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**Stock volatility reactions to violations subject to investigation
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Stock volatility reactions to violations subject to investigation by the SEC

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Abstract: This study examines how specific regulatory compliance laws impact corporate security violators, causing changes in the stock volatilities of financial markets. Several volatility indices are utilised as effective benchmarks in investigating actual corporate compliance. The Securities and Exchange Commission (SEC) Administrative Proceedings (AP) are the entities that conduct investigations into securities violators who cause changes in stock volatilities. This study investigates the effectiveness of several regulatory laws, such as the Sarbanes-Oxley Act (SOX) and the Dodd-Frank Act (DFA). Their effectiveness is monitored by measuring the number of securities violations before and after the passage and enforcement of each law. It remains uncertain how effective new regulations can reduce the number of financial market security violators. Consequently, in assessing the effectiveness of the new laws, the study suggests that despite firms incorporating the new regulations, there was still an increase in the number of violations over a subsequent six-month period.

Keywords: stock volatility reactions; violations; SEC investigations; the Securities and Exchange Commission; SEC; Administrative Proceedings; AP.

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Biographical notes: Arman Nikman has over 25 years of professional experience as a teacher and a certified public accountant, he prides himself in serving as a trusted advisor to organisations and institutions that want to attract, improve and maintain a diverse and inclusive workforce, boost leadership capability and drive transformational change. He served and taught as an Assistant Professor of Accountancy and Accounting Information Systems after being awarded the position at the Business Department of the City University of New York and the College of Mount Saint Vincent for more than 18 years. His background is quite diverse but one common theme runs through Dr. Nik's professional and academic career, he is a professional manager who teaches.

1 Introduction

One of the primary topics of scholarship in business and securities law is the effectiveness of the laws passed by the Securities and Exchange Commission (SEC) to control violations, thus curbing the effects that those violations have on stock prices. Prior research has primarily focused on, and investigated this matter at the firm level.

In a free financial market, prosperity, productivity, transparency, and integrity, build the reputation of key players in the corporate regime. Several prior studies of market transparency suggest that companies must adopt policies and procedures that not only help them achieve their goals but also adhere to laws and regulations (Cole, 2015). As the efficient market hypothesis reveals, this is a result of the market rapidly incorporating relevant information into stock prices. It has been observed that stock volatility reacts significantly to publicly available information about security laws, regarding the number of violators. These findings are based on that information's sensitivity and availability, along with the resulting lawsuits' burden on stakeholders. As a result, the offences of security class actions have an impact on stock prices (White, 2004).

Historically, the US Senate aimed to protect the public interest by regulating corporate governance. For that purpose, they introduced the Securities Act of 1933 and the Security and Exchange Act (SEA) of 1934. The 2002 passage of SOX, in conjunction with the passage in 2010 of the DFA Wall Street Reform and Consumer Protection Act, introduced additional measures to counteract securities violations. Both SOX and DFA represent distinct laws that address corporate governance. However, with the variations in the rates of violations, it does not appear that these laws are neither sufficiently consistently enforced, nor obeyed. Unfortunately, the enactment of both SOX and DFA regulations has resulted in companies experiencing an increased number of violations that were not previously seen with existing securities laws (Bumgardner, n.d.). As noncompliant deviations lead to class action lawsuits, these offences ultimately impact companies' profit-sharing to a tremendous degree, consequently harming their investors. In addition, the fines levied and time spent responding to legal action prove to be expensive and economically cumbersome (Armstrong and Green, 2013). The objective of a public company's management is to perform in a way that maximises its 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), ultimately leading to a reduction in both income and earnings per share (EPS). These adverse impacts disappoint the investors, thereby lowering stock prices. Finally, it has been documented that while firms tend to violate securities and the generally accepted accounting principles (GAAP) laws at lower rates, after the enactment of new regulations, they immediately revert to their usual delinquent patterns, often further accruing offenders at even higher rates (Dechow et al., 1996).

This study will conduct a specific investigation into whether the number of securities violations influences stock volatilities in the USA. In addition, the influence of the introduction of new regulatory laws and how they have impacted the number of securities violations, and consequent class actions, will be evaluated. Utilising the event study methodology, this research considers securities class lawsuits filed either in the federal courts or those investigated by the SEC. In this study, the gaps in the literature may be bridged by using the vector auto regressive (VAR) model. This research method addresses the hypothesis that a substantial number of security violations can harm the

entire financial market, not just a few targeted firms. In addition, the VAR model has been previously shown in the literature to yield highly competitive, comprehensive, and reliable results for these investigative probes. Moreover, the VAR model is more comprehensively suited than the event study method, and in particular, for probing the market's reaction to potential fraud offences. Furthermore, the VAR model is much more competitive, because it more accurately examines companies' potential securities violations, fraud, and these effects on the financial market.

The following section provides a brief introduction to the background and proposes research questions. It also includes an overview of SEC, SOX, along with DFA, and presents prior research on fraud investigations. The study then provides a sample selection, supporting descriptive evidence-based statistics and data analyses. Section 4 analyses these empirical results and findings. The final section summarises the results and interpretations of the study.

2 Background and research questions

2.1 Background

2.1.1 SEC legislation

Responding to the stock market crash of 1929 and the following Great Depression, US Congress created the SEC to safeguard investors' interests in financial markets. Congress then enacted the Securities Act of 1933, along with the SEA, to help regulate companies planning to obtain capital through the financial market (Eccles and Rogers, 2014). It is widely assumed that compliance with legislation introduced to regulate financial markets, protects both individual citizens, as well as the broader public interest. Ultimately these efforts aim to enhance consumer confidence in these markets and their purchases (Ardic et al., 2011; Arce, 2000). Violations constituted breaches of not only the landmark 1933 and 1934 Acts but also of the Accounting and Auditing Enforcement Releases (AAERs), along with Act 23 of the Investment Company, Act of 1940.

2.1.2 SOX and DFA legislation

Several widely publicised mega-scandals motivated the US Congress and the SEC to regulate corporate governance. For these objectives, the enactment of both SOX and DFA was launched. First, in July 2002, following the Enron and WorldCom scandals, Congress passed SOX. Later in July 2010, following the Global Financial Crisis of 2008 and the collapse of firms such as Lehman Brothers, Congress passed the DFA. These laws were intended to prevent, or at least minimise, corrupt actions by public companies' management and auditors that would result in diminishing the public's trust in financial markets (Dibra, 2016). However, previous research has demonstrated that even though the SEC had expanded its authority to ensure the safety of financial markets, this expansion did not lower the number of security class action lawsuits. However, with the variations in the rates of violations, it does not appear that these laws are neither sufficiently consistently enforced, nor obeyed. It appears that these increased rates are not necessarily directly related to an increase in the rate of underlying violations, yet rather, just the rate at which they are identified. In fact, unfortunately, they have had an

unexpected adverse impact not only on general stock prices but also on overall financial markets (Choi et al., 2013).

2.2 *The SEC investigation process*

Laws, regulations, and corporate governance rules are in place not only to reduce the risk of lost investor confidence but also to ultimately reduce the volume of litigations and lawsuits. By providing reliable information to the public, they foster wiser investment decisions. It is imperative that honest financial reporting enforces compliance with the Securities Acts of 1933, 1934, and 1940, along with the more recent SOX and DFA Acts 26. This study is based on the number of filings subject to SEC investigations that have been filed and then settled by management. These SEC-offending companies then either paid the imposed penalty fine or proceeded to court. In nearly every case, the SEC has identified at least one law that had been broken. Similarly, the SEC has found that corporate management was responsible for the offensive breach(es). Therefore, for defendants, the initial proposed SCACs proved much more economically suitable and less costly than court processes. Simultaneously, the SEC seeks out and investigates potential violators, with the rationale that all noncompliant delinquency will eventually result in harm to shareholders. That is the noncompliant deviance of corporate violators causes harm to shareholders, by either causing them to receive fewer dividends or lose a portion of their investment. Consequently, the company's value declines. Following this rationale, compliance with laws and fair corporate governance systems will safeguard the investors' interests. Ultimately and ideally, by acting to safeguard investors' interests, the conscious movement of the financial market to promote financial stability shall then blossom.

Through both the apocopate process along with the assistance of its Enforcement Division, the SEC pursues securities law offenders, bringing the law to bear against suspected wrongdoers. After an investigation reveals a securities law violation, the SEC can pursue at least three options. These include:

- 1 referring the case to the Department of Justice (DOJ)
- 2 referring the case to federal court
- 3 commencing an AP.

