regulations by using information about securities violations filed with the SEC's enforcement agency between 1996 and 2018, publicly available on the SEC's website. We also consider the impact of SOX and DFA on the number of lawsuits filed following large-scale corporate scandals, such as the collapse of Enron and WorldCom in the early 2000s, and those related to the Global Financial Crisis of 2008. Specifically, employing this data, we review and quantify the violations of SEC rules before and after the enactment of DFA and SOX, and the effect of the securities enforcement violations filed with SEC on the financial market, represented by the S&P 500 and the VIX (Implied Volatility Index; see Figure 11).

Perhaps most crucially, this study attempts to interrogate how collaboration with the U.S. Congress and the SEC impacts the degree of violations present in the financial market using statistical analysis. Prior to this, this research question had barely been explicitly addressed by scholars using quantitative methods. Cornerstone Research Center was the first to attempt to investigate this phenomenon, through an examination of Securities Class Action Settlements. Their robust quantitative analysis proved that a remarkable correlation exists between settlement size and the presence of new regulations, demonstrating the impact of new laws on the number of agreements reached by the SEC (Division of Enforcement, 2018).

Conclusion

This study sought to answer two intertwined research questions: first, whether or not the market volatility proportionately impacted by the number of SEC actions taken against it; and second, whether or not recent corporate governance laws such as the Dodd-Frank Act (DFA) and Sarbanes-Oxley Act (SOX) in fact prevent or at least reduce firms' violations of securities laws. In regard to the first question, our results indicate that there is indeed a direct relationship between increased securities litigation activity and stock market volatility. In months where filings increase, there is an upwards fluctuation in stock market volatility. As such, we can state that stock volatility increases in proportion to increased enforcement actions by the SEC. With respect to the second question, as made evident by a review of SEC violations filed between 1995 and 2018, based on information publicly available on the SEC's website, we have concluded that laws such as DFA and SOX may not lead to a decrease in securities violations by public companies. To quantify our findings, it is important to note that in this study, we disregarded the size of companies studied and their reputations, as well as the dollar amounts of SEC lawsuits. In the future, incorporating this information into a study might be the foundation for a worthwhile new direction of inquiry.

Our study contributes to the existing literature in business and law by using the VAR model, rather than an event study method, to examine the reaction of the market to the release of information about companies' potential securities violations and financial fraud, subject to investigation by the SEC's Division of Enforcement. In contrast with previous studies, we used all available information from the SEC, not limited to AAERs, to reach our conclusions. As discussed in the second section, there are two schools of thought concerning the market's reaction to announcements that the SEC is investigating securities violations or fraud. First,

consistent with the market efficiency hypothesis, Nourayi (1994) finds that on the day of the official announcement of an SEC enforcement action, the stock price already reflects the news. By the time the SEC filing reveals concrete information on the firm's violations of securities laws or GAAP, the market has already reacted negatively and begun to return to its normal state. However, differing from advocates of the market efficiency hypothesis, Feroz, Park, and Pastena (1991) find that investors pay less attention to the day of an action's announcement than they do to the seriousness of the SEC's decision. This is because the costs to a company might be greater or less depending on the Division of Enforcement's findings and court decisions. As our data is measured in months, with the dates of filing during the month capturing both the date of the SEC filing and its announcement, we neglect the question of which has greater impact. Therefore, our conclusions align more with the first hypothesis.

We also sought to determine not only whether or not DFA and SOX are effective in limiting securities violations, but whether they have, in fact, done more harm than good to the United States' economy. As DFA and SOX have not been proven to have a deterrent effect, new means of enforcing securities laws may need to be introduced that are not so financially burdensome to public companies and destructive to their investors. At the same time, it is equally irresponsible to investors for management to break securities laws and defend themselves from SEC actions on shareholders' costs. Shareholders rely on management, as their representatives trust in good faith that they will act in the shareholders' best interests. As such, to protect their investment, shareholders expect that corporate officers will comply with relevant state and federal laws. Due to the sensitivity of the market reaction to announcements of wrongdoing, investors should pay attention to—and hold management accountable for—actions that might jeopardize a company's reputation and deplete its funds, either intentional or unintentional.

The results also suggest that even though firms tend to adhere to new regulations shortly thereafter becoming effective, violations increase to an even higher level than before within the following six months. This leads us to question the effectiveness of DFA and SOX at reducing securities law violations by public companies. Therefore, using a methodology different from most prior scholarship on this topic, we intended to investigate whether SOX and DFA actually decreased SEC security law breaches by public companies (Clark, 2012). In conclusion, this study aimed to assess the effectiveness of SOX and DFA by examining the number of securities violations before and after their passage, as well as the effect of the number of filings on stock prices and financial market volatility (see Table 8).

APPENDIX

Tables and Figures

Table 1

Filing Years and Fluctuation of the Number of Settlements Made in Federal Court

DATE	AP	LR	DATE	AP	LR
1/1/2000 - 01/01/2004	2035	2621	1/1/2013 - 01/01/2017	4435	1434

Table 1 represents two different periods explaining and comparing those in terms of the number of security violations filed with the SEC Enforcement Division through the Administrative Proceedings (AP) and the number of cases that went to court, Litigation Released (LR).

Table 2

The Periods Before and After the Enactment of SOX and DFA

DATE	AP	ALJ	LR	DATE	AP	ALJ	LR
2-Jan-2002	27	1	58	2-Jan-2014	75	15	14
1-Feb-2002	23	2	38	3-Feb-2014	78	10	20
1-Mar-2002	42	1	61	3-Mar-2014	59	13	24
1-Apr-2002	33	2	49	1-Apr-2014	57	12	25
1-May-2002	17	2	42	1-May-2014	57	12	27
3-Jun-2002	35	2	55	2-Jun-2014	73	20	25
1-Jul-2002	45	2	53	1-Jul-2014	62	19	18
1-Aug-2002	27	4	60	1-Aug-2014	82	16	22
3-Sep-2002	30	3	49	2-Sep-2014	154	23	25
1-Oct-2002	25	0	65	1-Oct-2014	61	19	25
1-Nov-2002	38	1	46	3-Nov-2014	84	9	18
2-Dec-2002	52	2	43	1-Dec-2014	74	18	24

Table 2 shows the number of security violations at the AP, ALJ, and LR stage six months preceding the enactment of the Sarbanes-Oxley Act of 2002 (SOX) and six months thereafter. It also depicts the information related to the six months before and after the enactment of the Dodd-Frank Act (DFA) in July 2014.

