*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


# Can Whistleblowers Root Out Public Expenditure Fraud? Evidence from Medicare

Jetson Leder-Luis*

April, 2023

**Abstract**

This paper analyzes private anti-fraud enforcement under the False Claims Act, which compensates whistleblowers for litigating against healthcare providers who overbill the US government. I conduct several case studies of successful whistleblower lawsuits concerning Medicare fraud, pairing new legal data with large samples of Medicare claims. I estimate that deterrence from $1.9 billion in whistleblower settlements generated Medicare cost savings of nearly $19 billion, while imposing low costs on the government. These results suggest private enforcement is a cost-effective way to combat public expenditure fraud.

(JEL Codes: H41, K42, I13, D73)

Acknowledgments: I am grateful for the feedback from James Poterba, Benjamin Olken, Joshua Angrist, Jonathan Gruber, Juan Carlos Suárez Serrato, Alberto Abadie, David Autor, Amy Finkelstein, Kathryn Spier, David Howard, Cory Smith, Jon Petkun, Tal Gross, Keith Ericson, Evan Soltas, Andrew Johnston, and Mohan Ramanujan, as well as all participants of the MIT Public Finance Seminar, the Duke Law Empirical Health Law Conference, and the NBER Training Program on Health and Aging. Research reported in this publication was

*Boston University Questrom School of Business and NBER
Email: jetson@bu.edu

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


supported by the National Institute on Aging of the National Institutes of Health under Award Number P30AG012810. The content is solely the responsibility of the author and does not necessarily represent the official views of the National Institutes of Health. This research was also generously supported by the National Bureau of Economic Research, the Ford Foundation Dissertation Fellowship from the National Academies of Science, Engineering, and Medicine, and the George and Obie Shultz Fund from MIT Economics. I would also like to thank the Department of Justice, ResDAC, the Center for Medicare and Medicaid Services, and the NBER for providing access to data.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


# 1 Introduction

Waste, fraud and abuse are serious concerns in the governmental provision of goods and services. Governments often rely on private firms to execute their spending, such as the procurement of goods or in contracting to provide services, and these firms face strong incentives to divert government funds for their private interest. The government's efforts to combat public expenditure fraud face challenges: increased oversight can be costly or distortive, and bureaucrats themselves face weak incentives to combat waste and fraud as they face limited accountability mechanisms and are not personally responsible for the government's financial mismanagement.

Privatization is a potentially effective way to both elicit private information useful for the detection of fraud and also to provide incentives to catch fraudsters. The False Claims Act (FCA) is a US federal law that allows whistleblowers to recover over-billed money for the government and receive a share of the recoveries. Uniquely, FCA whistleblowers conduct their own litigation on behalf of the government in federal civil court, combining the private information of whistleblowers with the private enforcement of law. This process has generated thousands of whistleblowing lawsuits and recovered tens of billions of dollars since the 1986 enactment of the law. In fiscal year 2018 alone, whistleblowers recovered $2.1 billion for the US government from FCA lawsuits, for which whistleblowers were awarded $301 million (US Department of Justice, 2018). Despite the volume of lawsuits and recovered funds, there has been very little empirical evidence on the False Claims Act's effectiveness at both catching and deterring public expenditure fraud.

The issues of fraud in public expenditure are compounded in the provision of federal health insurance. The US federal government relies heavily on private firms to provide healthcare and reimburses these providers based on self-reported activity. Furthermore, much of healthcare is a credence good, meaning that neither patients nor non-specialist bureaucrats are able to effectively monitor doctors (Dulleck and Kerschbamer, 2006). This information asymmetry provides opportunities and incentives for healthcare firms to increase their profits through misreporting. In contrast,

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


the federal insurer has a limited capacity for monitoring and enforcement. With the US government spending more than a trillion dollars per year on healthcare, even small shares of impropriety can be expensive, prompting concerns about the magnitude of healthcare fraud and generating interest in the ways to combat it. Correspondingly, 55% of False Claims Act whistleblower lawsuits are related to the federal healthcare programs.

In this paper, I examine the economics of whistleblowing under the False Claims Act and empirically measure the costs and benefits of private enforcement, with evidence from Medicare, the American health insurance program for adults over 65 and the disabled. Medicare provides an excellent setting to understand the effects of private enforcement on fraud more generally, as we can observe all relevant expenditures and many of the important social consequences of these policies. First, I model the decision of a whistleblower to litigate, as compared to socially optimal behavior, and discuss the key magnitudes needed to understand whether privatization is efficient. For my empirical analyses, I pair a novel dataset on whistleblower filings and their allegations with a large sample of Medicare claims data from 1999 to 2016 to measure the benefits and costs of whistleblowing. I estimate the deterrence effects of a set of the largest successful whistleblower cases, as well as the public costs of whistleblowing and its effects on patient health outcomes. Overall, I find large deterrence effects, small public costs, and no evidence of negative health effects on patients, indicating that private enforcement is an effective anti-fraud policy.

Private antifraud enforcement involves social benefits, private costs, and public costs, none of which are fully internalized by the whistleblower. In a simple model of whistleblowing litigation, I show how the decision of the whistleblower to litigate differs from the publicly efficient choice. By paying whistleblowers a share of the money recovered, the False Claims Act creates incentives for whistleblowers to conduct enforcement when they expect cases to be profitable, which is proportional to the public cost of the fraud already committed. Yet whistleblowing can also have deterrence effects for which the whistleblower is uncompensated. Whistleblowing can change spending on the types of fraud the whistleblower identifies, called specific deterrence, and can also

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


cause spillovers to inhibit fraudulent billing throughout the medical industry, known as general deterrence.[1] Private enforcement can also risk over-enforcement because whistleblowers do not bear the full costs of their litigation. Lawsuits have both public and private costs, including to the Department of Justice, the court system, and the attorneys of the plaintiffs and the defendants. Whistleblowing can also affect care decisions by providers, with either positive or negative consequences for patient health that are not internalized in the whistleblower's enforcement decision.

To measure these deterrence effects, I analyze the effects of whistleblowing on public spending in four case studies of enforcement related to the Medicare program. These four case studies reflect dozens of lawsuits against hundreds of defendants, grouped by similar allegations of fraudulent conduct. I use a novel synthetic control methodology, which I call "staggered synthetic controls," to estimate counterfactual spending in the absence of whistleblowing. In each case study, the treated group is spending of the type identified by the whistleblower as fraudulent, for the broadest possible sample of potentially affected providers. I compare this treated group against a synthetic control group constructed of similar types of care not affected by the lawsuit. The staggered synthetic controls method allows estimation in a case study design where treated units are on trajectories that are uncommon among potential control units. My method extends existing synthetic control methods by using donor control units that occur asynchronously and estimating a time shift for these units to align them with the treated unit. This extension allows the comparison between similar trends in spending that occur at different points in time, which improves the pre-period fit of the synthetic control group. In effect, this method extends the staggered difference-in-difference approach to synthetic controls. The difference between the treatment and control series measures the specific deterrence effect of the whistleblower lawsuits. Importantly, my analysis does not estimate the counterfactual of whistleblowing versus having no such regime, but rather measures the benefits of these specific cases, taking the enforcement setup as given.

My results show that whistleblowing achieves a high level of specific deterrence, as measured

[1] The distinction between "specific" and "general" enforcement and deterrence comes from Shavell (1991).

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


by the change in spending on the procedures identified as fraudulent by the whistleblowers, netting out increases in spending on substitute procedures. I estimate that total specific deterrence effect of these four case studies is $18.9 billion in the first five years after the suits were filed, compared to a settlement total of $1.9 Billion. On average, specific deterrence is 6.8 times the case's settlement value, but with wide variation in this ratio across case studies. Importantly, these specific deterrence effects do not count the general deterrence value of these cases in deterring other types of fraud not identified by the whistleblower. Therefore, this estimate constitutes a conservative measure of the total deterrence caused by these suits. A variety of robustness checks support the high deterrence value found via the synthetic control method.

The public costs of whistleblowing are modest and are a small fraction of the estimated benefits. These costs include expenditures by the federal agencies that oversee and contribute to the litigation, including the courts, the Department of Health and Human Services, and the Department of Justice. Using data from federal budget reports, I estimate that total federal expenditures were less than $108.5 million in 2018. This indicates that whistleblowing has an extremely high return on investment for federal resources, and that privatization is a promising mechanism for antifraud enforcement. In further analysis presented as supplementary material, I discuss the effects of whistleblowing on provider care decisions and patient health outcomes with a case study on Kyphoplasty. This analysis finds no evidence that whistleblowing harmed patients.

While there has been substantial disagreement in the public sphere over the value of the False Claims Act, there has been little empirical evidence on the effects of this law. Engstrom (2012; 2013) presents descriptive statistics on FCA cases and settlements using similar legal data but does not measure the law's effects on providers and spending. In the accounting literature, Heese (2018) shows that hospitals prosecuted under the FCA are less likely to participate in broad measures of overbilling. In the health literature, Howard and Desai (2020) show that FCA investigations lower angioplasty volume in investigated hospitals, and Howard and McCarthy (2021) show that False Claims Act enforcement deters the overuse of implantable cardiac devices. No paper has quantified

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


the financial deterrence effects of whistleblowing across a generalizable sample of different cases.

This paper also relates to a broader literature on private enforcement and deterrence. Becker and Stigler (1974) suggest the privatization and marketization of enforcement as a way to align the incentivizes of enforcers with those who benefit from the enforcement. Landes and Posner (1975) formalize the theory of private enforcement, and Polinsky (1980) compares public and private enforcement for the imposition of fines. Shavell (1991) formulates the differences between specific and general enforcement of law used here. While the legal literature on private enforcement theory is robust, there has been limited empirical evidence of private enforcement in practice due to data limitations and the relative rarity of private enforcement mechanisms. Notably, private enforcement is widely used to combat self-dealing in securities law; Djankov et al. (2008) and Jackson and Roe (2009) discuss the efficacy of this form of private enforcement, with mixed results.

The main contribution of this paper is on the economics on healthcare fraud, where extant literature has largely not discussed whistleblowing. Silverman and Skinner (2004) and Dafny (2005) describe the financial incentives for misreporting (particularly upcoding) among hospitals. The types of fraud described in those papers were ultimately litigated by whistleblowers under the False Claims Act; this paper fills a gap in the existing literature by evaluating the whistleblowing program that seeks to catch and inhibit the fraud described in those studies. Becker et al. (2005) show that increased state-level Medicaid anti-fraud enforcement by government investigators lead to declines in fraudulent treatment, with no negative patient health outcomes. In recent work, Fang and Gong (2017) use a measure of the time spent on procedures to detect providers who bill Medicare for too many hours.

Finally, the question of the health consequences of whistleblowing reflects a broader concern about access and welfare effects when government services undertake reforms. This is similar in spirit to the analysis of malpractice litigation reforms in Kessler and McClellan (1996), who find no observable harm to patients. In recent work, Eliason et al. (2021) show that anti-fraud regulations in the dialysis ambulance industry do not harm patient health. In contrast, Meckel (2020) shows

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


that reforms intended to limit fraudulent price discrimination in a nutrition-assistance program reduces social welfare by causing providers to drop out.

This paper is organized as follows. Section 2 describes the institutional details of the False Claims Act, and Section 3 models the economics of private enforcement. Section 4 describes the data and provides stylized facts about FCA lawsuits and recoveries. Section 5 measures specific deterrence on a set of case studies using the staggered synthetic control methodology. Section 6 addresses the costs of private enforcement. Section 7 concludes.