APs are internally overseen by the SEC's internal rules of practice. They can be assigned to Administrative Law Judges (ALJs) when the SEC finds it suitable. A final decision or verdict depends on various factors. For instance, 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.

For civil lawsuits filed in federal court, the SEC usually produces a Litigation Release (LR). In response to an alleged breach of one or more sections or rules of the securities laws, the LR represents an official SEC document of the resulting settlement or trial. Usually, LRs require more drastic breaches of securities laws, in comparison to those requiring APs. Recently, the SEC's hostile pursuit of securities offenders 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. An increasing number of cases charged in APs has inspired a broad range of legal objections.

2.3 Prior research on fraud investigations

The first known research into fraud investigation was conducted in 1991, by J. Alexander. Since then, many researchers have investigated the effect of a number of securities law violators on stock prices. Some have focused on SEC investigations, while others have focused more on securities class action lawsuits and private investigations. For instance, in 1996, Dechow et al. investigated firms subject to violation actions by the SEC, for potential GAAP breaches. This research group found that substantial capital costs are imposed on firms after managerial fraudulent financial activity is revealed (Dechow et al., 1996). Similarly to the previous 1991 findings of Feroz et al., this research group also discovered that the initial announcement of management wrongdoing or violation steeply decreases stock prices.

Meanwhile, in building on the previous research by Feroz et al.; in 2010, Christensen et al. discovered that, although the stock market is more sensitive to the initiation of an SEC filing than comparison the day on which an investigation is announced, it still reacts adversely to the announcement of a violation. However, in 1994, Nourayi found that stock prices respond less adversely to the SEC's enforcement action than to its official announcement. In addition, he also noticed that stock prices respond less adversely to the level of severity of the alleged offenders. In 2004, Palmrose et al. examined the restatement announcements of 403 firms between 1995 and 1999 and discovered an adverse market reaction to GAAP violators. Moreover, in 2012, Choi and Pritchard found that the stock market reacts adversely not only to volatile stock prices but also, they respond more adversely to SEC class action filings leading to subsequent enforcement actions.

In 2006, Aggarwal and Williamson discussed how modern corporate scandals have led to the formulation of new corporate governance rules, that were initiated by both US Congress and the SEC. Their study examined changes in corporate governance practices between 2001 to 2005, covering the period before and after the passage of SOX. They analysed a comprehensive set of 64 organisational 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 adjusted their results for size and industry, they discovered a significant correlation between governance and firm value. These variables also reveal a direct connective relationship, demonstrating that those companies which initially adopted the new laws early on, 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 direct correlation between governance rules and market value, could not be entirely attributed to the presence of new regulations. This is so because those values remained stable even in the post-regulatory period. The resulting evidence supports an argument for the impact of the quality of governance on firm value. Moreover, in a transparent and harmonised economy, the public will rely on genuinely skilled professionals to fulfil their duty to run corporate entities, in ways that yield the most valid and legitimate benefits to stakeholders (Bloomfield and O'Hara, 1999).

Simultaneously, the government has a responsibility to supervise the transparency of public corporations, through agencies such as the SEC (Klock, 2010).

In 2006, Lobo and Zhou investigated the changes in managerial discretion over the financial reporting following SOX and recorded the substantial expansion of documentation after its enactment. These efforts complied with the SEC's newly required requests for outcome and reporting, which mandated that CEOs and CFOs certify their firms' financial statements. Following these regulations, it was observed that the number of accrual transactions and activities decreased following SOX, in comparison to the prior period. Furthermore, in 1997 according to Basu, before the passage of SOX, it was found that conservative firms tended to record losses faster than gains, both on their income statements and balance sheets. Their findings, based on suggested empirical evidence, reveal that the management's discretionary reporting moved towards more conservative behaviour, after the passage of SOX. They used alternative estimation and management approaches in adjusting for likely confounding variables. Their findings are consistent with the trend that more aggressive behaviour by the SEC temporarily yields less misconduct by management, but only for a short time after regulations are enacted. However, as the others have previously observed and discovered, this research group also found an increase in the number of filings subject to the offenders. In other words, there is a trend of misbehaviour and delinquency that resumes or even increases following this short period of regulatory surveillance.

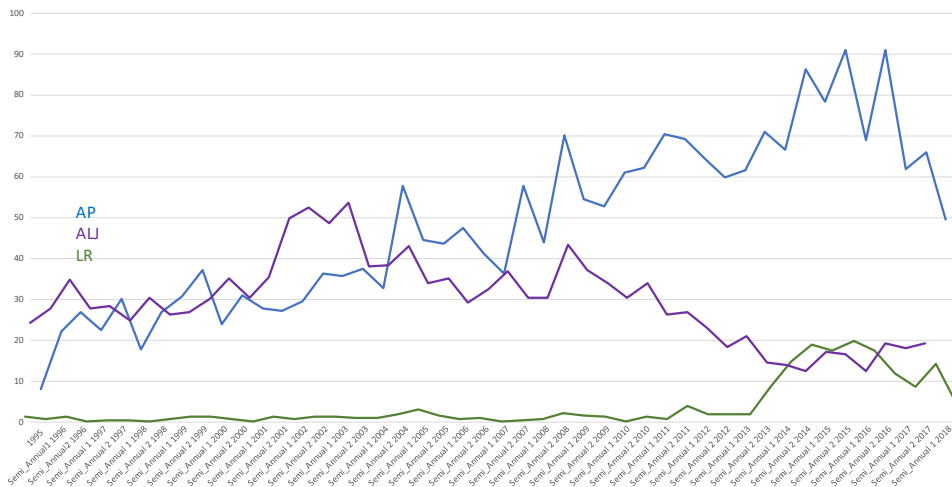
In 2015, Platt argued that unfortunately the SEC's enforcement actions, particularly aggressive prosecution has neither deterred nor prevented violations of corporate securities laws and regulations. Similarly, in 2014, Pincus and Brown discovered that securities class actions have neither substantially prevented, nor reduced future violations. In addition, as with the trends described above, unfortunately, these regulatory efforts have not sufficiently prevented corporate misdeeds. They argue that class actions are costly and harm shareholders' income, and that company employees tend to initially report violators to the SEC, even before wrongdoing is uncovered by enforcement actions (Pincus, 2014). After comparing securities class action filings with investigations by the SEC, Pincus and Brown found evidence that the stock market reacts more adversely to class actions than to actions involving SEC investigations (Pritchard and Choi, 2016).

SEC-ordered suspensions on securities' returns, volatility, and trading volumes, were previously studied by Ferris et al. from 1963 to 1987. In 1992, Ferris et al. reviewed the effect of SEC-ordered suspensions on securities' returns, volatility, and trading volumes, from 1963 to 1987. It was found that during the suspension, there is a permanent devaluation of these securities (Ferris et al., 1992). This result, however, is highly sensitive to both the suspension announcements and the reasons for enforcing these suspensions. Both the variance and the trading volumes are found to be substantially higher than normal in the pre-suspension period. This trend continues in the immediate post-suspension period. However, the variance and trade volume levels return to more normal levels only at a much later date. In addition, it has been concluded that trading suspensions are not associated with the immediate elimination of unusual market activity. Moreover, from the 1963 to 1987 time period, Ferris et al. discovered that these securities enduringly diminished during the suspension. Similarly, they found a connection between variance and the trading volume of suspensions, before and after the event (Ferris et al., 1992). However, these results are more exposed to the revealed motivations.

2.4 Analysis leading to research questions

In presenting these escalated violations of SEC regulations and laws, this study reveals that from 1995 to 2002, there were 1,973 offences filed. These results can be seen in Figure 1. From 2002 through 2010, after the passage of SOX, the recorded number of filings increased to 4,325. Likewise, from 2010 through 2018, after the passage of DFA, the number of filings increased to 7,071. This study reviewed a total of 7,874 cases filed with the SEC from 1996 to 2011, under Public Administrative Laws. The data demonstrate that more cases were recorded after 2003, than in the prior period from 1996 to 2003. The increase in the number of cases filed with the SEC shows that regardless of the dollar amount, at least one out of eight public companies violated SEC rules after the enactment of SOX, than in previous years. The violations of AAERs and the Securities Acts of 1933, 1934, and 1940, were counted over a company’s lifetime. After these offences were observed, public administrative proceedings (AP) as well as cease-and-desist proceedings were instituted, and different sections of the SEA and corresponding AP rules were enforced. For more details, refer to Figure 1.