Table 3

SEC Database Records of Violations

Date	AP	ALJ	LR
30-Sep-95 30-Jun-18	13369	1184	9498

Table 3 depicts the sample from the enforcement database of all securities violations filed with the SEC between 1995 and 2018. The database records 24,051 violations throughout this period.

Table 4

Project Variables

Date	Independent Variable	Independent Variable	Independent Variable	Dependent Variable	Dependent Variable
	AP	ALJ	LR	VIX	VXO
30-Sep-1995 30-Jun-2018	13369	1184	9498	274 days	274 days

Table 4 names the variables subject to investigation, and enumerates their total quantities over the period from September 30, 1995 to June 30, 2018. The independent variables correspond to the three filing processes undertaken by the SEC against a firm suspected of securities law violations: Administrative Proceedings (AP), Administrative Law Judges (ALJ), and Litigation Releases (LR). The dependent variables are the Chicago Board Options Exchange (CBOE) S&P 500 Volatility Index (VIX) and the CBOE S&P 100 Volatility Index (VXO).

Table 5

Augmented Dickey-Fuller test statistic

Variables	VIX	VXO	AP	ALJ	LR
Prob	0.0023	0.0047	0	0	0
t-Statistic	-3.907742	-3.694104	-12.55612	-15.75085	-14.91733
1% Level	-3.454353	-3.454353	-3.455193	-3.454443	-3.454626
5% Level	-2.872001	-2.872001	-2.87237	-2.872041	-2.872121
10% Level	-2.572417	-2.572417	-2.572615	-2.572439	-2.572482

Note: Sample (adjusted): 1996M03 2018M06. Included observations: 268 after adjustments.

Table 6

Wald Test: System: {%system}

Test Statistic	Value	Probability
Chi-square	19.56049	0.0015
Normalized Restriction (= 0)	Value	Std. Err.
C(5)	127.6477	51.7765
C(6)	123.9156	59.77261
C(7)	83.81986	60.05248
C(8)	64.22979	52.10548

Note: Restrictions are linear in coefficients. Summary: Null Hypothesis: C(5)=C(6)=C(7)=C(8)=0

Table 7

Results from the Regression Generated from Our Data Set

Variables	AP	ALJ	LR
C	3.76*** (8.13)	0.23** (2.05)	0.55*** (24.01)
Dummy for SOX	5.89*** (9.33)	0.17 (1.13)	3.19*** (10.96)
Dummy for DFA	6.69*** (10.96)	1.69*** (11.49)	1.96*** (7.00)
Observations	274	274	274
Adj. R^2	0.59	0.41	0.59

Note: t-stat in parentheses. All coefficients are multiplied by (x 10^{-3}). ***, **, * imply statistically significant at 1%, 5%, and 10%.

Table 8

Monthly Average AP Filings

Year	# of AP filings	Monthly Ave	% Inc/Dec
31-Dec-96	292	24	
31-Dec-97	316	26	8%
31-Dec-98	267	22	-16%
31-Dec-99	406	34	52%
31-Dec-00	330	28	-19%
31-Dec-01	330	28	0%
31-Dec-02	421	35	28%
31-Dec-03	438	37	4%
31-Dec-04	543	45	24%
31-Dec-05	529	44	-3%
31-Dec-06	531	44	0%
31-Dec-07	564	47	6%
31-Dec-08	684	57	21%
31-Dec-09	642	53	-6%
31-Dec-10	739	62	15%
31-Dec-11	837	70	13%
31-Dec-12	745	62	-11%
31-Dec-13	795	66	7%
31-Dec-14	916	76	15%
31-Dec-15	1015	85	11%
31-Dec-16	960	80	-5%
31-Dec-17	767	64	-20%

Table 8 shows the number of AP filings every year from 1996 to 2017, as well as each year's average number of filings per month. It also enumerates the percent increase or decrease in that monthly average from year to year. The monthly average in 2017 was 64, an overall increase of almost 200% from 24 in 1996, with the highest number of AP filings at 85 in 2015. In spite of year-to-year fluctuations, this demonstrates the overall trend of growth in AP filings over the period studied.