## 2 Background

Medical care has a fundamental information asymmetry among providers, insurers, and patients (Arrow, 1963), which creates opportunities for misreporting. Patients are less informed than doctors about the care they need, making healthcare a credence good: patients are not sufficiently able to monitor doctors for bad behavior (Dulleck and Kerschbamer, 2006). Conversely, insurers have limited means of directly observing medical conditions or treatments, and rely on information from providers' claims for payment. This information asymmetry provides opportunities for misreporting by providers, whose billing practices tie directly to their profits. It is difficult to uncover misreporting using top-down enforcement, as insurers often lack other sources of information besides the provider's claim and supporting documentation, which can be manipulated.

When the insurer is the federal government, as is the case with Medicare and Medicaid patients, these problems are exacerbated. Medicare and Medicaid are massive programs, spending respectively around $700 and $400 billion per year (Congressional Budget Office, 2019), creating bureaucratic issues due to the sheer volume of claims. Indeed, the Government Accountability Office (GAO) estimates that $48 billion (8%) of Fee-for-Service Medicare expenditures in 2017 were "improper," that is, they lack necessary documentation to ensure the correct amount was paid to the right person for a valid claim (United States Government Accountability Office, 2019). Not

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


all improper payments are fraudulent, and not all fraud is captured by improper payment measures, but this figure underscores the opportunism that may arise from expensive and overwhelmed federal programs.

With these issues in mind, in 1986 Congress amended the False Claims Act to enable whistleblowers to directly conduct lawsuits against those who overbill the government (United States Department of Justice, 2012). The False Claims Act applies to all claims for payment made to the federal government, but has largely been used against healthcare fraud, overbilling, and misreporting. Under the False Claims Act, individuals who uncover misreporting against the US government, themselves often healthcare workers (e.g., a hospital employee), hire their own attorneys and sue those filing false claims in federal civil court. The whistleblower sues *qui tam*, i.e., on behalf of the US government. These civil court cases have 3 parties: the whistleblower, the defendant, and the US government. The US government has the option to support a case by "intervening" – that is, by assigning its own attorneys to help litigate the case.

False Claims Act lawsuits can be high stakes for all parties involved. These cases are conducted in civil court, and the burden of proof is the preponderance of the evidence, i.e. "more likely than not." Because litigation is expensive, few cases go to trial; unsuccessful cases are often voluntarily dismissed by the whistleblower, and clear-cut cases are settled. In successful cases, the federal government can recover up to 3 times the amount of the proven false claims from the defendants, plus potentially large criminal fines. Upon settlement, the whistleblower is entitled to 15–25% of the recovery amount if the government intervened, and 25–30% if the government did not intervene. Section 4.1 provides summary statistics on FCA lawsuit outcomes.

The ability for the whistleblower to conduct the lawsuit in lieu of the government creates a profit motive for rooting out impropriety that may be otherwise lacking in the federally administered programs. This profit motive is in contrast to the usual incentives of federal bureaucrats, and thus can alleviate principal-agent problems within the government that can cause inefficient investment in monitoring and enforcement. Prosecution initiated by the government also has capacity

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


constraints due to the limited resources of the Department of Justice, while privatized enforcement creates a market for whistleblowing information and generates substantially more litigation than the federal government conducts alone.

Appendix A presents additional institutional details about the False Claims Act.

# 3 Theory of Private Antifraud Enforcement by Whistleblowers

## 3.1 Model

Consider the following simplified model of private enforcement against Medicare fraud under the False Claims Act. This model is motivated by other general models of private litigation not specific to the FCA, including Shavell (1982) and Spier (2007). This model explores the divergence between a whistleblower's private incentives to litigate and the decision a social planner would make.

A whistleblower receives a private signal about fraud occurring against the government, in the form of the probability $\pi$ that they can win a False Claims Act lawsuit, and the amount of fraud being committed as measured by the expected federal recovery amount $R$ (including fines). Whistleblowers are not permitted to represent themselves (United States District Court, D.C., 2003), and the whistleblower makes a joint decision with their attorney of whether to file suit; both parties must agree. The whistleblower and their attorney observe private costs $C_w$ associated with conducting litigation. Attorneys working on contingency expend resources pursuing litigation, most notably their time, which carries a high opportunity cost. A whistleblower attorney may be able to recover some of the costs of litigation from the defense in the case of a successful suit, although this fee-shifting is not always practiced. If the case is successfully pursued by the whistleblower-attorney pair, they expect to receive a share $s$ of the recovery. Then, a risk neutral whistleblower-

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


attorney pair would choose to litigate if:

$$\pi sR > C_w \tag{1}$$

The expected whistleblower compensation $\pi sR$ creates incentives for the whistleblower to come forward with their private information about fraud or misconduct, and can alleviate personal and professional costs arising from whistleblowing on one's employer, as well as the realized costs of litigation, all captured in $C_w$.

The whistleblower and attorney's decision reflects the fact the decision to litigate is increasing in the probability of settlement as well as the magnitude of the recovery, and decreasing in the expected litigation costs. This indicates that, all else equal, whistleblowers and their attorneys are more likely to litigate against large frauds, as well as frauds for which they have the greatest evidence, as evidence can both increase the likelihood of a successful suit $\pi$ and also decrease investigatory litigation costs.

Consider instead the decision of a social planner of whether a particular fraud should be litigated against. Whistleblowers fail to internalize the costs of litigation that they do not bear. The defendant must spend $C_d$ to defend against the lawsuit, and the lawsuit also has public cost $C_p$, reflecting the resources expended by the federal government in oversight and trial of the case.

Litigation by the whistleblower can also produce benefits that whistleblowers fail to internalize. Whistleblowing produces specific deterrence effects $D_s$, measured in cost savings by the government for the type of fraud the whistleblower deters. Figure 1 shows the relationship between spending, damages, and specific deterrence. I define specific deterrence as the difference between spending with and without whistleblowing, integrated after the time of the lawsuit:

$$D_s := \int_{t_s} (S_f - S_w)\delta^{t-t_s} dt \tag{2}$$

where $t_s$ denotes the time the lawsuit initiates, $S_w$ is spending with whistleblowing, $S_f$ is spending

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


with unaddressed fraud, and $\delta$ is a discount factor. In a circumstance where whistleblowers cause a decrease in one specific type of spending but an increase in a substitute procedure, $S_f - S_w$ reflects the net changes in spending.

In contrast, the recovery $R$ is proportional to the damages the government faces. As shown in Figure 1, damages are the integral of fraudulent minus non-fraudulent spending up to the lawsuit:

$$R \propto Damages = \int^{t_s} (S_f - S_n)\delta^t dt \tag{3}$$

where $S_f$ is fraudulent spending without whistleblowing and $S_n$ is spending without fraud. Spending with whistleblowing $S_w$ and spending without fraud $S_n$ may be the same if whistleblowing completely deters fraud and returns spending to a non-fraudulent level. As shown in Figure 1, the relationship between the magnitude of damages and of specific deterrence are governed by the amount of fraudulent spending as well as the extent to which whistleblowing curbs fraudulent behavior.

In addition to specific deterrence, whistleblowing can cause general deterrence $D_g$, not shown in Figure 1. Whistleblowing against a particular fraud may cause providers committing unrelated frauds to stop doing so because they fear being caught. Moreover, the existence of whistleblower lawsuits may deter providers from committing other frauds in the first place. The magnitude of general deterrence is difficult to measure empirically, as it concerns behavior not identified by the whistleblower. However, general deterrence effects must decrease spending on other fraudulent or misreported procedures, because providers are less likely to commit fraud given increased scrutiny. Therefore, I assume $D_g > 0$.

In addition to the financial costs and benefits discussed above, whistleblowing cases may also have impacts on provider decisions over patient care. False Claims Act cases may inform providers' care decisions as they seek to comply with the shifting landscape of regulation and litigation risk. These changes in provider behavior can be consequential to patient health outcomes.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


These changes to patient health outcomes may pose an additional cost $H_c$ if whistleblowing distorts care away from the social optimum, or may provide additional benefits $H_b$ if whistleblowing corrects fraudulent behavior that jeopardizes patient health. This relates to similar research on malpractice liability, in particular Kessler and McClellan (2002), whose model predicts that malpractice liability can cause either inefficiently high or low levels of care. I expect that the health effects of whistleblowing may differ between lawsuits, with some providing positive changes, and others causing negative changes.

From a social welfare perspective, private enforcement by the whistleblower is efficient if the total expected benefits exceed the total costs of the lawsuit:

$$\beta[\pi(1-s)R+\pi D_s+D_g]+H_b > C_w+C_d+C_p+H_c \tag{4}$$

The probability of settlement $\pi$ gives the probability that the government gains the recovery $(1-s)R$, and also governs the probability that specific deterrence effects $D_s$ are produced. I define specific deterrence as the effect of a successful whistleblower lawsuit. General deterrence effects $D_g$, measured in spillovers of this case onto other fraud decisions, can be produced even if the whistleblower's case is not successful; however, the magnitude of general deterrence may vary with factors that correlate to the probability the case is successful, such as the quality of evidence or the magnitude of alleged fraud. Costs, as well as changes to healthcare outcomes associated with litigation, are borne regardless of the outcome of the suit. The whistleblower's share $sR$ is a transfer from the defendant to the whistleblower and does not factor into social welfare. The coefficient $\beta$ governs how the social planner values the financial recoveries and deterrence effects, which they may value at more than one dollar per dollar recovered. For a discussion of exact values of $\beta$ and for more details and insights from the model, see Appendix B.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


## 3.2 Discussion

The difference between the whistleblower's decision as captured in Equation 1 and the social planner's choice in Equation 4 highlight some of the key issues facing private antifraud enforcement.

Whistleblower cases have the potential for valuable specific deterrence effects $D_s$, which contribute to the public good but not to the whistleblower's decision. Following a lawsuit, both the defendants and other providers of the same care face incentives to change their behavior to avoid further litigation or to comply with the terms of their settlement agreements. Defendants face potential exclusion from the Medicare and Medicaid programs for noncompliance with their settlements. Because the defendants may be only a small share of those committing litigable behavior, these specific deterrence effects have the potential to affect providers far exceeding the scope of the settlement.

This model gives rise to a set of cases where the private and public interests diverge. If damages prior to the whistleblower's signal are small, the expected recovery $R$ may be too small to be worth pursuing by the whistleblower, and the inequality in Equation 1 fails to hold. Yet from a social welfare perspective, these cases might be valuable to litigate if the deterrence value would be large. For example, a small trickle of fraud in perpetuity could have a low recovery but a high deterrence effect if enforced against. In contrast, there are potential circumstances in which the specific deterrence values are small. Specific deterrence is the difference between spending with and without whistleblowing, and when these values are similar then specific deterrence is small. This could occur when the increase in spending due to fraud all occurs before the whistleblower files, and future spending would look the same with or without whistleblowing. In this circumstance, the settlement serves as a transfer from the defendant to the government and whistleblower for past bad actions, but there is no specific deterrence. However, there may be general deterrence effects, if observing this transfer changes others' beliefs about their own enforcement probability or about the profitability of fraud. Another circumstance with little specific deterrence effect is one in which whistleblowing is not meaningful; for example, if fraud continues to be profitable

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


even following a settlement, whistleblowing may not deter future bad behavior of the same sort, and $S_f - S_w$ is small. In these circumstances, whistleblowing is potentially inefficient because the settlement only serves to correct retrospective damages, and the lawsuit incurs its full costs without providing social value into the future.