Figure 1 Number of filings: 1995–2018 (see online version for colours)



Notes: 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.

This research study documents more high-level class action lawsuits and violations of security laws after the enactment of SOX and DFA, than before. Table 1 represents the number of federal court settlements over two time periods of 2000–2004 and 2013–2017. It illustrates the number of security violations filed with the SEC Enforcement Division through AP, as well as those which have gone to court through LR. These results serve as a baseline, in which the effects of the subsequent results from both SOX and DFA legislations, can be compared. In addition, based on a review of the SEC’s records,

Table 2 illustrates how the number of violators of securities laws was at its lowest four to five months after the enactment of SOX and DFA. Moreover, after these five-month time periods following the initial SOX and DFA enactment had passed, these results also reveal another boost in the number of securities violators, which 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 protect investors' rights and best interests. For more detail, refer to Tables 1 and 2.

Table 1 Filing years and fluctuation of the number of settlements made in federal court

<i>Date</i>	<i>AP</i>	<i>LR</i>	<i>Date</i>	<i>AP</i>	<i>LR</i>
1/1/2000–1/1/2004	2,035	2,621	1/1/2013–1/1/2017	4,435	1,434

Notes: 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 AP and the number of cases that went to court, LR.

Table 2 The periods before and after the enactment of SOX and DFA

<i>Date</i>	<i>AP</i>	<i>ALJ</i>	<i>LR</i>	<i>Date</i>	<i>AP</i>	<i>ALJ</i>	<i>LR</i>
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

Notes: Table 2 shows the number of security violations at the AP, ALJ, and LR stage six months preceding the enactment of SOX and six months thereafter. It also depicts the information related to the six months before and after the enactment of DFA in July 2014.

In addition, one extension of this study involves VAR and/or IRF analyses to probe how the number of SEC violations filed impacts stock volatility. Another extension of this study utilises VAR and/or IRF analyses to investigate the effects of both SOX and DFA on the AP filings. These analyses that evaluate the number of SEC violations impacting stock volatility show that VIX is influenced by AP, ALJ, and LR. That is, in this first experiment, one could predict that VIX would cumulatively respond to AP, ALJ, and LR. The effects of both SOX and DFA on AP, ALJ, and LR filings also correlate to the influences of both the unemployment rate and political affiliation. The political party in power, whether Democrat or Republican, has an influence on domestic economic issues, such as the unemployment rate, which in turn affects the US gross domestic product (GDP).

3 Research questions and methodology

3.1 Research questions

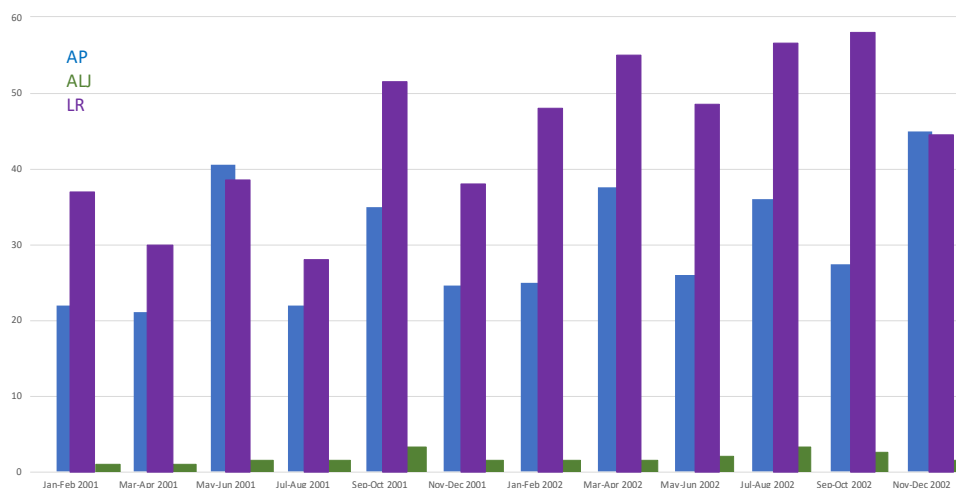
This academic study aims to answer two research questions and propose a null hypothesis for statistical analysis. The first question is, “what is the impact of securities violations that were filed with the SEC on the variation in firm stock volatilities?” For example, financial theory and market fluctuation trends suggest that the cost of settlements, as well as legal or professional fees resulting from SEC actions, has a significant impact on companies’ income, EPS, and ultimately, stock prices (Anderson, 2011). In addition, VIX may be impacted by APs, ALJs, and LRs, as presented below. The concept of semi-strong market efficiency implies that security prices incorporate all publicly available market information.

If a company is the subject of enforcement actions by the SEC and the consequent negative publicity, its stock price should proportionally reflect the number of actions taken against it. This negative publicity leads to the fluctuation of stock prices, which in turn creates changes in market volatility. Available evidence indicates that more than 80% of these cases were settled, with less than 20% eventually going to court (Velikonja, 2016). Other research groups have found that between 1978 and 2002, SEC enforcement actions imposed \$23.5 million in costs on the 585 firms that were the subject of legal action for fraudulent financial misrepresentation (Karpoff et al., 2017).

As demonstrated by the research presented in the previous section using event study methods, the market hypothesis states that external occurrences are reflected in stock prices during an event window. In this study, it is hypothesised that the lawsuits brought against security violators ultimately cost them more than preliminary out-of-court settlements. Therefore, as the number of securities violators and resulting lawsuits directed at firms increases, it can be inferred that variations in stock volatilities would be more heavily impacted. The first research question is presented below.

RQ1 Does an increased number of security violators lead to changes in the volatility of the stock markets?

It is intriguing to examine whether corporate governance regulations implemented over the past two decades have reduced the number of filings subject to SEC Enforcement Division investigations. It can be inferred from these trends, that the new regulations had at least initially targeted relevant governance (Lobo and Zhou, 2006). However, as shown in Figure 2, a more in-depth analysis indicates that markets were already rewarding firms with enhanced governance attributes. Currently, it is unclear to what extent regulations can reduce the number of security violators in our financial markets. Publicly available information on the SEC’s website was used to analyse the effectiveness of the two new regulations, SOX and DFA. The website serves as a valuable source for ordinary public investors, while more sophisticated and/or institutional investors use a variety of tools to learn new information about public companies and financial markets. These latter tools presented may involve transactions through either financial statements or professional intermediaries. In effect, this access to publicly available financial information, can facilitate investors’ decisions to either support or reject a firm. Furthermore, the effects of both SOX and DFA on AP, ALJ, and LR filings, are believed to be influenced by both the unemployment rate and which political party is in power. Future studies will reveal the cause-and-effect nature of these newly linked factors. For more detail, see Figure 2.

Figure 2 Monthly filings before and after SOX: 2001–2002: AP, ALJ and LR (see online version for colours)

Notes: Figure 2 shows the number of SEC filings per month before and after the enactment of SOX. On average, this number increased 24% 12 months after SOX's enactment in July 2002, compared to 12 months prior. This may demonstrate the ineffectiveness of corporate governance regulations like SOX at reducing the number of SEC violations by public companies.

The second research question is presented below:

RQ2 Did the enactment of both SOX and DFA reduce the number of securities violators and consequent lawsuits?

3.2 Null hypothesis

The research methodology integrates research questions RQ1 and RQ2 with a null hypothesis. This null hypothesis was then statistically tested at 95% confidence levels, to evaluate whether it should be rejected. It is formulated below.

$H_{0,1}$ An increase in security violators does not lead to a change in the volatility of the stock market.

$H_{a,1}$ An increase in security violators does lead to a change in the volatility of the stock market.

$H_{0,2}$ SOX and DFA do not significantly reduce the number of securities violators and consequent lawsuits.

$H_{a,2}$ SOX and DFA do significantly reduce the number of securities violators and consequent lawsuits.

3.3 Sample selection and descriptive statistics

In this study, a sample is drawn from the enforcement database of all securities offences filed with the SEC between 1995 and 2018 (Division of Enforcement, 2018). The

database recorded 24,051 violations in this period, and is classified into the type of legal action taken by the SEC against them. The legal actions that were filed against offenders include APs, ALJs, and LRs. The SEC updates this record on its website every month. APs are assessments of guilt, that might result in penalties for a violator’s wrongful actions. Whether the Commission decides to bring a violation case before an ALJ, depends on various factors. Because 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, which is independent of the Commission. LRs concern civil lawsuits brought by the Commission in federal court. They represent official SEC documents detailing a settlement or trial, scheduled before a civil court judge. These LRs address the alleged crime of breaching one or more sections or rules of the securities laws. Usually, an LR requires a more severe breach of securities laws than an AP. For more detail, see Table 3, which represents the security violations filed with the SEC, from 1995 through 2018. From these Table 3 results, a total of 24,051 violations were reported, in particular, with LR cases, along with 13,369 AP cases.