Figure 1

Number of Filings

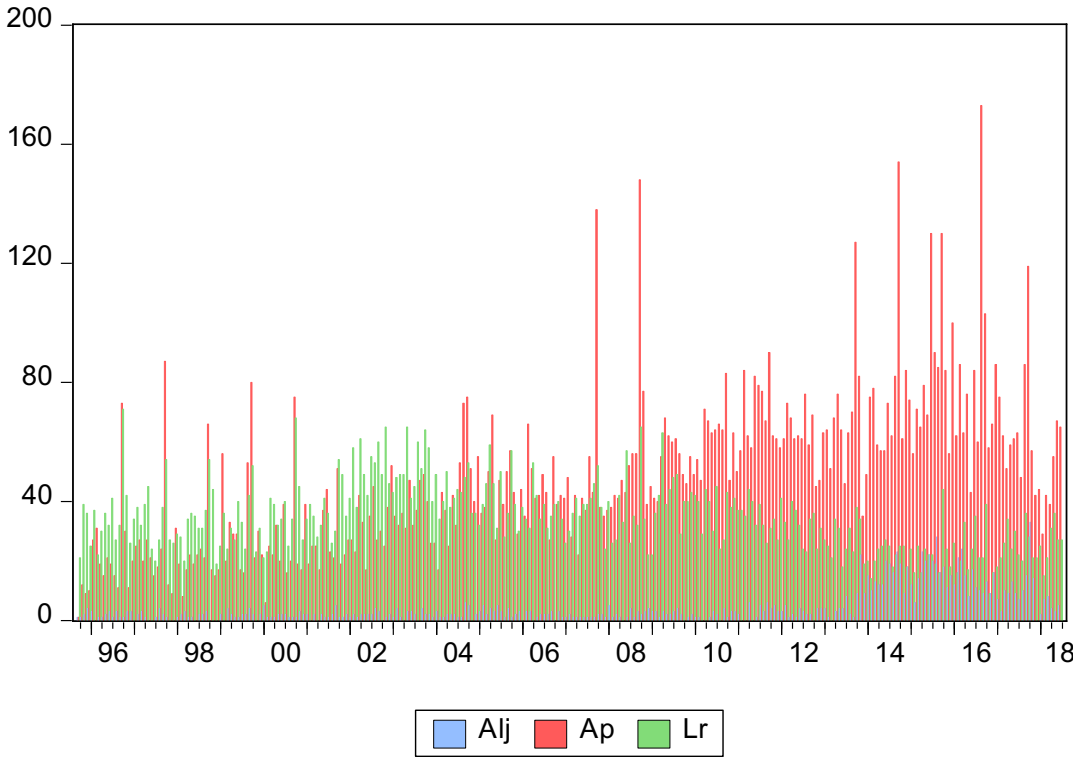


Figure 1 shows the number of filings from 1995 to 2018. In late September 2015, the total number of filings was 130, an increase of 900% from 1995, when the number of filings was 12. Every year, the number of APs exceeded the number of either ALJs or LRs, LRs formed the highest percentage of total annual filings until about 2003, when APs began to predominate. This may be explained by the fact that filings are increasingly resolved through an AP settlement, and do not reach the stage of an LR or ALJ.

Figure 2

Monthly Filings Before and After SOX

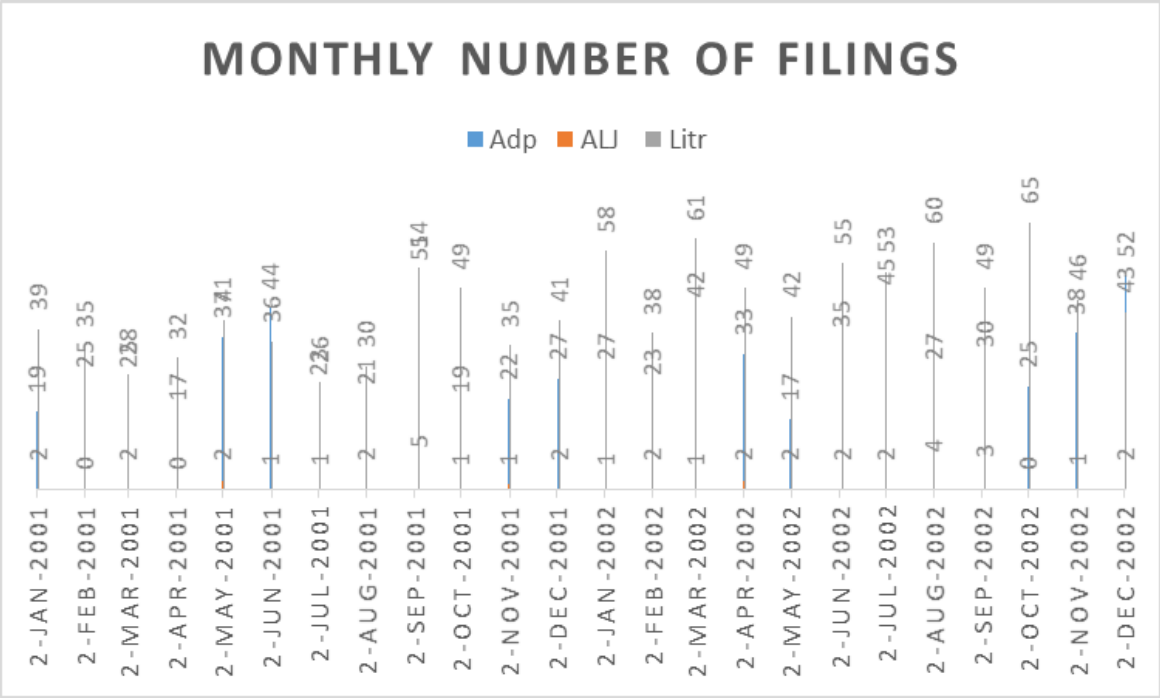


Figure 2 shows the number of SEC filings per month before and after the enactment of SOX. On average, this number increased 24% twelve months after SOX's enactment in July 2002, compared to twelve months prior. This may demonstrate the ineffectiveness of corporate governance regulations like SOX at reducing the number of SEC violations by public companies.