The value of the deterrence effects $D_s + D_g$ is policy-relevant in evaluating the compensation of whistleblowers. Whistleblowers are paid a portion of the settlement recovery, which is itself proportional to the amount of damages due to pre-settlement overbilling. Therefore, whistleblowing compensation is purely *retrospective*. However, the value of whistleblowing depends on both the settlement and the deterrence effects, the latter of which does not factor into whistleblower compensation. This disconnect between whistleblower compensation and whistleblower value-added may indicate that whistleblowers are inefficiently compensated, as they do not internalize the public good element of the deterrence they provide. As an alternative policy, whistleblowers could be compensated based on both settlement and their ex-post deterrence effects, for example through a contract that pays the whistleblower for a proportion of the deterrence realized after their suit. This discussion ties directly to the literature on incentives for private enforcers, as discussed by Polinsky (1980).

The value of the private enforcement regime relies on the extent to which the benefits of whistleblowing outweigh its costs. This motivates an analysis of both the deterrence effects and health consequences of False Claims Act lawsuits. Section 5 undertakes an exercise to measure the deterrence effects of the largest whistleblower cases, and Appendix G undertakes a case study of the health effects of a set of whistleblower lawsuits against a spine surgery procedure.

# 4 Data and Descriptive Statistics

The data for this project come from a variety of complementary sources which aggregate information on whistleblower cases and their downstream impacts on medical care provision and patient

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


health outcomes.

Data on whistleblowing at the lawsuit level comes from a Freedom of Information Act (FOIA) request I conducted on the Department of Justice in 2018 for data on all completed (settled or dismissed) whistleblower-filed FCA suits (Department of Justice, Civil Division, 2018). These data describe almost 6,000 whistleblowing cases and include information on the defendant, whistleblower, filing date, federal agency to which the case relates, federal court district of filing, government intervention election status and date, settlement amount, and whistleblower share. These data start with the introduction of the law in 1987, and the coverage declines after 2012, as many newer cases are still under seal. These data are used for descriptive statistics and stylized facts in section 4.1, as well as for providing supplementary information on whistleblower lawsuits for each case study in Section 5. Appendix C describes the data cleaning process.

The FOIA data from the Department of Justice do not contain allegations of conduct by the defendants, which is necessary to trace the effects of lawsuits in the Medicare claims data. To find such allegations of fraud, I scraped the Department of Justice "Justice News" archive website for all press releases related to Medicare and whistleblowing. For the cases analyzed in this paper, I also collected whistleblowers' original court filing documents (complaints), settlement agreements, and other court documents from a variety of sources. These documents detail exact filing dates, settlement timing, allegations of fraud, and the conduct covered by the settlement agreements. Sources for these documents include the federal court record system (PACER), the Department of Justice digital archives, SEC filings of publicly traded companies, and the legal database of Taxpayers Against Fraud, a not-for-profit supporting whistleblowers' attorneys. Combined with the press release and FOIA data, the court filings give a complete picture of the allegations and outcomes for a subset of the whistleblower lawsuits for which I conduct case studies. Section 5 describes this process and presents its results.

Data on Medicare claims and payment are necessary for the analysis of the medical and fiscal impacts of whistleblowing cases. My available data include 100% samples of Fee-for-Service

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


Medicare, i.e. Parts A and B, from 1999–2016, for inpatient, outpatient, hospice care, durable medical equipment, home health care, and skilled nursing facilities; and 20% samples of the carrier files that reflect physician office visits (Center for Medicare and Medicaid Services, 1999-2016). These data, containing mostly 100% samples of each type of care over nearly 20 years, cover tens of billions of claims from hundreds of millions of patients. Section 5 presents the methodology by which I selected whistleblowing cases for analysis, which translates into the usage of these data. Medicare data are used only as they related to each case presented there, and for the analysis of patient health outcomes in Appendix G. As such, only a portion of the available data is used in these analyses, reflecting the "needle in a haystack" aspect of Medicare overbilling.

Information on the costs of whistleblowing comes from a different set of data. The Department of Justice does not publish data on the costs of FCA lawsuits directly. Data on public expenditures related to civil enforcement were culled from federal budget reports, particularly the 2018 Health Care Fraud and Abuse Control Program Annual Report from the Department of Health and Human Services and the Department of Justice (The Department of Health and Human Services and The Department of Justice, 2019). Other data on costs were gathered from the Department of Justice Qui Tam Fraud Statistics (US Department of Justice, 2018) and the budget of the federal judiciary (Administrative Office of the US Courts, 2017).

## 4.1 Descriptive Statistics about False Claims Act Lawsuits

Table 1 presents descriptive statistics about False Claims Act lawsuits. I observe 5,967 lawsuits, of which 3,269 (55%) are healthcare-related. Of the healthcare cases, only 35.7% result in a recovery of funds; the rest were dismissed by the whistleblower, the judge, or the Department of Justice. This points to a high level of cases for which the federal government receives no compensation, underscoring questions about the value of the False Claims Act.

Both the settlement amounts and the whistleblower shares have high variance reflecting very long right tails. The median settlement amount for healthcare-related whistleblower lawsuits is

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


$1.5 million, but the mean is $22.7 million and the standard deviation is $87 million. Total settlements amount to $26.47 billion, for which whistleblowers were paid a total of $4.23 billion, with a median of $250,000 per case. Similarly, whistleblower cases take a highly variable amount of time. The median healthcare whistleblower lawsuit length, defined as the time from filing to case closure, is 964 days (2.6 years) with a standard deviation of 800 days (2.2 years).

Appendix Figure A1 shows the trend of healthcare whistleblowing cases by year of filing and whether they end in a settlement. Settlements rose between 1990 and 1995 to around 75 cases per year, and have stayed rather constant since. Conversely, the total number of cases and the share of dismissed cases have both risen substantially since 1987, and continue to grow. Cases that are ultimately dismissed now constitute the majority share of whistleblowing. Naturally, the settling or dismissal of cases does not reveal their underlying merit – some meritorious cases are dismissed (for example, due to cost reasons) while some frivolous cases settle, (for example if the defendant is particularly risk-averse).

While the number of settled cases has remained steady since 1995, total settlement dollars have risen immensely. Total settlements were just $80.6 million in 1995, when the number of settled cases reached its steady state of around 75 per year. However, settlement totals exceed $4 billion in 2012, the last year of the data. The 2012 total was in a large part due to a single $1.5 billion settlement against GlaxoSmithKline for allegedly promoting its pharmaceuticals for non-FDA-approved uses.

The Department of Justice Data also include lawsuits from outside of the medical field, and exhibit the broad use of the False Claims Act. Medical-related suits, those categorized by the DOJ as relating to the Department of Health and Human Services, the Food and Drug Administration, or the Center for Medicare and Medicaid Services, constitute 55% of cases. Suits regarding the Department of Defense account for 11% of the nearly 6,000 whistleblower lawsuits, and cases have arisen from nearly all parts of the federal government, including the Department of Education (3% of cases) and the Goods and Services Administration (2% of cases). The use of FCA whistleblow-

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


ing outside of the medical field is beyond the scope of this paper and presents an opportunity for future research.

# 5 Deterrence Effects: Method and Results

The deterrence effects of whistleblower lawsuits are a key component in the economic tradeoffs described in the model in Section 3. If deterrence effects are large, whistleblower lawsuits not only provide recovered funds for the government, but also save the government money in the form of fraud not committed.

As discussed in Section 3, deterrence from a whistleblowing lawsuit takes two forms: specific deterrence, from changes in spending on the type of care that the whistleblower identifies as fraudulent, and general deterrence, from reduced spending on other types of fraud due to increased litigation risk. In simpler terms, specific deterrence is the main effect of the lawsuit, and general deterrence captures the spillover onto other types of fraud. This analysis measures the dollar value of the specific deterrence of whistleblower cases.

The section proceeds as follows: first, I describe the econometric method for the analysis, which uses staggered synthetic controls to estimate the treatment effect of whistleblower lawsuits on healthcare spending. Second, I describe the lawsuits that serve as case studies, which are the largest whistleblower cases for which I have data. Finally, I apply the method to these case studies and find that whistleblowing produces large specific deterrence effects, saving the government nearly $19 billion in deterred fraud from just $1.9 billion of settlements. The cases I analyze account for roughly 7% of total whistleblower healthcare settlements. I conduct a series of robustness checks that support these results. Importantly, specific deterrence does not count the spillovers of these lawsuits onto other types of fraud, and therefore this estimate provides a lower bound of the total deterrence effects of the FCA.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


## 5.1 Method

The measurement of deterrence requires an analysis of a counterfactual, between the real world in which enforcement happened and one in which it did not. Synthetic controls, first introduced in Abadie and Gardeazabal (2003), provide a method by which to produce such a counterfactual. Here, the treatment group is the type of spending identified by the whistleblower as fraudulent, and the treatment effect of interest is the change in spending following whistleblowing. The treatment date is the filing of the first related whistleblower lawsuit. The control groups are other types of medical care or other providers that are not treated by whistleblowing, but saw similar rises in spending. Synthetic controls use untreated control groups to construct a series that most closely matches the treated unit in the pre-treatment periods. The difference between the treated unit and the synthetic control group in the post-treatment periods estimates the treatment effects.

Traditional synthetic controls make the assumption that the counterfactual of the treated unit in the absence of treatment can be captured by using a set of controls with contemporaneous time patterns (for example, in the factor model given by Abadie et al. (2010)). However, whistleblowing often affects types of care with unusual trends: they exhibit high growth in spending and claims, potentially driven by the improper conduct of the defendants. This means that there may be few control units on similar trajectories, and a sparse donor pool can lead to a poor fit in the pre-treatment periods when the contemporaneous control groups do not have such trends. The increases among control units may have been due to unchecked fraud or other profit-centered changes in billing practice.

Rather than comparing the treated unit to contemporaneous controls, I consider control groups that saw a similar rise in spending at other points in time but were not subject to enforcement by whistleblowers within the sample period. The rise in spending on control units used here were also potentially driven by fraud; the specific control units given weight by the method are presented in the results section, and many are indeed other forms of fraud that were eventually enforced against, much later. This method makes the assumption of a similar growth trajectory at different points in

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


time between treated and untreated units in the absence of whistleblowing. Appendix D.1 presents an econometric model consistent with this assumption that motivates the use of staggered synthetic controls, modeled after Abadie et al. (2010). Under this model, the staggered synthetic control method can estimate the counterfactual spending of the treated unit, as though it were untreated, by producing a synthetic control group constructed as a weighted combination of untreated units.

This modification of synthetic controls relies on different assumptions than standard synthetic controls. In effect, this model assumes that the "life cycle" of the fraudulent procedure dominates any common time effects. However, this raises concerns about time-varying confounders, as well as concerns about spillovers between treated units and control units due to their asynchronous timing. Section 5.5 presents a series of robustness checks that further address these issues, which find similar estimates of the deterrence value.

Figure 2 provides a simple graphical explanation of the staggered synthetic control method for two controls, one shifted forward in time and one shifted backward. The method is implemented with a two step procedure. First, I estimate a time shift for each control unit by finding the time shift with the best pre-period fit between the control group and the treated unit. Second, I construct a synthetic control group by estimating weights for the time-shifted controls. The resulting synthetic control group is used to estimate the counterfactual of the treated unit in the absence of enforcement.