Table 3 SEC database records of violations

<i>Date</i>	<i>AP</i>	<i>ALJ</i>	<i>LR</i>
30-Sep-95	13,369	1,184	9,498
30-Jun-18			

Notes: 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.

3.4 VAR and IRF models and analyses

The VAR and IRF models are used to evaluate both the violations influencing stock volatilities, along with the number of securities offenders. With the extended analyses that evaluate the number of SEC violations impacting stock volatility, a multivariate linear expression was formulated. In this multivariate linear regression analysis, all variables have been represented as time-dependent. This is illustrated in equations (1a) and (1b). For this first experiment, the VIX dependent variable cumulatively responded to AP, ALJ, and LR independent variables. Similarly, for the second experiment probing the effect of SOX and DFA on APs, another multivariate study was conducted, again with all variables represented as time-dependent. This is illustrated in equation (2). This second experiment investigates the influence of both the unemployment rate, and the political party in power, that is, the impacts of either Democratic or Republican parties, on AP, ALJ, and LR filings. It shows an influence on domestic economic issues, such as the unemployment rate, which in turn affects the US GDP. In the second experiment, the dependent variables reflect AP, ALJ, and LR. They again depend upon both the unemployment rate and the political party in power, the latter two of which are considered control variables. In this second experiment, multivariate linear regression analyses were also conducted. For instance, the first dependent variable, AP, was run against the independent or control variables, which reflect the unemployment rate and political party. Likewise, the second dependent variable, ALJ, was run against these control independent variables. Similarly, the third dependent variable, LR, was run against these control independent variables.

For the future VAR and/or IRF analyses described above, multivariate linear expressions were utilised for both experiments. In the first experiment, it was expected that the number of violations filed by the SEC would impact stock volatility, and can be expressed in terms of a multivariate form as given in equations (1a) and (1b).

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \dots + \beta_k Y_{t-k} + \alpha_0 + \alpha_1 X_{t-1} + \dots + \alpha_{t-k} X_{t-k} \quad (1a)$$

$$X_t = \beta_0 + \beta_1 Y_{t-1} + \dots + \beta_k Y_{t-k} + \alpha_0 + \alpha_1 X_{t-1} + \dots + \alpha_{t-k} X_{t-k} \quad (1b)$$

where $Y_t = \text{VIX}$ at time t and $X_t = \text{AP, ALJ, LR}$ at time t .

In terms of equation (1a), VIX at time t or Y_t recursively depends upon their previous values at earlier times. Y_t also depends upon those previous X_{t-1} through X_{t-k} AP, ALJ and LR values, which accumulate over time. In addition, equation (1b) implies that the impact of AP, ALJ and LR may consequently influence the previously established VIX values. That is, from equation (1b), AP, ALJ, and LR at time t or X_t , recursively depend upon their previous values at earlier times. X_t also depends upon those previous Y_{t-1} through Y_{t-k} VIX values, which accumulate over time. As the models shown by equations (1a) and (1b) demonstrate, the nature of the mutual cause/effect influences may be considered, along with their accumulated past values.

In the second experiment, both VAR and/or IRF analyses were used to investigate the multivariate expression as shown in equation (2).

$$Y_i = \beta_0 + \beta_1 C_{\text{SOX}} + \beta_2 C_{\text{DFA}} + \beta_3 \text{Controls} + u_i \quad (2)$$

where $Y_i = \text{AP, ALJ, LR}$, controls = unemployment rate, Dem_Pres. For this experiment, multivariate linear regression was also performed. In equation (2), the dependent variable Y_i reflects AP, ALJ, and LR. The independent control variables reflect the unemployment rate, a democratic president, and dummy variables. The initial beta coefficients represent the Y_i intercepts (β_0). The remaining beta coefficients represent linear rates of change for the dummy variables and controls. That is, β_1 reflects the linear rate of change for the first dummy variable associated with SOX. Similarly, β_2 reflects the linear rate of change for the second dummy variable associated with DFA. The fourth beta coefficient β_3 reflects the linear rate of change for the controls. For the political party independent variable, it is set to '1' for a Democrat and '0' for a Republican. In this way, the positive effect of the Democratic Party on the economy can be justly represented. Equation (2) is formulated in such a way that the dummy variables are utilised with multivariate linear regression analysis so that the effects of SOX and DFA on AP filings can be found. As stated earlier, the effects of SOX and DFA on ALJ filings can also be observed from repeated multivariate analyses with ALJ. Likewise, this can be repeated for investigating the effects of SOX and DFA on LR filings. Through a multivariate linear regression approach, the impact of both SOX and DFA on AP, ALR, and LR filings can be more fully revealed, in the presence of the control independent variables.

3.5 *Data analysis*

Table 4 portrays all 24,051 records used to assist the SEC in its regulatory compliance monitoring. During the period of study, it itemises information about the determination of whether a company's violations, along with the subsequent SEC actions, had any impact on variations in its stock prices in the overall market. The number of annual violations in

this dataset is based on AP actions, which range from 32 in 1995, to 297 in 2018. Similarly, the number of annual violators found through LR investigations reflects an increase from 121 in 1995, to 157 in 2018. Likewise, the number of ALJ cases ranged from 8 in 1995, to 29 in 2018. In order to calculate the monthly ratio of the number of violations, this data has been categorised by the number of public companies listed by the NYS Stock Exchange and NASDAQ. The US public company data came from both the World Bank and the Federal Reserve Bank. The stock market volatility data was derived from the Chicago Board Options Exchange (CBOE). Two volatility indexes have been generated, one concerning the S&P 500 Implied Volatility Index (VIX), and the other drawing from the S&P 100 Volatility Index (VXO). This data was converted from daily to monthly, using a preferred weighted averaging method. With this approach, consistency with the number of security violations subject to the SEC Enforcement Division investigation can be ensured. These results are regularly updated monthly on the SEC website. For more detail, see Table 4.

Table 4 Project variables

<i>Date</i>	<i>Independent variable</i>	<i>Independent variable</i>	<i>Independent variable</i>	<i>Dependent variable</i>	<i>Dependent variable</i>
	<i>AP</i>	<i>ALJ</i>	<i>LR</i>	<i>VIX</i>	<i>VXO</i>
30-Sep-1995	13,369	1,184	9,498	274 days	274 days
30-Jun-2018					

Notes: Table 4 names the variables subject to investigation and enumerates their total quantities over the period from 30 September 1995 to 30 June 2018. The independent variables correspond to the three filing processes undertaken by the SEC against a firm suspected of securities law violations: AP, ALJ, and LR. The dependent variables are the CBOE, VIX, and VXO.

Table 5 ADFT statistic

<i>Variables</i>	<i>VIX</i>	<i>VXO</i>	<i>AP</i>	<i>ALJ</i>	<i>LR</i>
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

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

In contrast to numerous prior studies on this topic, the VAR model is the preferred research methodology for this study. The VAR model measures how the number of violators filed by the SEC impacts changes in stock volatilities. In this study, the augmented Dickey-Fuller test (ADFT) was selected to measure the effect of the number of filings on stock market volatility. This ADFT test can run a unit test root, which determines if the data are ready for examination, via analyses of time series models. Similarly, the ADFT represents the preferred unit test on the three independent variables, APs, ALJs, and LRs, and both dependent variables, VXO and VIX. For this study, the first difference is utilised. The data must be transformed so that the first difference test

can be implemented. For more details, see Table 5, for the Dickey-Fuller statistical representation of how AP, ALJ, and LR, give rise to the VIX and VXO responses.