Figure 3

Monthly Filings Before and After DFA

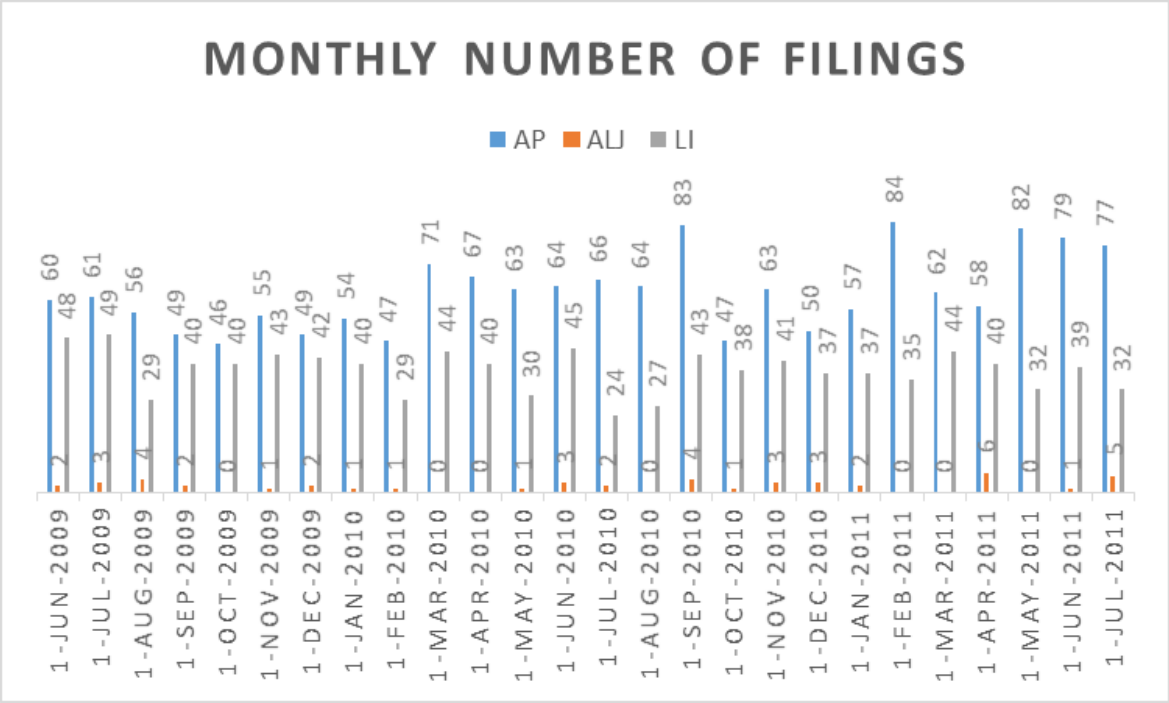
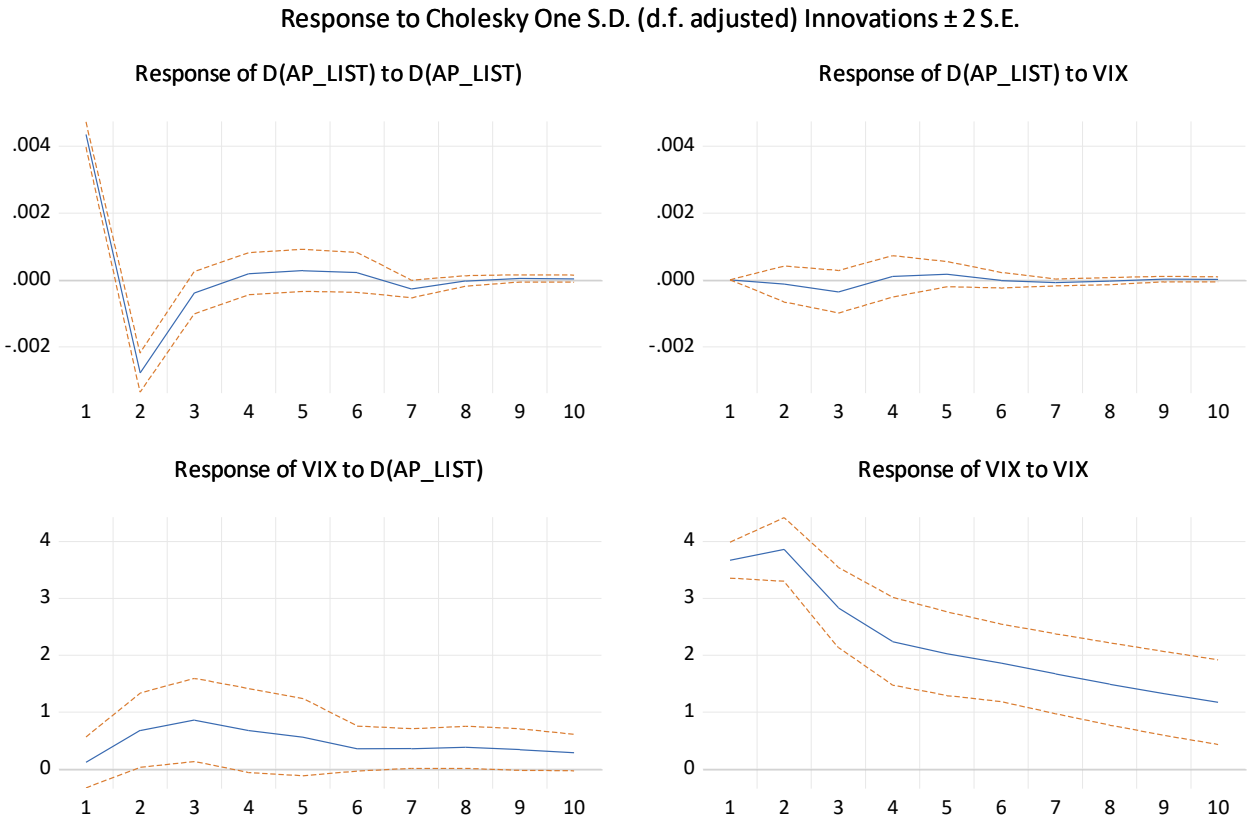


Figure 3 shows the number of SEC filings per month before and after the enactment of DFA. On average, this number increased 18% twelve months after DFA's enactment in July 2010, compared to twelve months prior. Like the previous figure, this may demonstrate the inadequacy of legislative intervention in protecting stakeholders' interest in public companies' compliance with securities laws.