For each case study, I estimate the deterrence effect by integrating the difference between the observed spending and the synthetic control in the post-lawsuit period. Appendix D.2 provides the technical details of the implementation of the shifting, weighting, and deterrence integral estimation. When the type of care treated by whistleblowing has a clear substitute, e.g., inpatient and outpatient medical care, I consider the net change in spending by applying the synthetic control method to both the treated unit and its substitute.

The deterrence values presented in this paper are computed using 5 years of post-treatment effects at a 10% discount rate, which is a conservative estimate. In the absence of whistleblowing,

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


fraud or abuse may have continued indefinitely into the future, in which case the total deterrence effect would be a perpetuity, providing value at all later periods. Rather than assume that the deterrence effects persist indefinitely, the use of 5 years of post-treatment effects avoids excess extrapolation. Fundamentally, the specific deterrence being measured here is a lower bound of the total deterrence effect, as it also does not include the general deterrence effect, i.e. the spillover of these lawsuits onto deterring other types of fraud.

This method extends the use cases for synthetic controls. Traditional synthetic controls are only useful when there are contemporaneous control units that experience similar patterns to the treated unit in the pre-treatment period. This fails in circumstances where the treated unit is on a rarely seen trajectory. In these circumstances, the staggered synthetic control method can estimate the treatment effect on the treated unit from the pattern of the other similar, untreated units that occur asynchronously. In this sense, it extends the staggered difference-in-difference approach to synthetic controls. This method could be used for a variety of applications in circumstances where traditional synthetic controls produce a poor pre-period fit but the researcher would like to use control units from different points in time.

In order to conduct inference on my results, I employ a permutation test as per Abadie et al. (2010). Each synthetic control is substituted in for the treated unit, and the same two-step procedure detailed above is performed, fitting leads and lags and constructing weights, using all other controls. These weights give a synthetic control unit for the placebo, from which the deterrence measurement can be computed. The deterrence effects corresponding to each control unit form an empirical distribution against which the deterrence effect of the treated unit can be compared.

For further robustness, I produce estimates of deterrence that do not rely on controls, but instead take the approach of projecting the pre-enforcement trend. Section 5.5 describes these methods and results.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


## 5.2 Case Selection

An ideal study of whistleblowing would analyze every whistleblower lawsuit to compute deterrence effects; however, such an analysis is impossible. There is no complete database that provides information on the allegations of fraud of whistleblower lawsuits, including the Department of Justice FOIA Data. Each lawsuit must be researched individually through Department of Justice press releases and publicly available federal court filings. Some whistleblower documents remain under seal, and so the whistleblower's allegations are not available whatsoever. Even for unsealed lawsuits, finding corresponding claims in the Medicare data requires a thorough understanding of medical billing for the procedure, which has changed extensively over time.

The difficulty of mapping from lawsuits into the medical claims data motivates a case study design. The summary statistics presented in Section 4.1 show that a few large whistleblower cases dominate the settlement totals and amounts paid to whistleblowers. Therefore, I undertake a case-study based design of the largest whistleblower cases that are feasible to analyze.

Many lawsuits contain similar allegations of fraud and therefore must be treated as a single case study of enforcement. The FOIA data contain 3,269 healthcare lawsuits through 2012, of which 1,167 were successful, but there are no allegations of conduct tied to the FOIA data. To collect the allegations of fraud by whistleblowers, I scraped the universe of 325 press releases from the Department of Justice "Justice News" website that relate to Medicare and whistleblowing, from 1994 (the start of the archives) through 2014.[2] The 325 DOJ press releases contain details on 170 potential cases, after excluding press releases that could not theoretically be linked to the Medicare data. From these press releases, I hand-coded lawsuits that contain similar allegations of misconduct in similar types of medical care into a single case study: the 170 press releases are grouped into 54 case studies, and I focus on the four case studies with settlements over $100 million that can be identified in the data. For example, one case study is the misuse of the outlier payment

[2] 2014 is chosen as it ensures that cases are filed early enough for use in the synthetic control methodology, which requires 5 years of post-filing data.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


system, which contains 11 press releases from different settlements with similar allegations. Table 2 lists the four case studies with the largest total settlement amounts for which I have data, which comprise 29 press releases detailing $1.9 billion in total settlements. While presented as four case studies grouped by fraudulent conduct, these case studies reflect lawsuits against hundreds of providers, and represent about 7% of total healthcare whistleblower settlements. For each case study, I use court documents including whistleblower complaints and settlement agreements to gather details about the alleged conduct and guide the analysis of claims.

A number of case studies were omitted from analysis, including enforcement that precedes the start of my data, or allegations related to falsification not visible in the Medicare claims. Appendix E describes the case selection process in greater detail, and Appendix Table A3 provides additional details about case studies not selected. The most important reason for not selecting cases is that the timing of the lawsuit precedes the first year of Medicare data available.

## 5.3 Case Details

The following case studies examine the effect of FCA lawsuits on the type of spending identified as fraudulent by the whistleblower, using the staggered synthetic control methodology described above. For each case study, I select controls that are appropriate based on the nature of the case. There are two general sets of potential control units for synthetic controls in this setting: spending on other types of medical care not named by the whistleblower, and spending at other non-defendant providers on the same type of medical care. Using other types of care as controls relies on the assumption that other types of medical care are on similar trajectories as the treated unit. In contrast, using non-defendant providers as controls relies on the assumption that other providers were not affected by the lawsuit, which may not hold in some cases. Therefore, for the first three case studies, where the behavior identified as fraudulent by the whistleblower shows a large change in total volume, which indicates non-defendants were affected, I use different types of medical care with similar pre-enforcement trends as controls. For the last case study, where behavior was lo-

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


calized to the defendants, I use spending at other non-defendant providers on the same type of medical care, focusing on controls groups geographically separated from the defendants.

As a robustness check, for each method I also present robustness estimates not using controls, estimated by carrying forward the pre-enforcement trend in fraudulent spending at defendant providers. In contrast to the other methods, this makes assumptions about extrapolation from past trends rather than assumptions about controls.

#### **5.3.1** Outlier Payment Falsification

The first case study concerns the misuse of outlier payments for inpatient hospitalization, for which over $900 million in settlements was recovered by the government between 2004 and 2010. Medicare pays providers of inpatient medical care a fixed reimbursement amount for the diagnosis related group (DRG) under which the patient is coded. By fixing reimbursement for each diagnosis, providers have incentives to keep costs down. However, this raises concerns that providers would be unwilling to treat high-cost patients. To mitigate this adverse selection effect, the Medicare system contains a provision for outlier payments, which are additional reimbursements for very-high-cost patients. Before 2004, to qualify for outlier payments, a patient must have exceeded a cost threshold, computed with a complicated formula based on the provider's labor costs, capital costs, historic charges, and a geographic adjustment factor.[3] This formula provided an opportunity for misreporting: by manipulating their historic costs, hospitals were able to change their thresholds and collect more outlier payments.

On November 4, 2002, Tenet Healthcare, a large investor-owned hospital company, was sued under the False Claims Act for manipulating its cost reports in order to illicitly receive additional outlier payments. This lawsuit was settled in June, 2006, with Tenet paying $788 million to resolve these allegations without admission of guilt. The DOJ press releases describe 10 other settlements for alleged manipulation of outlier payments. Appendix F.1 contains additional details about the

[3] Rawlings and Aaron (2005) provide a detailed analysis of this computation.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


related lawsuits.

Tenet settled the outlier case for $788 million, but outlier payments were around $500 million per month at the time of the lawsuit, and declined by more than half following litigation. This indicates that outlier payment manipulation was widespread, and therefore, I use outlier payments from all hospitals as the treated unit. Then, to construct controls, I use spending on other types of medical care. I consider that outlier payments constitute their own type of spending by the Medicare system, and they are an accounting measure rather than a medical treatment *per se*. Therefore, for its controls, I consider the other broad types of payments made by Medicare that are of comparable scale, including durable medical equipment, home health care, hospice care, nursing care, and disproportionate share payments for hospitals that serve many low-income patients. Analysis is conducted at the month level for each type of spending.

#### **5.3.2** Medically Unnecessary Botox

The second case regards medically unnecessary usage of Botox. Despite popular branding as an anti-wrinkle procedure, Botox is FDA-approved for a number of important medical uses, including treatment of crossed eyes (strabismus) and neck spasms (cervical dystonia). Medicare covers medically necessary Botox injections for FDA-approved uses, but not for non-FDA-approved uses.

Between 2007 and 2009, Allergan, the sole manufacturer of Botox, was sued by a set of whistleblowers who alleged that Allergan had illegally promoted Botox for non-FDA-approved ("off-label") uses, including headaches. In order to ensure that Medicare would pay for the injections, Allergan allegedly instructed physicians to miscode the injections, using diagnosis codes for approved uses. Additional details about the outpatient coding of Botox and the whistleblower lawsuits are presented in Appendix F.2. On August 31, 2010, Allergan settled with the federal government for $600 million, of which $210 million was for federal civil liability (primarily Medicare overbilling), $375 million was a criminal fine, and $14.85 million was to recompense affected state Medicaid programs.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


The False Claims Act settlement against Allergan lists a set of outpatient billing codes and diagnosis codes that were subject to fraud. I consider all spending that falls under these codes to be the treated unit, by all providers. For the synthetic control design, fraudulent Botox spending is compared to other outpatient procedure codes that saw similar pre-whistleblowing levels and trends in spending, also by all medical providers. The unit of analysis is the code-month level. Appendix F.2 contains additional details about these control units.

The Botox case study is somewhat unlike the other False Claims Act lawsuits studied here, because following its settlement, Botox received FDA approval for migraines, approving the behavior that the whistleblower had indicated as fraudulent. I discuss these issues more in the results section, and show how my estimates change if the Botox case study is excluded.

#### **5.3.3** Unnecessary Inpatient Kyphoplasty

Kyphoplasty is a spine procedure to repair vertebral compression fractures that cause pain and deformity of the back, often observed among patients with osteoporosis. Kyphoplasty involves the percutaneous (through the skin) injection of bone cement into an inflatable balloon placed within the affected vertebra. Because the procedure is performed percutaneously, kyphoplasty can be safely conducted as an outpatient procedure. The kyphoplasty procedure was developed, patented, and marketed by the company Kyphon, which sold a spine surgery kit as well as other related medical devices. Hospitals using the kyphoplasty procedure on Medicare patients would purchase the equipment from Kyphon and bill Medicare for the procedures that used these kits.

In December, 2005, Kyphon was sued by FCA whistleblowers who alleged that Kyphon illegally promoted the procedure as an inpatient procedure as opposed to outpatient. By doing so, hospitals received greater reimbursement for the treatment, allowing Kyphon to charge more for its products. Hospitals kept patients for a short inpatient stay so they could receive the inpatient reimbursement level for a low amount of inpatient care. Inpatient stays under the relevant diagnosis-related groups (DRGs) were reimbursed in the $6,000 - $11,000 range, as opposed to

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


outpatient kyphoplasty which was reimbursed between $500 and $2,000.