4 Empirical results

4.1 VAR results

As illustrated in the graph and Figures 5–9, the first null hypothesis of this study, $H_{0,1}$, is examined for all models, first using VAR, then followed by the impulse-response function (IRF). It has been observed that one standard deviation (SD) innovation shock to AP initially, causes VIX to escalate rapidly over the next period. This direct response rises very slowly from the first period through the third period, then starts decreasing 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 peculiar tendencies. This means that when additional filings occur, an increase in AP has a direct impact on VIX after one period. In effect, this explains more variations in the volatility of the stock market when there are more APs. However, no such impact of APs on VXO has been observed. Similarly, no significant effect of ALJ and LR, on either VIX or VXO was noted. This may be because when information becomes public in the AP filing, process investors react immediately, even before the ALJ and LR stages commence, since the disappointing news had already dissipated. For more detail, see Figures 5, 6, 7, 8 and 9. Table 6 shows the results of the Wald test, which examines the effect of the short-term relationship between the joint independent variable AP, and the dependent variable VIX. To summarise, in the short run, there appears to be a causality trending from independent variables to dependent variables. Therefore, it can be inferred that if the number of violations filed by the SEC escalates, it will have a considerable impact on changes in the stock's volatility. Consequently, in the short term, these relationships will increase VIX. However, unlike AP, in the short run, none of the other independent variables shows any results on either VIX or VXO. For more detail, see Table 6 for these results from the Wald test statistical analysis.

Table 6 Wald test: system: {% system}

<i>Test statistic</i>	<i>Value</i>	<i>Probability</i>
Chi-square	19.56049	0.0015
<i>Normalised restriction (= 0)</i>	<i>Value</i>	<i>Std. err.</i>
C(5)	127.6477	51.7765
C(6)	123.9156	59.77261
C(7)	83.81986	60.05248
C(8)	64.22979	52.10548

Notes: Restrictions are linear in coefficients.

Summary: null hypothesis: $C(5) = C(6) = C(7) = C(8) = 0$.

The above results reflect a learning curve effect, which is consistent with the assumption that a flow of public information will impact market efficiencies. These findings are aligned with Cornerstone Research's Securities Class Action Filings 2010 Year in Review. From these sources, data from the Stanford Law School Securities Class Action

Clearinghouse have been studied. Specifically, the data review 3,227 federal securities class action filings between 1 January 1996 and 31 December 2010. From this review, it has been discovered that securities litigation activity correlates to variations in stock market volatilities. In particular, the fourth quarters of 2008 and 2006 were emphasised. During these periods, VIX demonstrated its greatest extremes: VIX extremes reflecting the highest and lowest levels in 2006 and 2008, were then linked to the highest and lowest number of filings in those quarters (S&C, 2011).

4.2 *Statistical and linear regression analysis*

Tables 6 and 7 illustrate the Wald test and linear regression statistical analysis results, which can be connected to the null hypotheses above. The Wald test includes chi-squared and F test statistics. Table 7 includes linear regression T-test statistics and favourable R values, which can also evaluate the null hypotheses. It is intriguing to discover that the combinations of these empirical test statistics and results do not reject the second null hypothesis ($H_{o,2}$), for a two-tailed test at 95% confidence levels. These results hold consistent for the Wald test, along with the linear regression analyses. Moreover, the linear regression results for the correlation coefficient R value is 0.707, which suggests a moderately strong correlation, that also fails to reject the null hypothesis ($H_{o,2}$). For this study, this combination of several statistical tests generating evidence-based support provides an even stronger foundation for the failure to reject the second null hypothesis ($H_{o,2}$). Based on the favourable chi-squared and F-test statistical results from the Wald test, along with the t-test linear regression and R values, these combined results at 95% confidence levels, can be interpreted together as a failure to reject the second null hypothesis ($H_{o,2}$). In summary, these combined arguments for the failure to reject the second null hypothesis, are highly favourable. This equally supports the first alternative statement $H_{a,1}$, that an increase in security violators leads to a change in the volatility of the stock market. As presented above, it also fails to reject the second statement $H_{o,2}$, that SOX and DFA legislations do not significantly reduce the number of securities violators and the consequent lawsuits.

Table 7 Results from the regression generated from our dataset

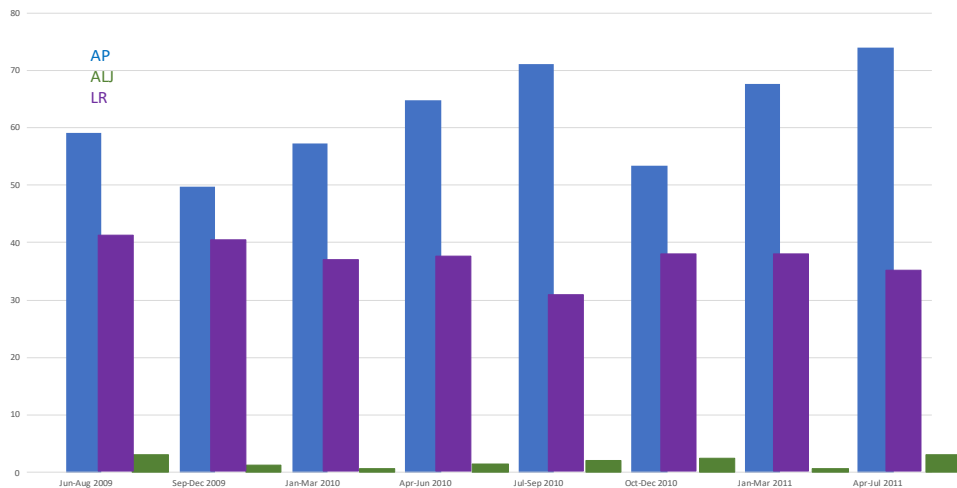
<i>Variables</i>	<i>AP</i>	<i>ALJ</i>	<i>LR</i>
C	3.76*** (8.13)	0.23** (2.05)	0.55*** (24.01)
Dummy for SOX	5.89*** (9.33)	0.17 (1.13)	3.19*** (10.96)
Dummy for DFA	6.69*** (10.96)	1.69*** (11.49)	1.96*** (7.00)
Observations	274	274	274
Adj. R ²	0.59	0.41	0.59

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

As shown in Table 7, a dummy variable was utilised for DFA as well as for SOX. Both DFA and SOX ran on APs, ALJs, and LRs. These results showed that the passage of both SOX and DFA resulted in an increase in the number of AP, ALJ, and LR cases. However, this occurrence may be due to an endogeneity problem. Due to SOX and DFA, more APs, ALJs, and LRs were being filed more than before. Therefore, it cannot be firmly

concluded that SOX and DFA ‘caused’ more APs, and/or ALJs, and/or LRs. However, these trends are clearly correlated. For more detail, see Table 7.

Figure 3 Monthly filings before and after DFA: 2009–2011: AP, ALJ and LR (see online version for colours)

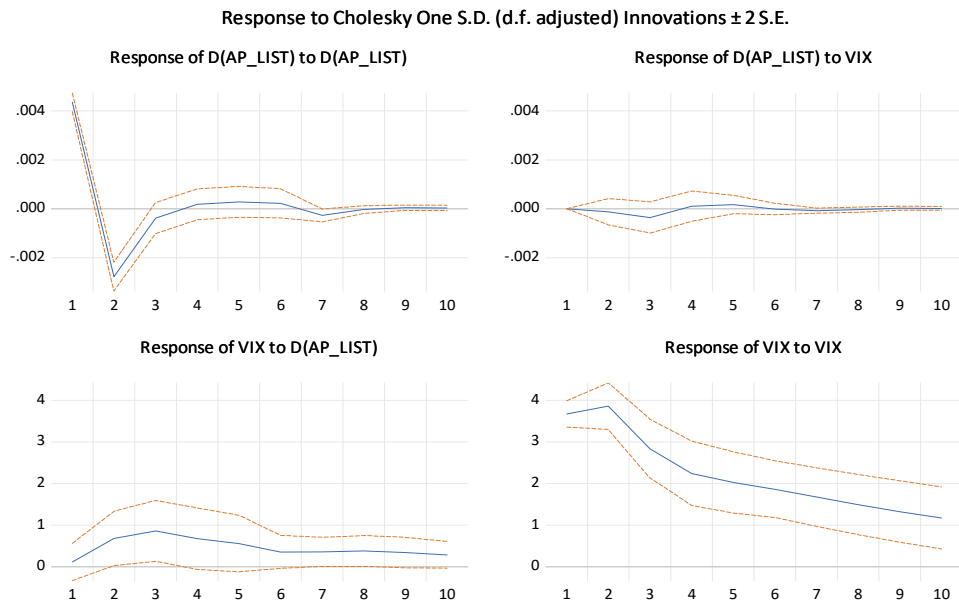


Notes: Figure 3 shows the number of SEC filings per month before and after the enactment of DFA. On average, this number increased 18% 12 months after DFA’s enactment in July 2010, compared to 12 months prior. Like the previous figure, this may demonstrate the inadequacy of legislative intervention in protecting stakeholders’ interest in public companies’ compliance with securities laws.