Figure 4



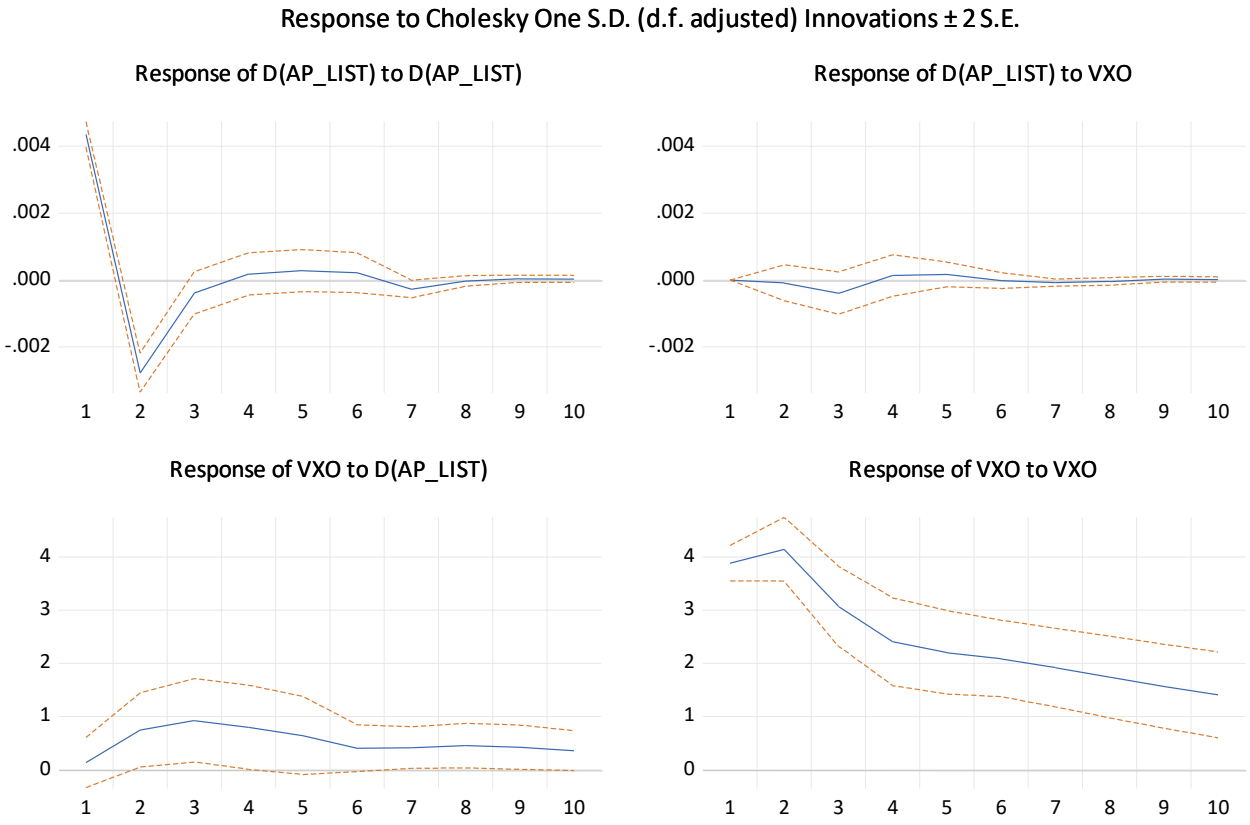
Response of AP to AP: The response decreases over the next period while it is significant for one period, then increases until the seventh period, and it is insignificant.

Response of VIX to AP: The response of VIX (S&P 500 Volatility Index) to the first difference of AP (ratio of Administrative Proceeding and total number of list public companies on NYS stock exchange and NASDAQ): A one SD shock (innovation) to AP initially increases rapidly over the next period. This positive response very slowly rises from the first period until the third period, when it starts decreasing until the sixth period where hits its steady state value. From there, it remains in the positive region until approximately the tenth period, albeit with describing tendencies. The graph shows that the confidence interval of the impulse response function does not contain the zero-horizontal axis for the third period, which means the response is significant at a 95% confidence level.

Response of AP to VIX: The response is insignificant.

Response of VIX to VIX: The response increases slowly over the next period and decreasing until the tenth period in the positive region.

Figure 5



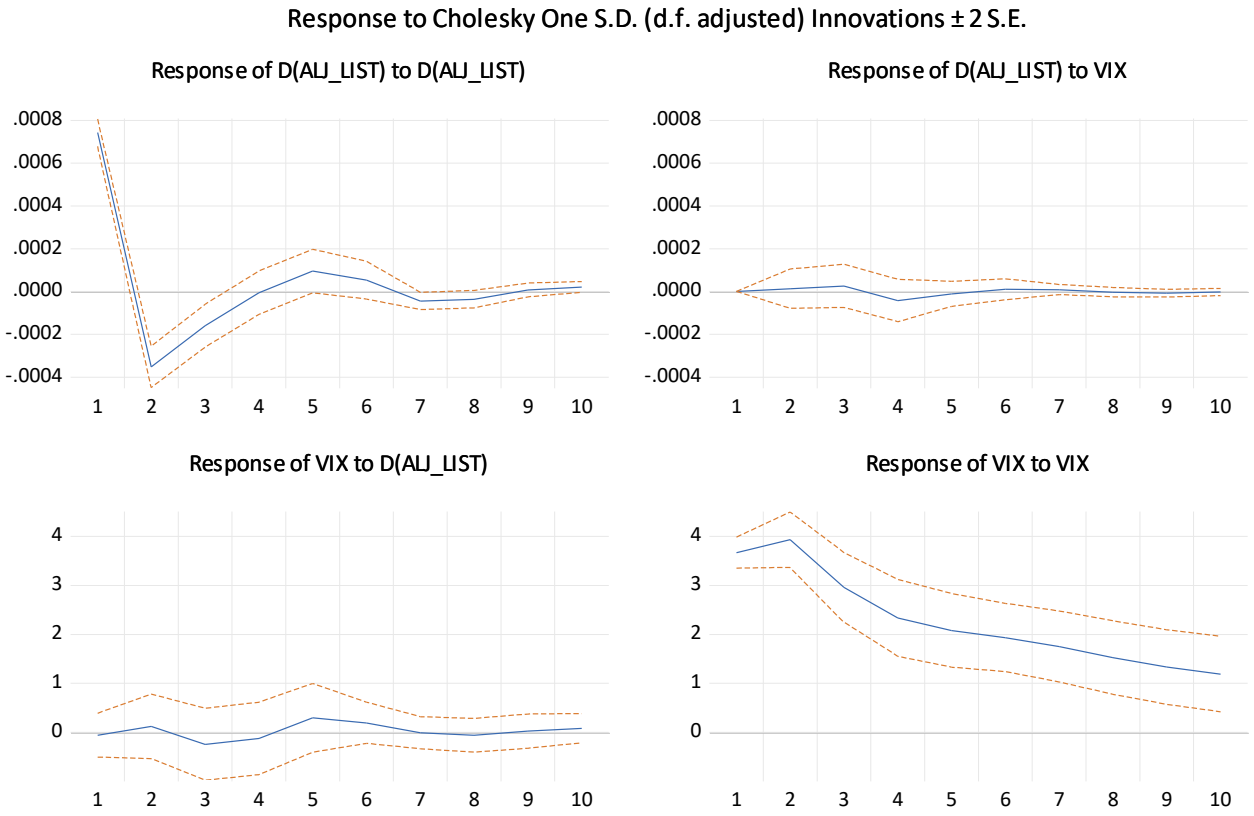
Response of AP to AP: The response decreases over the next period while it is significant for one period, then increases until the seventh period, and it is insignificant.