In May 2008, Kyphon settled these allegations with the Department of Justice for $75 Million, without admission of guilt. Between 2009 and 2015, the DOJ released another 9 press releases detailing settlements with 140 hospitals having performed unnecessary inpatient kyphoplasty. The sum of the settlements against Kyphon and the defendant hospitals was $214.2 Million. Appendix F.3 provides additional details for these lawsuits. For the treated units, I analyze monthly inpatient spending at all hospitals on short stays of 7 or fewer nights under the inpatient DRGs promoted by Kyphon, and monthly outpatient spending on all spine procedures at all medical providers. As controls for short-stay inpatient visits, I use inpatient spending at all hospitals for short stays of 7 or fewer nights under other DRGs that saw similar rises in spending. For controls on outpatient spine procedures, I use spending on other outpatient surgical procedures on the musculoskeletal system at all providers. Appendix F.3 describes the coding of inpatient and outpatient kyphoplasty and the control units used.

#### **5.3.4** Unnecessary Inpatient Admission

The fourth case study concerns the unnecessary admission of Medicare beneficiaries for inpatient care at hospitals, instead of receiving observational or outpatient care. Many of these patients presented at the hospital's emergency department and should have been held under observational or outpatient status, which are reimbursed much less than inpatient care. The first successful lawsuit of this type was filed in October 2004, and in total, 7 settlements were reached regarding 135 hospitals for a total of $172.3 million in recovery between 2007 and 2014. The majority of the enforcement comes from the settlement with Community Health Systems, the nation's largest operator of acute care hospitals at the time, which settled for $98 million in 2014 for similar conduct in 119 of their hospitals. Appendix F.4 provides additional details about these lawsuits.

Inpatient admission is a broad class of medical care, with many different billing codes, and therefore an analysis which compares different types of care is unfeasible. Moreover, the few

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


hundred million dollars of fraud in this case is unlikely to have affected the hundreds of billions of dollars of inpatient Medicare spending nationwide. Therefore, instead of using a control strategy based on comparing different types of care, I consider a control strategy comparing different providers and their admissions patterns. The set of potential controls for the defendants are all other hospitals not litigated against for unnecessary inpatient admissions. To mitigate spillover effects into the control groups, I restrict the controls to hospitals in states that contained no defendants. These hospitals treat different patient pools than the defendants and are less likely to have doctors or administrators cross-employed with the defendant hospitals.

The outcome variable in this case study is total inpatient spending at the defendant hospitals or the control hospitals, and for the substitution effect, total outpatient spending at those hospitals, at the month level of analysis. For each of the defendants, I construct a random sample of 100 control units, where each control group contains the same number of hospitals as the defendant. For example, two defendants were chains of 6 hospitals each; I create 100 control units of 6 randomly grouped control hospitals, drawn with replacement, from the set of controls. Similarly, to measure substitution by the defendant providers to increased outpatient expenditure, I use randomly grouped outpatient providers from the unaffected states. Appendix F.4 provides further details about this process.

## 5.4 Results

Figure 3 shows the main results of the synthetic control method. In 3 of the 4 case studies, all except Botox, whistleblowing caused a large decline in spending relative to the synthetic control unit, indicating strong specific deterrence effects of whistleblowing on fraudulent provider behavior. Each case study is analyzed at the month level, and each outcome variable is total payments from Medicare. In each case study, the pre-treatment fit of the treated unit on the controls is excellent, indicating that the synthetic control method successfully replicated the trends of the treated unit. Appendix Table A2 reports the Root Mean Square Prediction Error for each synthetic control

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


analysis.

Table 2 also summarizes the deterrence effects for these cases and provides totals, deterrence values, and deterrence-to-settlement ratios. These 4 whistleblower case studies produced deterrence effects totaling to $18.9 billion, compared to settlements of just $1.9 billion. The mean deterrence effect for these cases is 6.8 times the settlement value. There is substantial heterogeneity in the deterrence ratios, from a small negative deterrence effect in the Botox case to a particularly high positive deterrence ratio for the Outlier Payments case. Notably, the deterrence metric used here is computed using a discounted difference between the treated and control units for only five years after the filing of the case, giving 0 weight to deterrence effects beyond five years, and does not include general deterrence effects, i.e. spillovers to other types of fraud. Therefore, this is intentionally conservative in measuring the total deterrence effects of whistleblowing.

The largest of these effects is in the Outlier Payments case (top left in Figure 3): the 5-year discounted deterrence measurement for the outlier payments computed is $17.46 billion, which is roughly 19 times the total settlement value of the outlier whistleblowing lawsuits of $923 million. Visually, the synthetic control method estimates the rise of the outlier payments system at roughly a linear trend equal to its pre-period rise in the absence of whistleblower enforcement. The magnitude of the deterrence is driven by the scale of spending on outlier payments, which exceeded $500 million per month in its pre-whistleblowing peak, and then dropped off substantially following the lawsuits.

Notably, for the Botox case (top right in Figure 3), there is a small negative deterrence effect: Botox spending exceeds the synthetic control group post-lawsuit. The 5-year discounted deterrence effect is −$41.67 million, around 7% of the settlement value of $600 million. One potential reason for the negative deterrence effect is that Botox gained FDA approval for migraine coverage about 2 months after settling with the Department of Justice for illegally promoting botox for headaches (Singer, 2010). Because civil litigation and settlement negotiations can stretch out for indefinite periods of time, it is possible that Allergan timed the settlement to coincide with its expected FDA

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


approval, although the original whistleblower complain indicated that, at least when the off-label promotion was conducted, Allergan knew it lacked evidence to support FDA approval.

This case exhibits that deterrence effects are not necessarily positive, and that the future value of misconduct is not necessarily large when compared to the past costs and settlement amount. In this circumstance, the $600 million settlement paid by Allergan to the US functioned as a penalty for promoting its product for a use that was not yet FDA approved. But given that FDA approval did ultimately arise, the future value of the damages and the specific deterrence effect are small. Because the Botox case study is different than the others in its context, the reader might consider how these results would differ if this case were excluded; Appendix Table A1 repeats the analysis in Table 2, excluding the Botox case. The deterrence effects total $18.96 billion, compared to settlements of $1.31 Billion, and the average per-case deterrence ratio is 9.1.

For the Kyphoplasty case (bottom left) and Unnecessary Inpatient Admissions case (bottom right), Figure 3 shows that inpatient spending declined relative to the respective synthetic controls. The short-stay inpatient deterrence total for the Kyphoplasty case is $538.9 million. For the Unnecessary Inpatient Admissions case, I graph results for the Community Health Systems lawsuit, the largest defendant by far. Inpatient deterrence for the defendant Community Health Systems is $693.2 million, and the total inpatient deterrence for all defendants is $1.124 billion. Appendix Figure A2 shows the deterrence effect on other defendants. These decreases in inpatient spending must be weighed against expected increases in outpatient spending. Figure 4 plots the substitute outpatient spending for these cases. In the Kyphoplasty case, the increase in outpatient spending on all spine procedures totals to $257.8 million; when compared with an inpatient spending decrease of $538.9 million, this results in a net deterrence effect of $281.1 million. For the Unnecessary Inpatient Admissions case, outpatient spending at the defendant CHS did not rise relative to the control providers. Appendix Figure A3 displays the similar synthetic control setup for each of the other defendants' outpatient spending, and shows heterogeneity, with some defendants' outpatient spending rising post-lawsuit and others' falling. The total deterrence from decreases in outpatient

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


spending is $96.9 million.

Many of the particular control units that comprise the synthetic controls in these case studies were also due to fraudulent spending, which supports the validity of these controls to estimate the spending trajectory of the treated unit. Appendix Table A4 shows the synthetic control weights and time shifts for the control units for the Outlier case. Most of the synthetic control weight is placed on disproportionate share payments, with only a 1-month time shift. Disproportionate share payments operate very similarly to outlier payments in that they are additional payments for inpatient stays, and were also subject to later whistleblower lawsuits for overuse.[4] Appendix Table A5 shows the weights for the Botox case study among other outpatient CPT codes. Similarly, the top 2 controls by weight, retroperitoneal ultrasound and debridement, which were given 60.2% and 22.6% respectively by the synthetic control process, were also subject to enforcement for fraudulent overbilling at much later dates. In the Kyphoplasty case, Appendix Table A6 shows that 43.1% of the synthetic control weight was placed on inpatient rehabilitation; as with the other case studies, rehabilitation was eventually the subject of anti-fraud enforcement due to overuse and improper billing.[5] The ultimate enforcement against the most heavily weighted control groups for fraud at later dates supports the validity of these control groups in estimating counterfactual spending without whistleblowing.

Overall, these results indicate that the specific deterrence benefits of whistleblowing cases often exceed the settlement values many times over, and greatly exceed the retrospective damages used to compute those settlement values. This indicates a large savings to the Medicare program as a result of these whistleblowing cases, exceeding both the recoveries to the government from the settlement as well as the whistleblower compensation.

[4] See, e.g., Department of Justice Office of Public Affairs (2009), for one such settlement.

[5] See, e.g., Department of Justice Office of Public Affairs (2019), where the nation's largest inpatient rehabilitation provider was sued under the False Claims Act for unnecessarily admitting patients, as well as miscoding them, and settled for $48 million.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


## 5.5 Inference and Robustness

I conduct inference on the synthetic control deterrence estimates using permutation placebo testing, following Abadie et al. (2010). For each control, I construct a staggered synthetic control unit using all other control groups in the donor pool, and then construct the placebo deterrence value. I then compare the real estimated deterrence to the distribution of these placebo deterrence values. I conduct a 1-tailed test, which counts what fraction of placebos exceed the value of the treated unit's deterrence amounts, comparing positive deterrence values to other positive deterrence values and negative to negative.

Appendix Table A7 presents the results of the placebo test. These results indicate that the deterrence effects found are not due to chance. The deterrence total for the Outlier Payments case exceeds 100% of the placebo units. The small negative deterrence effect for Botox – that is, increased spending after whistleblowing – exceeds all but 3 of the 93 controls, indicating that this effect is statistically different from 0 despite the small magnitude. For the Kyphoplasty case, the reduction in inpatient spending exceeds 26 of the 30 placebos, and the corresponding increase in outpatient spending exceeds 14 of the 15 placebos. For the Unnecessary Inpatient Admissions case, there is strong evidence that the reduction in inpatient spending is not a chance finding; the 5 largest defendants (of 7) exceed between 93 and 99 of the 100 placebo units. However, substitution to outpatient spending shows mixed results, including statistically significant values in both the positive and negative direction. This mix of positive and negative effects indicates heterogeneity in how whistleblowing changed substitute outpatient spending at the defendant hospitals. Some hospitals may have reduced total volume after being sued, causing both inpatient and outpatient spending to decline, while others substituted from inpatient to outpatient spending. Taken together with the good pre-period fit shown in Figure 3, the placebo results indicate that the staggered synthetic control method measures large, statistically significant deterrence effects due to whistleblowing.

One potential concern about staggered synthetic controls is that controls that are shifted back-

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


ward in time to match the treated unit could potentially be contaminated by the event in question. If the event contaminates the controls, the pre-period fit of the controls on the treated unit would be an invalid way of constructing an estimate of the counterfactual untreated series. To mitigate these concerns, I repeat the staggered synthetic control exercise with the additional restriction that controls are only shifted forward in time; that is, the trends of the controls used in fitting the pre-period occurred exclusively before the treatment date, and therefore cannot be contaminated by spillovers. Appendix Figure A4 presents the corresponding figure for this analysis. The figure is nearly indistinguishable from the original Figure 3, and the deterrence measurements are nearly identical, if only slightly greater than the original estimates. Therefore, spillovers onto the staggered controls are not a source of bias in this analysis.