The results from Figures 2–9 reveal interesting similarities, that are consistent with the failure to reject the second null hypothesis. For instance, Figures 2 and 3 both demonstrate the ineffectiveness of SOX and DFA corporate governance regulations. That is, Figure 2 reveals no significant relationship between SOX regulations in reducing the number of SEC violations from public companies. Similarly, Figure 3 reveals no significant relationship between DFA legislative intervention in protecting stakeholders’ interest in public companies’ compliance with securities laws. Figures 4–9 reveal similar trends, in that initially, there may be a perturbation in activity right after regulation has been announced, yet with subsequent periods, this response rapidly diminishes. For instance, in Figure 4, there is an initial perturbation in the response of AP and VIX to AP until the third period on average, yet it decays out to an equilibrium value after 5 to 9 periods. In addition, in Figure 5, there is an initial perturbation in the response of AP and VXO to AP until the fifth period on average, yet it decays out to an equilibrium value after 6 to 10 periods. Likewise, in Figure 6, there is an initial perturbation in the response of ALJ and VIX to ALJ until the seventh period on average, yet it decays out to an equilibrium value after 8 to 10 periods. Moreover, in Figure 7, there is an initial perturbation in the response of ALJ and VXO to ALJ until the sixth period on average, yet it decays out to an equilibrium value after 7 to 10 periods. Similarly, in Figure 8, there is an initial perturbation in the response of LR and VIX to LR until the seventh period on average, yet it decays out to an equilibrium value after 5 to 10 periods. In the same way, in Figure 9, there is an initial perturbation in the response of LR and VXO to LR until the

seventh period on average, yet it decays out to an equilibrium value after 8 to 10 periods. Furthermore, in comparison to ALJ and LR, it appears that the response to AP fades out faster, as early as the third period. This may be consistent with the observation that AP cases do not reach the LR or ALJ stages, as Figure 1 suggests.

Figure 4 Impulse response function of AP to AP, VIX and VIX to AP and VIX to VIX (see online version for colours)

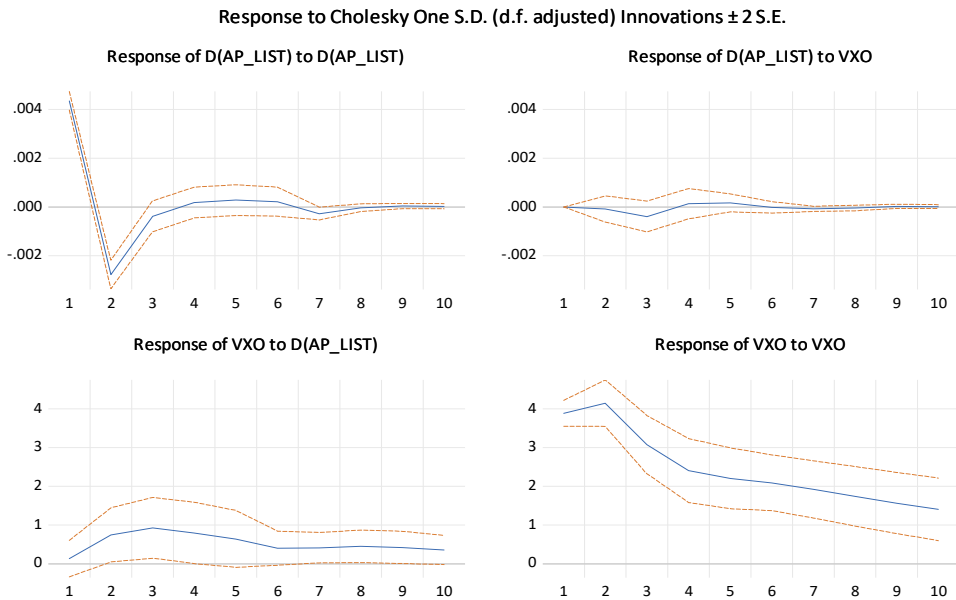


Notes: Response of AP to AP: the response decreases over the next period while it is significant for one period, then increases until the seventh period, and it is insignificant. Response of VIX to AP: the response of VIX to the first difference of AP (ratio of AP and total number of list public companies on NYS stock exchange and NASDAQ): a one SD innovation shock 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.

It is interesting how the efficient markets hypothesis applies to this study. It suggests that the market rapidly factors relevant information into stock prices. This study subsequently aims to address the question of SOX's and DFA's effectiveness, by examining the number of securities violators filed by the SEC against companies. These causal links suggest that the number of files SEC securities violators are more significant than the number of securities class-action lawsuits. The financial markets' reaction to corporate SEC investigations, in turn, influences the immediate response of stock prices to regulatory announcements. Similarly, the financial market's reactions to SEC

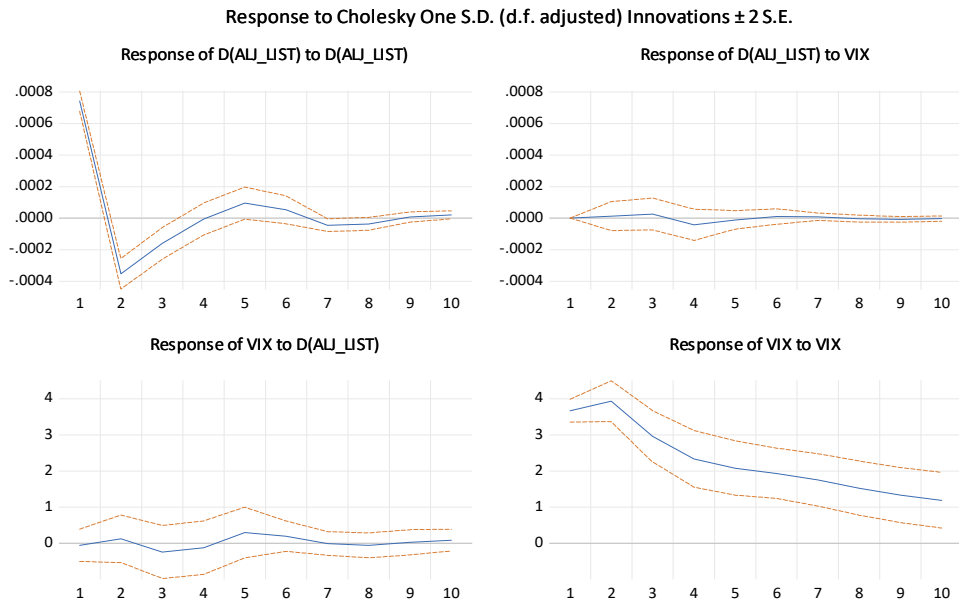
investigations, also influence the market fluctuations that follow. These trends are further enhanced if serious violations occur, and the SEC Enforcement Division files for corrective action. In this study, empirical examinations of the impact of the SEC and corporate governance regulations have been conducted, using information about the number of securities violators filed with the SEC’s enforcement agency between 1996 and 2018, along with information that is publicly available on the SEC’s website. They 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 2000’s, and those related to the Global Financial Crisis of 2008. Specifically, by employing this data, the violations of SEC rules before and after the enactment of DFA and SOX are reviewed, quantified, and reported. Likewise, the effects on the financial market of the number of securities violations filed with SEC enforcement, as represented by the S&P 500 and its VIX, are also evaluated. For more detail, see Figure 10.

Figure 5 Impulse response function of AP to AP, VXO and VXO to AP and VXO to VXO (see online version for colours)



Notes: 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 to the first difference of AP (ratio of AP and total number of list public companies on NYS stock exchange and NASDAQ) with four-lag: a one SD innovation shock 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.