Response of VXO to AP: The response of VXO (S&P 100 Volatility Index) to the first difference of AP (ratio of Administrative Proceeding and total number of list public companies on NYS stock exchange and NASDAQ) with four-lag: A one SD shock (innovation) to AP with four-lag initially increases rapidly over the next period. This positive response very slowly rises from the first period until the third period, when it starts decreasing until the sixth period where hits its steady state value. From there, it remains in the positive region until approximately the tenth period, albeit with describing tendencies. The graph shows that the confidence interval of the impulse response function does not contain the zero-horizontal axis for the third period, which means the response is significant at a 95% confidence level.

Response of AP to VXO: The response is insignificant.

Response of VXO to VXO: The response increases slowly over the next period and decreases until the tenth period in the positive region.

Figure 6



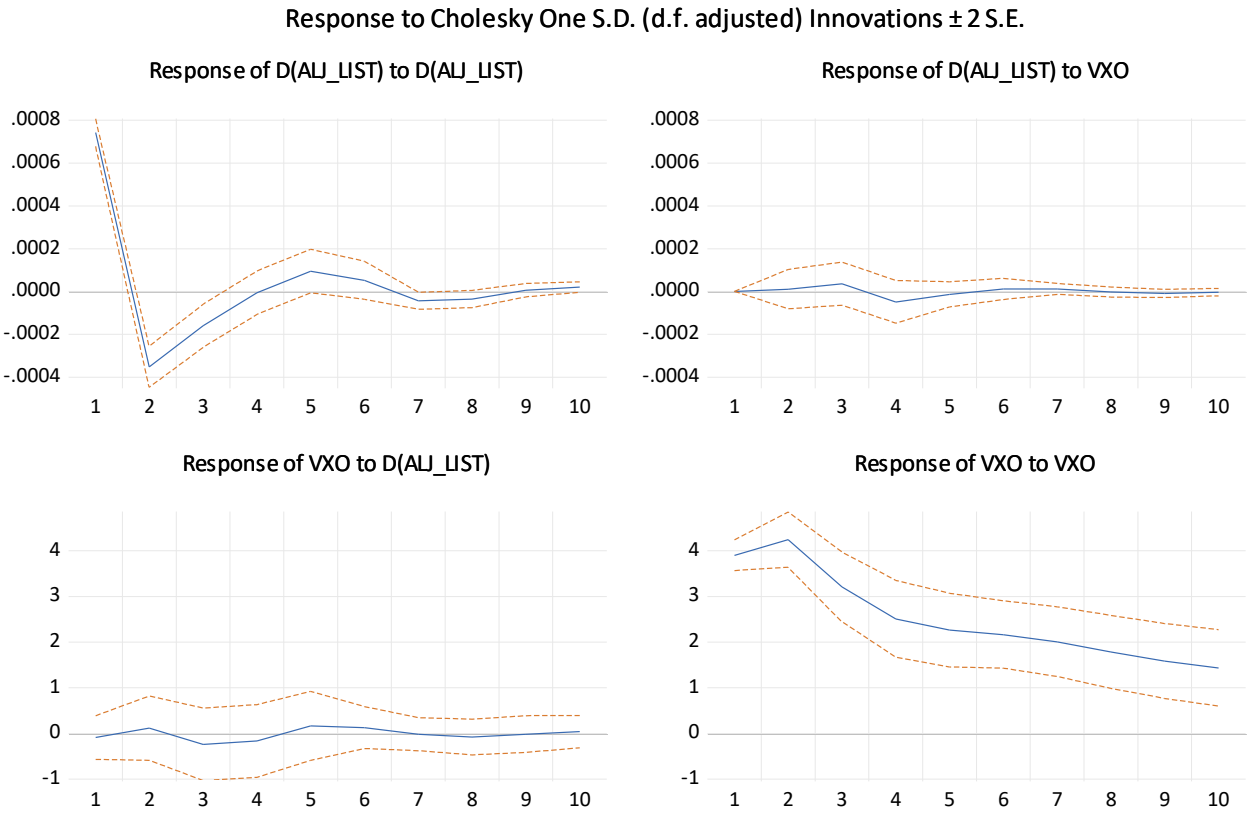
Response of ALJ to ALJ: The response decreases over the next period while it is significant for one period, then increases until the seventh period, and it is insignificant.

Response of VIX to ALJ: The response of VIX (S&P 500 Volatility Index) to the first difference of ALJ (ratio of Administrative Law Judge and total number of list public companies on NYS stock exchange and NASDAQ): A one SD shock (innovation) to ALJ initially slowly increases over the next period. This positive response very slowly rises from the first period until the second period, when it starts decreasing and hits the negative territory, until the fourth period where it increases, until the sixth period where it hits its steady state value. From there, it remains in the positive region until approximately the tenth period, albeit with describing tendencies. The graph shows that the confidence interval of the impulse response function does contain the zero-horizontal axis for all periods, which means the response is insignificant at a 95% confidence level.

Response of ALJ to VIX: The response is insignificant.

Response of VIX to VIX: The response increases slowly over the next period and decreases until the tenth period in the positive region.