The staggered synthetic control methodology differs from the traditional synthetic control methodology of Abadie et al. (2010) in that it assumes common time trends but not common calendar-time shocks. To mitigate concerns that this is a source of bias, I partial out time fixed effects (at the month level) for both the treated unit and its controls, and then re-estimate the staggered synthetic control model. Appendix Figure A5 presents the main effects of this analysis, and Appendix Figure A6 shows the effects on the substitute procedures. The total deterrence effects from this method are $27.6 billion, or around 1.5 times the main specification's estimated deterrence. The deterrence estimates of the Outlier Payments case are largely increased under this specification, while the deterrence estimates of the Kyphoplasty case are diminished. Qualitatively, Appendix Figure A5 shows good pre-period fits from the control units, and the same pattern of divergence between the synthetic control and the treated unit in the post-treatment period. Removing time fixed effects from the synthetic control estimator is similar in form to the demeaned estimator proposed by Ferman and Pinto (2021), who show that this can correct for bias due to unobserved confounding.

As a final set of robustness checks, mitigating concerns about the appropriateness of the selected controls, I consider an estimation strategy without synthetic controls, using either a flat line

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


or a linear projection. Appendix Figure A7 shows the result of the flat line projection on the main results. The total deterrence measurement under this method is $5.56 Billion, which includes the net increases in substitute procedures (figure not shown). Even under this conservative estimate, in which expenditures would not have risen even in the absence of whistleblowing, whistleblowing produces very large deterrence effects. Appendix Figure A8 shows the result of the linear projection on the main results. The total deterrence measurement under this method is $13.7 Billion, which includes the net increases in substitute procedures (figure not shown). This shows the magnitude of deterrence if pre-enforcement spending trends were to proceed linearly upwards in the absence of whistleblowing. These measurements are similar in magnitude to the main effects, and reinforce the reasonableness of the synthetic control estimates.

# 6 Estimating the Costs of Medicare Whistleblowing

Although False Claims Act litigation is conducted privately, whistleblowing incurs both public and private costs, as discussed in the model above. While FCA litigation produces strong deterrence effects, this policy could be inefficient if it does so by incurring high legal costs associated with enforcement. Conversely, if FCA costs are low, it indicates that the FCA is a cost-effective way of combatting healthcare fraud. The goal of this section is to provide an estimate of the public costs of healthcare-related FCA cases and to contextualize these costs against the benefits of private enforcement and the costs of other enforcement mechanisms.

## 6.1 Public Costs

Overall, I estimate that public expenditure on the 445 healthcare-related False Claims Act cases filed in 2018 amounted to less than $108.5 million. Public expenditure on FCA occurs from a few different federal agencies: the Department of Justice, the Office of the Inspector General of Health and Human Services, and the federal courts. For each of these agencies, there are limitations

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


to estimating costs expressly associated with the False Claims Act, because data are aggregated across multiple responsibilities of these agencies. To overcome this limitation, I estimate FCA-related spending by combining data on the legal process of FCA lawsuits, data on the number of FCA lawsuits, and the agencies' public budgets. Each of the amounts included are intentionally conservative in the direction of overestimation.

The Department of Justice spent no more than $99.1 million on healthcare-related whistleblower FCA lawsuits in Fiscal Year 2018. In the Health Care Fraud and Abuse Control Program Annual Report for Fiscal Year 2018 from the Department of Justice and HHS to Congress, Department of Justice expenditures on overall healthcare fraud amounted to $135.3 million. However, these resources include $25.3 million for the criminal division and $10.9 million for the civil rights division, neither of which handle whistleblower lawsuits. This leaves $99.1 million for all other DOJ spending related to healthcare fraud, including all healthcare anti-fraud spending by the DOJ civil division, the US attorneys, and the FBI. While certainly much of these expenditures were for non-FCA cases, particularly FBI expenditures on criminal healthcare fraud, $99.1 million forms an upper bound of total healthcare whistleblower-induced spending by the DOJ in 2018.

False Claims Acts healthcare-related whistleblower lawsuits involve the Office of the Inspector General of Health and Human Services (OIG-HHS). The main relationship between OIG-HHS and the False Claims Act is through the Office of Counsel, a small internal department that provides general legal support to the Office and also oversees Corporate Integrity Agreements for companies settling False Claims Act lawsuits. The total expenditure of the Office of the General Counsel was $7.1 million in 2018 (The Department of Health and Human Services and The Department of Justice, 2019). Although some of these expenditures support non-FCA responsibilities of the Office of Counsel, I use $7.1 million as an upper bound on OIG-HHS spending on these cases.

I estimate that the Federal Courts, which try the whistleblower lawsuits, spent $2.3 million in 2018 on FCA cases. While there are no data available from the Courts on case-specific spending, the average cost of lawsuits is an upper bound for the marginal cost of lawsuits. In 2018, the federal

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


courts spent a total of $7.7 billion on all operations, handling 1.48 million federal lawsuits across a variety of topics, including criminal prosecutions, bankruptcy, and the court of international trade (The Administrative Office of the US Courts, 2019). The Department of Justice reported 446 healthcare-related lawsuits in 2018 (US Department of Justice, 2018) or about 0.03% of the total federal cases. Therefore, the average cost associated with these cases can be estimated at $0.0003 \times \$7.7\text{Bil} = \$2.3\text{Mil}$. Given that the federal court system handles nearly a million and a half lawsuits, the marginal costs associated with these additional 445 cases are potentially even smaller, as they benefit from use of an established court system largely devoted to other areas of law.

Overall, the total expenditures of the federal government on False Claims Act whistleblower healthcare lawsuits were no more than $108.5 million in fiscal year 2018. This expenditure is small compared to the deterrence effects of just the few largest False Claims Act cases, and also to government expenditure on top-down antifraud enforcement. In Fiscal Year 2018, total federal healthcare fraud and abuse resources across agencies amounted to $2.04 billion, of which the vast majority was unrelated to civil False Claims Act enforcement (The Department of Health and Human Services and The Department of Justice, 2019). The largest budget item by far is the Medicare Integrity Program (MIP) at $809 million in FY 2018, focusing on top-down fraud identification including audits and medical reviews. In comparison to the large anti-fraud expenditure, whistleblowing is a particularly low-cost way to combat and deter healthcare fraud, and produces extensive public benefit.

Whistleblower payouts also appear as an accounting liability to the government when considering the costs of the False Claims Act. However, these payments do not affect social welfare, as discussed in Section 3, because they are transfers from the defendant to the whistleblower. Whistleblower payouts for healthcare-related cases in my data total to $4.29 billion, which is a relatively small figure compared to the tens of billions of dollars in recovery and deterrence that these cases have produced. Statistics focused on whistleblower payouts, which are regularly included as a

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


"cost" in government accounting, misconstrue the nature of these payments which are not in fact a public cost at all.

## 6.2 Private Costs

Another important aspect of the False Claims Act is the private cost of whistleblower lawsuits, captured in the model as $C_w$ and $C_d$. Private costs for plaintiffs and defendants are difficult to measure accurately, as there are no public data sources that compile this information. However, ballpark figures can be gleaned from other models of civil litigation costs that use surveys of attorneys' hours and expenses to estimate costs. A 2013 study estimated that the median professional malpractice lawsuit cost $122,140, the highest of all surveyed categories, while the median automobile tort lawsuit cost only $43,238, the lowest category (Hannaford-Ago, 2013). Even if False Claims Act cases cost *double* the reported price of the average malpractice lawsuit for both plaintiff and defendant, the 446 healthcare-related whistleblower lawsuits filed in 2018 would cost only an estimated $109 million. Therefore, both the public and private costs of whistleblowing lawsuits are dominated by the benefits of recovered funds and deterred overspending.

A final set of private costs or benefits of whistleblowing come in the form of health effects of patients whose care changes due to whistleblowing. While a full study of the health effects of whistleblowing is beyond the scope of this paper, Appendix G discusses the effects of whistleblowing on patient health and conducts a measurement exercise using data from the Kyphoplasty case. The major concern in measurement of health effects of the FCA is distinguishing the health effects of whistleblowing from secular trends in care. Using a design that controls for baseline observable characteristics of treated patients, Appendix G finds no evidence that the whistleblower-induced substitution from inpatient to outpatient surgical care harmed patients.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


# 7 Conclusion

Private enforcement is a potentially valuable way to improve the federal provision of services and eliminate waste, fraud, and abuse. The United States relies upon a private enforcement regime to conduct a major form of federal anti-fraud enforcement, whereby whistleblowers conduct lawsuits on behalf of the federal government in exchange for a share of the funds they recover. Many of these lawsuits have been related to Medicare and the federal health insurance programs, which are particularly susceptible to fraud. Privatization comes with trade-offs that are not fully internalized by the enforcers: whistleblowing has the potential for large deterrence effects, but may impose costs on the government, private firms, and people receiving public services.

This paper models the trade-offs of whistleblowing and quantifies its effects using data from Medicare and the Department of Justice. I undertake a set of case studies of large whistleblower lawsuits and measure specific deterrence effects, the change in the type of spending a whistleblower indicated was fraudulent. I analyze four case studies for which whistleblowers recovered a total of $1.9 billion in federal funds. I estimate that these lawsuits generated $18.9 billion in specific deterrence effects. In contrast, public costs for all lawsuits filed in 2018 amounted to less than $108.5 million, and total whistleblower payouts for all cases since 1986 have totaled to $4.29 billion. Just the few large whistleblowing cases I analyze have more than paid for the public costs of the entire whistleblowing program over its lifespan, indicating a very high return on investment to the FCA.

Changes in medical care induced by whistleblowers can have effects on patient health. While a full study of these health effects is beyond the scope of this paper, I consider the health effects of kyphoplasty, a spine procedure for patients with osteoporosis that was affected by whistleblower lawsuits against more than a hundred hospitals. I find no evidence of harm to patients. This case study motivates further analysis of the effects of whistleblowing on patient care. In addition, whistleblowing generates changes to the care of patients that are potentially unrelated to the quality

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


of the provider or the procedure, and this may provide experimental variation that other researchers find useful in the analysis of medical outcomes.

Whistleblowing has other potential costs and benefits not quantified in this paper. The risk of litigation may cause providers to forgo misreporting in the first place, particularly when whistleblowers are empowered to directly sue for their own profit. These general deterrence effects are hard to measure without knowing the types of potential fraud that could have been committed. The deterrence effects presented here are lower bounds of the total deterrence effects due to these spillovers, and therefore the total deterrence may be much greater. Conversely, increased compliance requirements impose costs on providers that are not measured here, and I am only able to broadly estimate the private costs of whistleblower lawsuits.

In this paper I estimate the fiscal benefits of instances of privatized enforcement, taking the enforcement regime as given. However, a broader analysis would consider the effects of the existence of the False Claims Act as compared to no such privatized regime. This presents an opportunity for future research. Yet another counterfactual would be better public enforcement: paying whistleblowers 15-30% of recovered funds is expensive if the government could produce similar recoveries without whistleblowing. Given the vast amount of data collected by the Medicare program, some of the effects of whistleblowing could likely be accomplished through machine learning, pattern detection, and automated audits. The fact that these programs are not yet in place may point to the limited enforcement capacity of the federal bureaucratic institutions.

The results of this analysis suggest that privatization is a highly effective way to combat fraud. Whistleblowing and private enforcement have strong deterrence effects and relatively low costs, overcoming the limited incentives for government-conducted anti-fraud enforcement. A major benefit of the False Claims Act is not just the information provided by the whistleblower, but also the profit motive it provides for whistleblowers to root out fraud.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


# References

**Abadie, Alberto, Alexis Diamond, and Jens Hainmueller**, "Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program," *Journal of the American Statistical Association*, 2010, *105* (490), 493–505.