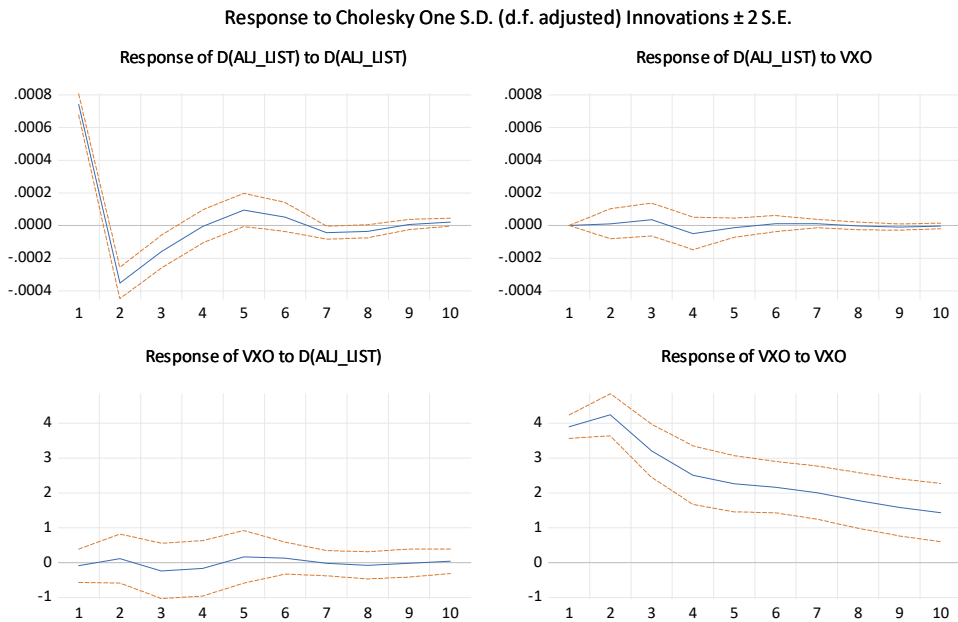
Figure 6 Impulse response function of ALJ to ALJ, VIX and VIX to ALJ and VIX to VIX (see online version for colours)



Notes: 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 to the first difference of ALJ (ratio of ALJ and total number of list public companies on NYS stock exchange and NASDAQ): a one SD innovation shock 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.

Perhaps most crucially, this statistical analysis study attempts to question how collaboration between the US Congress and the SEC, impacts the extent of the presence of violators in the financial market. Previously, these research questions were not sufficiently addressed by scholars using explicit quantitative methods. Through an examination of SCACs, the Cornerstone Research Center was the first to attempt to investigate these phenomena. Their comprehensive quantitative analysis proved that there is a noteworthy correlation between SCAC size and the presence of new regulations. It also demonstrated the impact of new laws on the number of agreements reached by the SEC (Division of Enforcement, 2018).

Figure 7 Impulse response function of ALJ to ALJ, VXO and VXO to ALJ and VXO to VXO (see online version for colours)



Notes: 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 to the first difference of ALJ (ratio of ALJ and the total number of list public companies on the NYS stock exchange and NASDAQ): a one SD innovation shock 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.

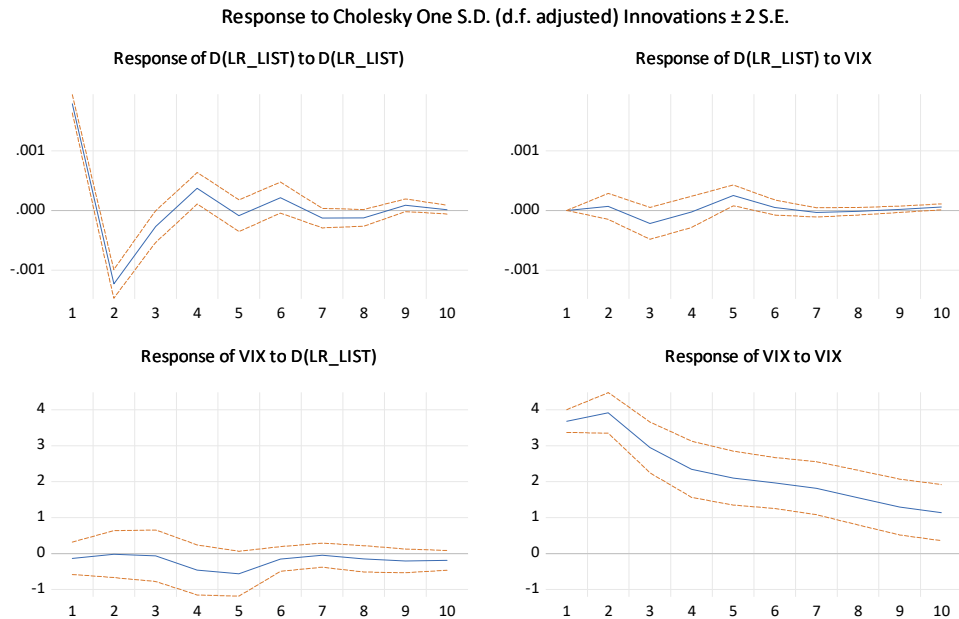
Response of VXO to VXO: the response increases slowly over the next period and decreases until the tenth period in the positive region.

5 Discussion

By using the VAR model methodology, which differs from most prior scholarship on this topic, this study is intended to investigate whether SOX and DFA decreased SEC security law breaches by public companies (Clark, 2012). It contributes to the existing literature in business and law by using the unbiased VAR model, rather than an event study method. The VAR model is more comprehensively suited than the event study method for probing the market’s reaction to potential fraud offences because it more accurately examines information about companies’ potential securities violations and fraud, as well as their

effects on the financial market. Disregarding the size and reputation of companies studied, and the dollar amounts of SEC lawsuits limit the ability to quantify these findings. For more detail, see Table 8, which summarises the monthly average AP filings from 1996–2017. In this table, the overall growth of the number of AP cases filed is demonstrated.

Figure 8 Impulse response function of LR to LR, VIX and VIX to LR and VIX to VIX (see online version for colours)



Notes: 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 to the first difference of LR (ratio of LR and the total number of list public companies on NYS stock exchange and NASDAQ): a one SD innovation shock 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.

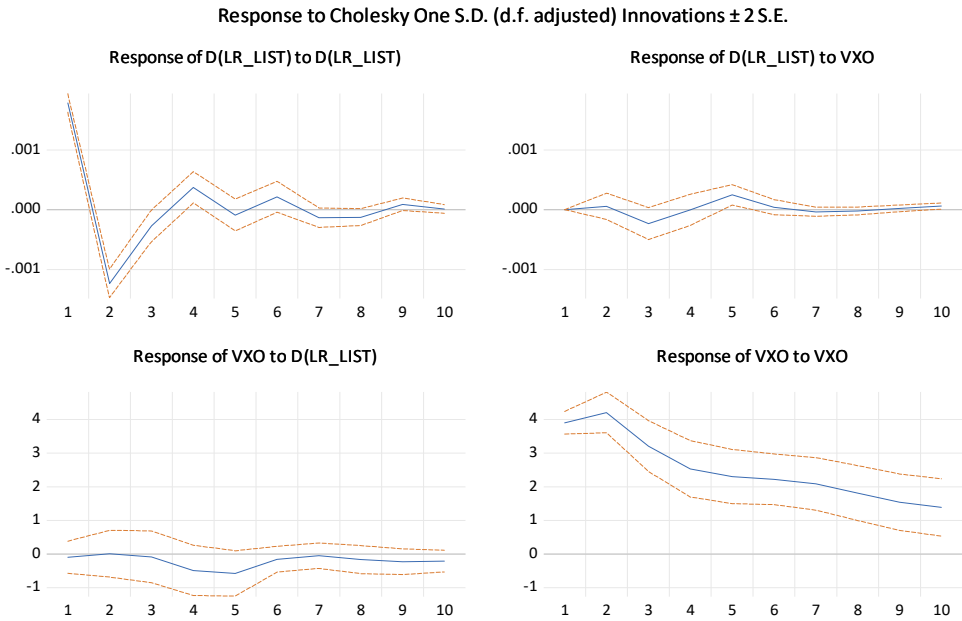
Response of LR to VIX: the response is insignificant.

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

The evidence-based statistical support provided in this study allows for a stronger foundation for the failure to reject the second null hypothesis ($H_{0,2}$), and these results are confirmed from a combination of different statistical tests. For instance, the favourable chi-squared and F-test statistical results from the Wald test, and the t-test linear regression and R value results at 95% confidence levels, can be interpreted as a failure to reject the second null hypothesis ($H_{0,2}$). That is the SOX and DFA legislation does not

significantly reduce the number of securities violations and the consequent lawsuits, and these findings stem from several different statistical tests, so these combined interpretations are even stronger. Simultaneously, the results of this study reject the first null hypothesis ($H_{0,1}$), supporting instead the alternative statement of the first null hypothesis ($H_{a,1}$). This interpretation reveals that an increased number of security violators, lead to changes in the volatilities of the stock market.