Figure 7



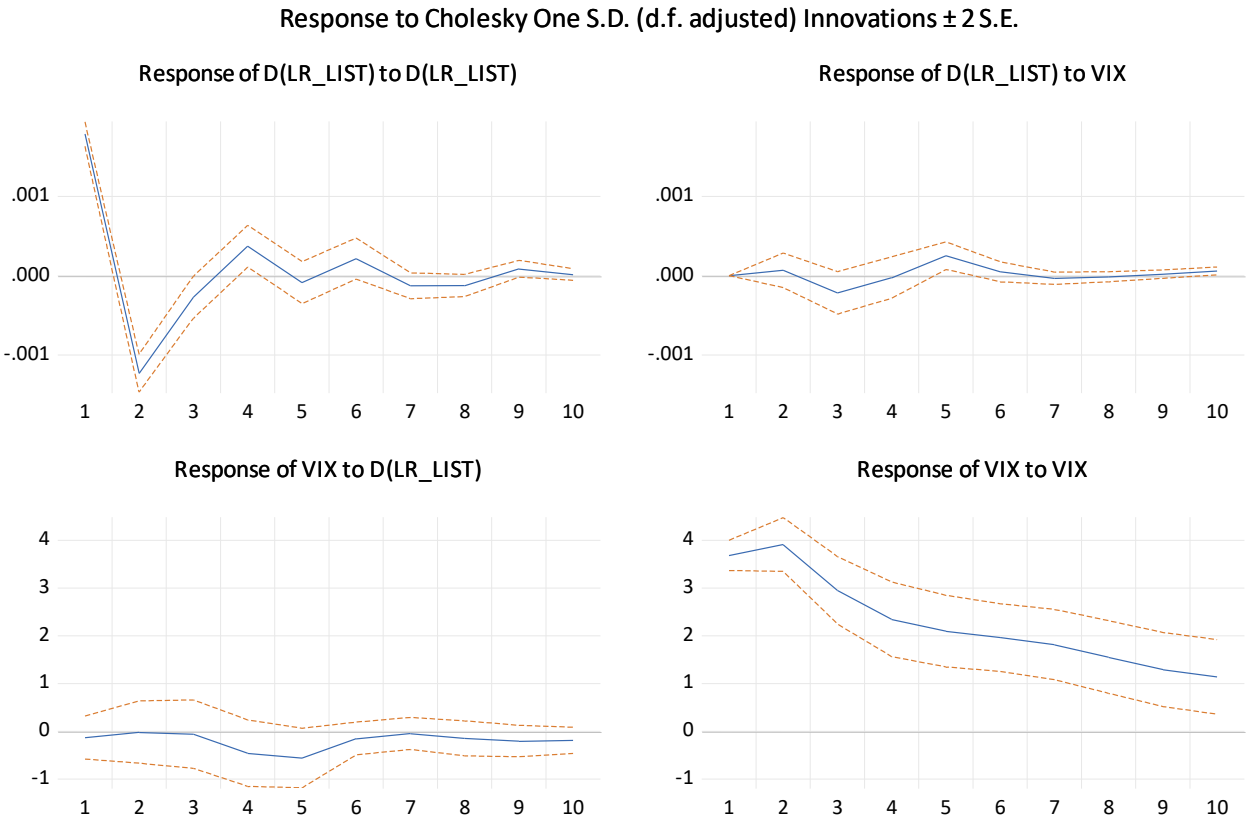
Response of ALJ to ALJ: The response decreases over the next period while it is significant for one period, then increases until the seventh period, and it is insignificant.

Response of VXO to ALJ: The response of VIX (S&P 100 Volatility Index) to the first difference of ALJ (ratio of Administrative Law Judge and total number of list public companies on NYS stock exchange and NASDAQ): A one SD shock (innovation) to ALJ initially slowly increases over the next period. This positive response very slowly rises from the first period until the second period, when it starts decreasing and hits the negative territory, until the fourth period where it increases, until the sixth period where hits its steady state value. From there, it remains in the positive region until approximately the tenth period, albeit with describing tendencies. The graph shows the confidence interval of the impulse response function does contain the zero-horizontal axis for all periods, which means the response is insignificant at a 95% confidence level.

Response of ALJ to VXO: The response is insignificant.

Response of VXO to VXO: The response increases slowly over the next period and decreases until the tenth period in the positive region.

Figure 8



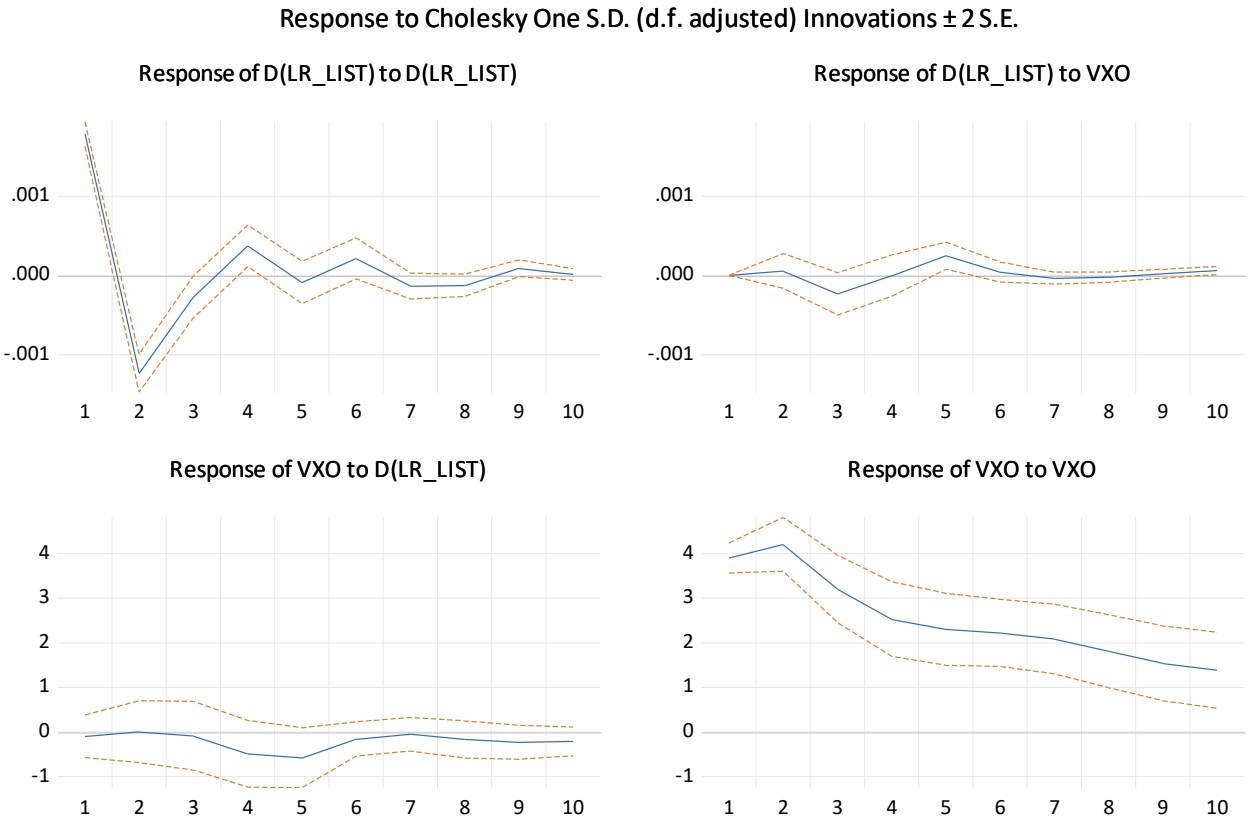
Response of LR to LR: The response decreases over the next period while it is significant for one period then, increases until the fourth period, and it is insignificant.