__ **and Javier Gardeazabal**, "The Economic Costs of Conflict: A Case Study of the Basque Country," *American Economic Review*, March 2003, *93* (1), 113–132.

**Administrative Office of the US Courts**, "The Judiciary Fiscal Year 2018 Congressional Budget Summary," 2017. Accessed: August 20, 2019.

**Arrow, Kenneth J.**, "Uncertainty and the Welfare Economics of Medical Care," *American Economic Review*, 1963, *53* (5), 941–973.

**Becker, David, Daniel Kessler, and Mark McClellan**, "Detecting medicare abuse," *Journal of Health Economics*, 2005, *24* (1), 189–210.

**Becker, Gary S. and George J. Stigler**, "Law Enforcement, Malfeasance, and Compensation of Enforcers," *The Journal of Legal Studies*, 1974, *3* (1), 1–18.

**Center for Medicare and Medicaid Services**, "Medicare 100% Research Identifiable Files," 1999-2016.

__ , "List of Diagnosis Related Groups (DRGS), FY 2005," 2005. Accessed: August 20, 2019.

**Congressional Budget Office**, "Health Care," https://www.cbo.gov/topics/health-care 2019. Accessed: August 19, 2019.

**Dafny, Leemore S.**, "How Do Hospitals Respond to Price Changes?," *American Economic Review*, December 2005, *95* (5), 1525–1547.

**Department of Justice, Civil Division**, "Freedom of Information Act Request 145-FOI-15832," 2018. Fulfilled April 9, 2018.

**Department of Justice Office of Public Affairs**, "San Mateo County, California, to Pay US $6.8 Million to Resolve False Claims Allegations," March 2009.

__ , "Encompass Health Agrees to Pay $48 Million to Resolve False Claims Act Allegations Relating to its Inpatient Rehabilitation Facilities," June 2019.

**Djankov, Simeon, Rafael La Porta, Florencio Lopez de Silanes, and Andrei Shleifer**, "The law and

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


economics of self-dealing," *Journal of Financial Economics*, 2008, *88* (3), 430 – 465. Darden - JFE Conference Volume: Capital Raising in Emerging Economies.

**Dulleck, Uwe and Rudolf Kerschbamer**, "On Doctors, Mechanics, and Computer Specialists: The Economics of Credence Goods," *Journal of Economic Literature*, March 2006, *44* (1), 5–42.

**Eliason, Paul J, Riley J League, Jetson Leder-Luis, Ryan C McDevitt, and James W Roberts**, "Ambulance Taxis: The Impact of Regulation and Litigation on Health Care Fraud," November 2021, (29491).

**Engstrom, David Freeman**, "Harnessing The Private Attorney General: Evidence From Qui Tam Litigation," *Columbia Law Review*, 2012, *112* (6), 1244–1325.

__ , "Public Regulation Of Private Enforcement: Empirical Analysis Of DOJ Oversight Of Qui Tam Litigation Under The False Claims Act," *Northwestern University Law Review*, 2013, *107* (4), 1689–1756.

**Fang, Hanming and Qing Gong**, "Detecting Potential Overbilling in Medicare Reimbursement via Hours Worked," *American Economic Review*, February 2017, *107* (2), 562–91.

**Ferman, Bruno and Cristine Pinto**, "Synthetic Controls with Imperfect Pre-Treatment Fit," *arXiv*, 2021, (1911.08521).

**Hannaford-Ago, Paula**, "Measuring the cost of civil litigation: Findings from a survey of trial lawyers," *Voir Dire*, 2013.

**Heese, Jonas**, "The Role of Overbilling in Hospitals' Earnings Management Decisions," *European Accounting Review*, 2018, *27*.

**Howard, David and Ian McCarthy**, "Deterrence effects of antifraud and abuse enforcement in health care," *Journal of Health Economics*, January 2021, *75*.

**Howard, David H and Nihar Desai**, "False Claims Act Investigations of Unnecessary Percutaneous Coronary Interventions," *JAMA Internal Medicine*, September 2020, *180*, 1534–1536.

**Jackson, Howell E. and Mark J. Roe**, "Public and Private Enforcement of Securities Laws: Resource-Based Evidence.," *Journal of Financial Economics*, 2009, *93* (2), 207 – 238.

**Kessler, Daniel and Mark McClellan**, "Do Doctors Practice Defensive Medicine?," *Quarterly Journal of Economics*, 1996, *111* (2), 353 – 390.

**Kessler, Daniel P. and Mark B. McClellan**, "How liability law affects medical productivity," *Journal of Health Economics*, 2002, *21* (6), 931 – 955.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


**Landes, William and Richard Posner**, "The Private Enforcement of Law," *Journal of Legal Studies*, 1975, *4* (1).

**Meckel, Katherine**, "Is the Cure Worse Than the Disease? Unintended Effects of Payment Reform in a Quantity-Based Transfer Program," *American Economic Review*, June 2020, *110* (6), 1821–65.

**Polinsky, A. Mitchell**, "Private versus Public Enforcement of Fines," *The Journal of Legal Studies*, 1980, *9* (1), 105–127.

**Rawlings, R. Brent and Hugh E. Aaron**, "The Effect of Hospital Charges on Outlier Payments under Medicare's Inpatient Prospective Payment System: Prudent Financial Management or Illegal Conduct?," *Annals of Health Law*, 2005, *14* (2), 267–328.

**Shavell, Steven**, "The Social versus the Private Incentive to Bring Suit in a Costly Legal System," *The Journal of Legal Studies*, 1982, *11* (2), 333–339.

__ , "Specific versus General Enforcement of Law," *Journal of Political Economy*, 10 1991.

**Silverman, Elaine and Jonathan Robert. Skinner**, "Medicare upcoding and hospital ownership.," *Journal of health economics*, 2004, *23 2*, 369–89.

**Singer, Natasha**, "Botox Shots Approved for Migraine," *The New York Times*, Oct 2010.

**Spier, Kathryn E.**, "Chapter 4: Litigation," in A.M. Polinsky and S. Shavell, eds., *Handbook of Law and Economics*, Vol. 1 of *Handbook of Law and Economics*, Elsevier, 2007, pp. 259 – 342.

**The Administrative Office of the US Courts**, "The Judiciary Fiscal Year 2020 Congressional Budget Summary," February 2019.

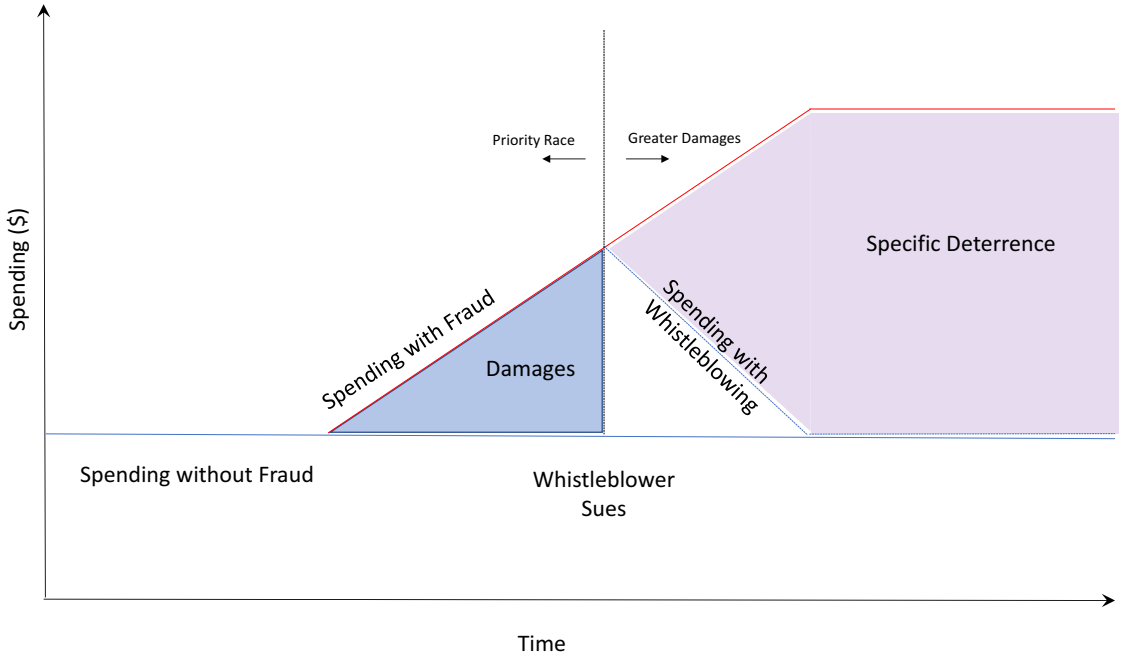
**The Department of Health and Human Services and The Department of Justice**, "Health Care Fraud and Abuse Control Program Annual Report for Fiscal Year 2018," May 2019.

**United States Government Accountability Office**, "Report to Congressional Committees: High Risk Series. Substantial Efforts Needed to Achieve Greater Progress on High-Risk Areas," March 2019, *GAO-19-157SP.*

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


# Figures and Tables

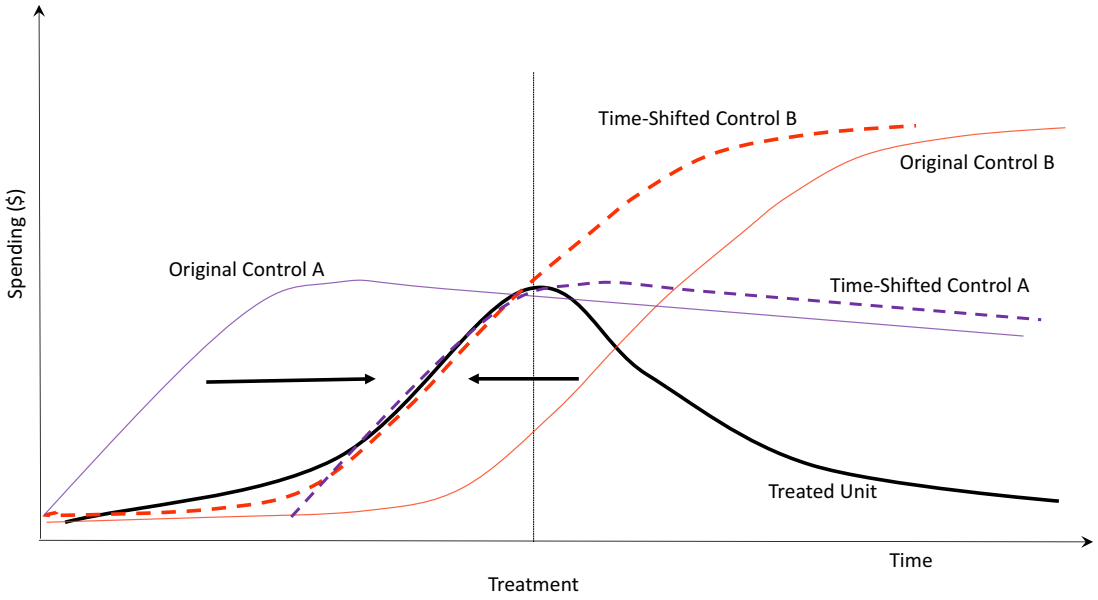
Figure 1: Specific Deterrence




Notes: This figure describes the theoretical effects of a successful whistleblowing case on federal spending. When fraud is committed, the government has damages that are the difference between spending with fraud and the counterfactual spending without fraud. After the whistleblower sues, spending decreases back to its pre-fraud levels. Time trends are presented as linear trends for simplicity. Without loss of generality, fraudulent spending rises and eventually asymptotes, as it cannot grow infinitely even in the absence of enforcement. The specific deterrence effect is the difference between how much would have been spent without whistleblowing and how much is spent after whistleblowing occurs. Because whistleblowers are paid proportionally to the damages, they have incentives to blow the whistle later and allow the damages to accumulate; however, because the first whistleblower to come forward receives greater compensation, they have countervailing incentives to file as soon as possible.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339