Figure 9 Impulse response function of LR to LR, VXO and VXO to LR and VXO to VXO (see online version for colours)



Notes: 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 to the first difference of LR (ratio of litigation released and the total number of list public companies on the NYS stock exchange and NASDAQ): a one SD innovation shock 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.

As discussed in Section 2, there are two schools of thought concerning the market’s reaction to announcements, that the SEC is investigating securities offenders and/or fraud. The potential securities offences studied are subject to investigation by the SEC’s Enforcement Division. In contrast to previous studies, in this one, all available information from the SEC – not limited to AAERs – was utilised to reach its final

conclusions. These two schools of thought give rise to two separate hypotheses, which yield trends that are subject to critique and interpretation. The first argument is consistent with the market efficiency hypothesis, as Nourayi discovered in 1994. It reiterates the observed pattern that on the day of the official announcement of an SEC enforcement action, the fluctuations in the stock price already reflected the news. This interpretation historically reflects the first hypothesis. However, in 1991, Feroz et al. discovered, contrary to the market efficiency hypothesis, that investors pay less attention to the day of an action’s announcement than to the seriousness of the SEC’s decision. This interpretation reflects the second hypothesis, for the costs to a company might be greater or less, depending on the Division of Enforcement’s findings and court decisions.

Table 8 Monthly average AP filings

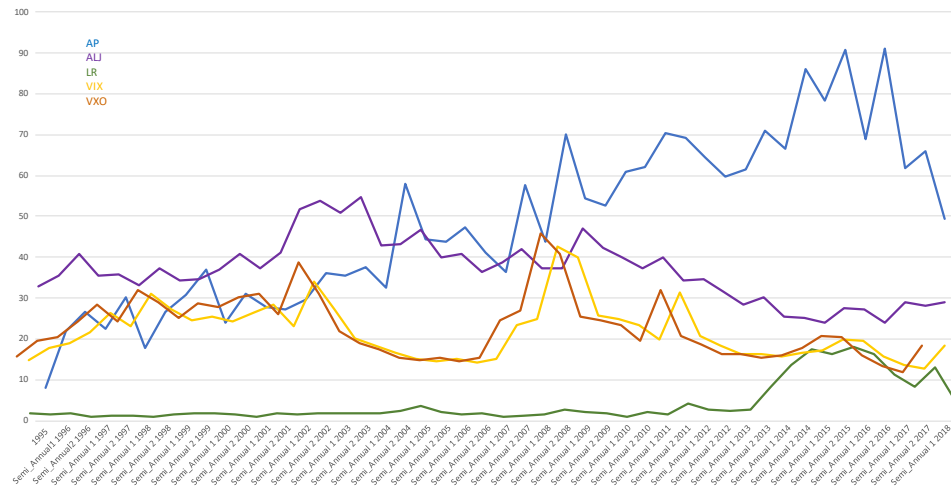
<i>Year</i>	<i># of AP filings</i>	<i>Monthly ave</i>	<i>% inc/dec</i>
31-Dec-96	292	24	
31-Dec-97	316	26	8%
31-Dec-98	267	22	-16%
31-Dec-99	406	34	52%
31-Dec-00	330	28	-19%
31-Dec-01	330	28	0%
31-Dec-02	421	35	28%
31-Dec-03	438	37	4%
31-Dec-04	543	45	24%
31-Dec-05	529	44	-3%
31-Dec-06	531	44	0%
31-Dec-07	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	1,015	85	11%
31-Dec-16	960	80	-5%
31-Dec-17	767	64	-20%

Notes: 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.

The two schools of thought, or two separate hypotheses presented above, were considered in this study. Because the study’s data are measured in months, from the date of the SEC

filing to its announcement, the question of which has a greater impact was neglected. In the months when filings increase, there is an upward fluctuation in stock market volatility. These results then reflect stock volatility escalations both as a result of and in proportion to, increased SEC enforcement actions. By the time the SEC filing revealed concrete information on the firm's violations of securities laws or GAAP, the market had already reacted adversely and begun to return to its normal state. Therefore, the conclusions of this study align more with the first hypothesis in concurrence with Nourayi, as presented above.

Figure 10 Correlation between VIX and VOX and SEC filings: 1995–2018 (see online version for colours)



Notes: 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.

This novel study examines the effect of stock market regulatory SEC enforcement actions on the changes in the volatility of the stock market, as measured by the corresponding volatility indices. Derived from single-firm event studies, this research concentrates on the overall market consensus is reached when the market participants realise the penetration of the management's and/or insiders' wrongdoings into the market. In effect, SEC acts as the safe keeper of individual investors against insiders' efforts to gain a competitive advantage, by using their superior preventative information. The market expects a minimum level of proceedings from its regulatory authority, as part of its enforcement strategy against offences. Hence, the market probes both the number and quality of SEC enforcement. In this way, an overall picture and assessment of the seriousness of insiders' wrongdoings can be formulated. The most reliable measure of the magnitude of wrongdoings is the increase in the number of SEC APs. In addition, the correlation between the change or increase in SEC filings, along with changing market volatility, is accurate. This is true because an increase in SEC filings reflects a disparaging image of both corporate compliance and governance for the entire market.

This study evaluates whether DFA and SOX are effective in limiting the number of securities violators. It is not clear if DFA and SOX have benefited the US economy. Rather, complications from the results of DFA and SOX might have, in fact, done more harm than good. Because DFA and SOX have not been proven to have a deterrent effect, new means of enforcing securities laws may need to be introduced. Any such new legislation should not be as financially burdensome to public companies, nor as destructive to their investors. It is irresponsible to investors when management breaks securities law and then defends itself from SEC actions at a cost to shareholders. This is especially so because shareholders rely on management to represent them and trust in good faith, that it will act in their best interests. For the purposes of protecting their investments, 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 their management accountable for, actions that might jeopardise a company's reputation and deplete its funds.

In the future, incorporating the variables of both company size and reputation into a more in-depth study may provide a new emphasis on, and foundation for, the direction of inquiry. In addition, future studies should probe how the number of SEC violations filed impacts stock volatility with VIX, as a function of AP, ALJ, and LR. Another future extension of this study will probe the effects of both SOX and DFA on AP, ALJ, and LR filings. Consequently, it is then highly interesting to investigate how these are in turn, influenced by the unemployment rate, and the political party in power. However, with the variations in the rates of violations, it does not appear that the US Government, nor these laws are sufficiently consistently enforced, nor obeyed. This may suggest that the variations in the rates of SEC violations are less dependent upon the US Government, existing laws, and the efforts to enforce them.

6 Conclusions

This study seeks to answer two intertwined research questions using the VAR model probe. As presented above, this VAR model most accurately scrutinises the release of information about companies' potential securities violators and fraud, along with its effects on the financial market. Regarding the first question, it analyses whether market volatility is proportionately impacted by the number of SEC actions taken against it. Similarly, it probes the question of whether recent corporate governance laws such as the DFA and SOX, in fact, prevent or at least reduce firms' violations of securities laws. When considering the first question, the results of this study indicate that there is indeed a direct relationship between increased securities litigation activity and variations in stock market volatilities. With respect to the second question, based on a comprehensive review of publicly available information on SEC violations filed between 1995 and 2018, it is concluded that laws such as DFA and SOX, may not lead to a decrease in public company securities offenders.

This study aims to assess the effectiveness of SOX and DFA by examining not only, the number of securities violators before and after their passage; but also, the effect of that number on stock prices and changes in financial market volatilities. The first argument presented above that this research group supports is consistent with the market efficiency hypothesis. It emphasises that on the day of the official announcement of an SEC enforcement action, the recently modified stock price has already been presented in

the news. The study's results suggest that even though firms tend to adhere to new regulations shortly after they become effective, the number of violators increases to an even higher level than before, within the following six months. In addition, the failure to reject the second null hypothesis ($H_{0,2}$) for this study leads to questioning the effectiveness of DFA and SOX at reducing securities law violations by public companies. Moreover, there appears to be a direct relationship between the number of security violators and the fluctuations in stock market volatilities. This observation reflects the failure of the first null hypothesis ($H_{0,1}$), which was initially expected. Furthermore, it is not clear if DFA and SOX have benefited the US economy. In fact, complications from the results of DFA and SOX might have done more harm than good.

In conclusion, the number of security violations leads to changes in the volatility of the stock market. Thus, as presented above, laws such as DFA and SOX, may not lead to a decrease in the number of public company securities offenders. As DFA and SOX have not been proven to have a deterrent effect, new means of enforcing securities laws may need to be introduced.

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