Response of VIX to LR: The response of VIX (S&P 500 Volatility Index) to the first difference of LR (ratio of Litigation Released and total number of list public companies on NYS stock exchange and NASDAQ): A one SD shock (innovation) to LR with four-lag initially has no effect over the next period. This flat movement response very slowly drops and hits the negative territory from the third period until the fifth period, where hits its steady state value. From there, it remains in the negative region until approximately the tenth period, albeit with describing tendencies. The graph shows that the confidence interval of the impulse response function does contain the zero-horizontal axis for all periods, which means the response is insignificant at a 95% confidence level.

Response of LR to VIX: The response is insignificant.

Response of VIX to VIX: The response increases slowly over the next period and decreases until the tenth period in the positive region.

Figure 9



Response of LR to LR: The response decreases over the next period while it is significant for one period, then increases until the fourth period, and it is insignificant.

Response of VXO to LR: The response of VXO (S&P 100 Volatility Index) to the first difference of LR (ratio of Litigation Released and total number of list public companies on NYS stock exchange and NASDAQ): A one SD shock (innovation) to LR initially has no effect over the next period. This flat movement response very slowly drops and hits the negative territory from the third period until the fifth period, where it hits its steady state value. From there, it remains in the negative region until approximately the tenth period, albeit with describing tendencies. The graph shows that the confidence interval of the impulse response function does contain the zero-horizontal axis for all periods, which means the response is insignificant at a 95% confidence level.

Response of LR to VXO: The response is insignificant.

Response of VXO to VXO: The response increases slowly over the next period and decreases until the tenth period in the positive region.

Figure 10

Correlation Between VIX & VOX and SEC Filings

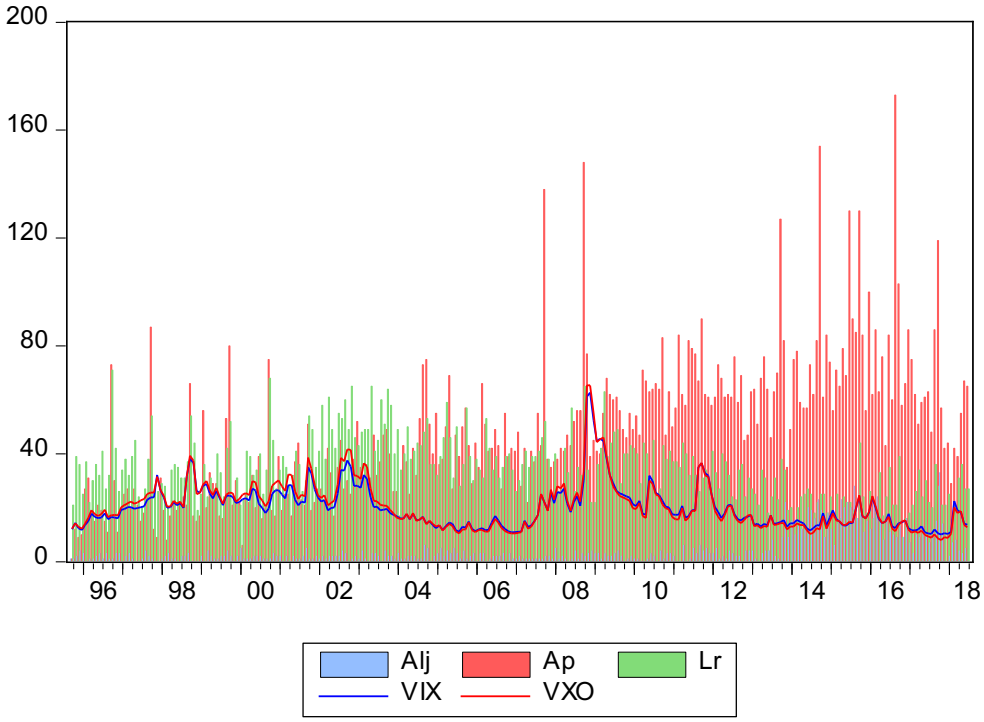


Figure 10 demonstrates the correlation between the monthly fluctuation in VIX and VXO, on one hand, and the number of monthly SEC filings, on the other, over the period studied. One can see that, in general, as the number of filings rises, so does volatility as measured by VIX and VXO. This is because as filings increase, the value of the S&P 500 and 100 indexes tends to decrease.

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