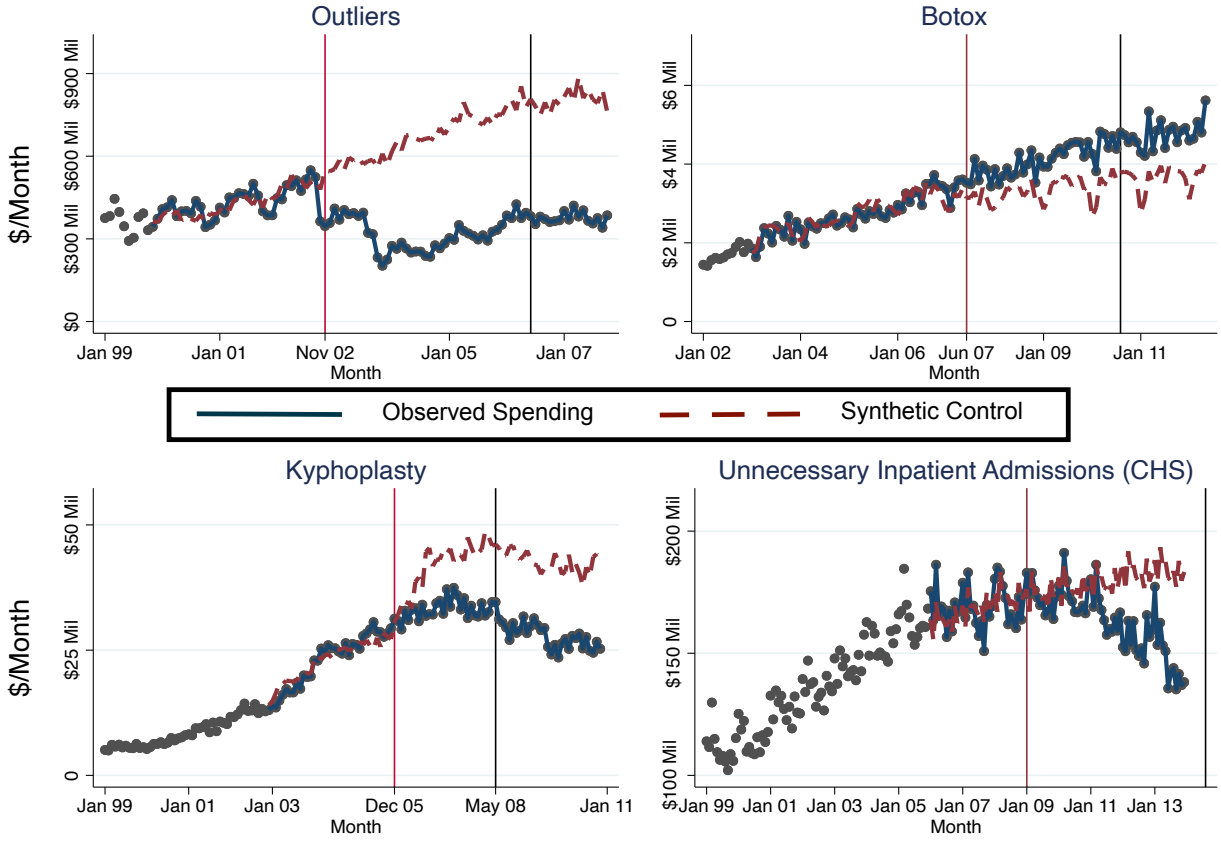

Figure 2: Example of Staggered Synthetic Controls




Notes: This figure exemplifies the fitting process for staggered synthetic controls. Spending on the treated unit is a solid black line that increases pre-treatment and decreases post-treatment. Control A exhibits a similar rise to the pre-period, but at an earlier time, and is shifted forward. Control B exhibits a comparable rise at a later period, and is shifted backward. The shifts are picked to best approximate the pre-treatment period in both shape and levels. These fits are agnostic to how the controls develop in the post-treatment period; Control A falls while Control B continues to rise. Following these fits, a synthetic control unit can be constructed from Time-Shifted Control A and Time-Shifted Control B.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339

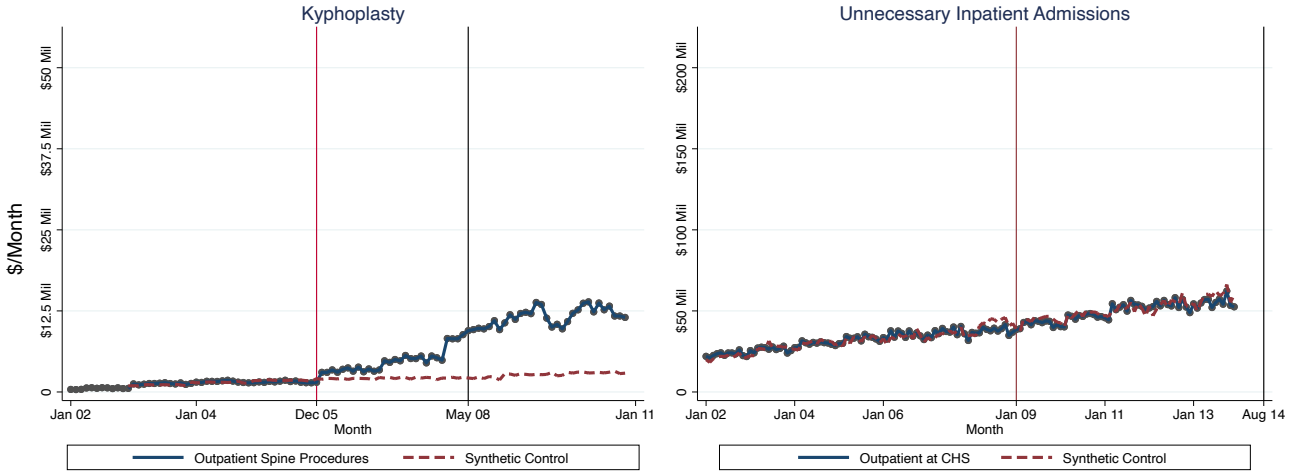

Figure 3: Effects of Whistleblowing on Medicare Expenditure




Notes: This figure plots the main effects of the 4 case studies: Outlier Payments (top left), Botox (top right), Kyphoplasty (bottom left), and Unnecessary Inpatient Admissions (bottom right). For each case, the spending affected by whistleblowing is plotted as a solid line, while the synthetic control series is dashed. The dots represent the spending on the treated unit in the period before it overlaps with the synthetic control group. The first vertical line of each case represents the filing of the first related whistleblower lawsuit, which is used as the treatment date, and the second vertical line reflects the first settlement. Post-treatment effects are analyzed for 5 years after the treatment date. For the Unnecessary Inpatient Admissions Case (bottom right), multiple defendant hospitals were analyzed, and the series included here reflects Community Health Systems, the largest defendant hospital chain. Appendix Figure A2 plots the same figure for the other defendants in that case.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


Figure 4: Synthetic Controls for Substitute Outpatient Spending




Notes: This figure plots the substitution effect to outpatient spending for the Kyphoplasty (left) and Unnecessary Inpatient Admission (right) case studies. These graphs correspond to the bottom half of Figure 3 and are scaled identically to those panels for comparison. In both case studies, whistleblowers alleged that patients should have been treated outpatient instead of inpatient. Outpatient spine procedure spending (left) rose following the kyphoplasty case as compared to the synthetic controls. However, there is no increase in outpatient spending at defendant hospitals (right) following the unnecessary admissions case. For the Unnecessary Inpatient Admissions case, multiple defendant hospitals were analyzed, and the series included here reflects Community Health Systems, the largest defendant hospital chain. Appendix Figure A3 plots the same figure for the other defendants in that case.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


Table 1: Summary Statistics about Whistleblower Lawsuits

| | Healthcare Whistleblower Lawsuits | All Whistleblower Lawsuits |
|---|---|---|
| Number of Lawsuits | 3269 | 5967 |
| Years | 1986-2012 | 1986-2012 |
| Government Intervened | 31.6% | 27.5% |
| Of Which Settled/Judged in Favor of Gvt. | 91.0% | 92.3% |
| Settled/Judged in Favor of Government | 35.7% | 32.2% |
| Of which Government Intervened: | 80.5% | 78.7% |
| Settlement Amounts (Among Cases Not Dismissed) | | |
| Mean | $22,678,349 | $17,450,907 |
| Median | $1,500,000 | $1,315,540 |
| Standard Deviation | $87,029,658 | $71,445,704 |
| Total | $26.47 billion | $33.54 billion |
| Whistleblower Share (Among Cases Not Dismissed) | | |
| Mean | $3,798,847 | $2,968,751 |
| Median | $250,614 | $228,750 |
| Standard Deviation | $14,891,989 | $12,226,857 |
| Total | $4.23 billion | $5.49 billion |
| Case Length (Days) | | |
| Mean | 1138 | 1140 |
| Median | 964 | 920 |
| Standard Deviation | 800 | 883 |

Notes: This table presents descriptive statistics about False Claims Act whistleblower lawsuits using data from a Freedom of Information Act Request filed with the Department of Justice.

*Review of Economics and Statistics* Just Accepted MS.
https://doi.org/10.1162/rest_a_01339


Table 2: Case Studies of Medicare Whistleblowing Enforcement and Deterrence Effects

| Type of Care | Type of Fraud | First Case Filed | First Settlement | # Press Releases | Settlement Total | Specific Deterrence | Deterrence Ratio |
|---|---|---|---|---|---|---|---|
| Inpatient | Manipulation of Outlier Payments | Nov 2002 | Dec 2004 | 11 | $923 Million | $17.5 Billion | 18.92 |
| Botox | Off-Label Promotion | June 2007 | Aug 2010 | 1 | $600 Million | -$41.7 Million | -0.69 |
| Kyphoplasty | Inpatient Procedure Should be Outpatient | Dec 2005 | May 2008 | 10 | $214.2 Million | $281.1 Million | 1.31 |
| Inpatient | Unnecessary Hospital Admissions | Nov 2004 | Dec 2007 | 7 | $172.3 Million | $1.2 Billion | 7.09 |
| | | | | **Total** | **$1.91 Billion** | **$ 18.9 Billion** | |
| | | | | | | **Average Ratio** | **6.81** |

Notes: This table shows the 4 highest settlement value case studies of Medicare whistleblowing enforcement for which I have data. Case studies are constructed using Department of Justice press releases to link lawsuits with similar allegations. Appendix E contains more details about the grouping of lawsuits and on the potential case studies not analyzed here. Specific deterrence values are computed using a staggered synthetic control strategy to compare treated units to their counterfactual in the absence of whistleblowing. The specific deterrence is computed over 5 years post-treatment with a 10% annual discount rate compounded monthly. The deterrence ratio is computed as the ratio of the deterrence value to the settlement total.