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DISSERTATION

Three Essays on Corporate Financial Misconduct and Market Reactions

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Declaration of Authorship

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Abstract

The dissertation is a compilation of three empirical papers on the effects of corporate financial misconducts on financial markets. The scope of misconducts covers insider trading, price manipulations, communication of false information (including accounting frauds), and any breach to securities laws. The first two papers exploit a unique and exhaustive dataset of the sanction decisions made by the French Financial Market Authority (*Autorité des Marchés Financiers*) since its creation in 2003, using an event study methodology. The first paper investigates how French markets react to the unanticipated news of a sanctioned financial misconduct committed by listed firms. The results stress that condemned listed firms endure significant but limited negative abnormal returns in the aftermath of the regulator's decision. In particular, after accounting for the regulatory fines, large firms would gain from being sanctioned in terms of reputation. The second paper changes perspective by analyzing the spillovers for listed firms of being named as the victims of sanctioned financial misconducts. The conclusion is that the victims endure a double-punishment: first, when the breach is committed (such as price manipulation or insider trading), and then again when their past executioner is condemned. The last paper enlarges the perspective by meta-analyzing the literature on intentional financial crimes and subsequent market reactions, estimated with an event study methodology. The goal is to put into perspective the results of the first article as well as to fill in a gap in the existing literature. The meta-analysis demonstrates that this empirical literature is affected by a negative publication selection bias. Still, after controlling for this bias, financial crimes imply statistically significant negative abnormal returns.

JEL Classification C83, G14, G18, K42, N24

Keywords Financial Misconduct; Fraud; Sanction; Listed Companies Regulation; Victim, Returns Spillovers, Event Study; Meta-Analysis; Financial Markets, Information and Market Efficiency

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Chapter 2. Financial Impact of Regulatory Sanctions on Listed Companies

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Acronyms

AMF	*Autorité des Marchés Financiers*
BALO	French Official Journal for Legal Notices
AAR	Average Abnormal Returns
AARD	Average Abnormal Returns *per* Day
AR	Abnormal Returns
ASL	Average Shareholder Loss (or gain), averaged across events
BaFin	*German Bundesanstalt für Finanzdienstleistungsaufsicht*
BMA	Bayesian Model Averaging
CAAR	Cumulative Average Abnormal Returns
CAC	*Cotation Assistée en Continu*, with CAC40 being the main French index
CAR	Cumulative Abnormal Returns
CSRC	China Securities Regulatory Commission
DAX	*Deutscher AktienindeX*
DoJ	Department of Justice
EC AMF	Enforcement Committee of the AMF
ESMA	European Securities and Markets Authority
EUR	Euro
FASB	Financial Accounting Standards Board
FAT	Funnel-Asymmetry Test
FCA	Financial Conduct Authority (FCA, FSA until 2012)
FP	Financial Penalty (or fine)
GAAP	Generally Accepted Accounting Principles
GDP	Growth Domestic Product
GEE	Generalized Estimating Equation
GLS	Generalized Least Squares
GNI	Growth National Income
HR	Human Resource
IFRS	International Financial Reporting Standards
LME 2008	Law of Modernization of the Economy
LRBF 2010	Law on Banking and Financial Regulation
LSDV	Least Square Dummy Variable
MAD	Market Abuse Directive
M&As	Mergers and Acquisitions
MiFID	Markets In Financial Instruments Directive
ML	Maximum Likelihood
MRA	Meta regression analysis
MV	Market Value (or capitalization)
OLS	Ordinary Least Squares
PEESE	Precision-Effect Estimate with Standard Error
PET	Precision-Effect Test
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RL	(Net) average Reputational Loss
RSE	Robust Standard Error
SBF 250	*Société des Bourses Françaises*
SE	Standard Error
SEC	U.S. Securities and Exchange Commission
SL	Shareholder Loss (or gain) due to the event
U.K.	United Kingdom
U.S.	United States of America
USD	U.S. dollar
VIF	Variance Inflation Factor
WLS	Weighted Least Squares
YoY	Year on year growth rate

Chapter 1

Summary of the Dissertation

"We are in the golden age of fraud."

Jim Chanos, Kynikos Associates, Financial Times 24/07/2020.

Beyond the speculations about the consecutive waves of Covid, 2020 will be reminded for one of the most notorious failures of a listed firm, due to a massive accounting fraud: the German payment fintech Wirecard. The firm, with 30 subsidiaries in 26 countries, joined the prestigious DAX index just two years before. The spillovers of the billion-euro fraud range from the arrest of top managers to suspicion of auditors, politicians, and regulatory authorities (BaFin, European Commission, and ESMA), as suggested the Financial Times headline "Why was Frankfurt so blind for so long?"[1] Such a failure serves as a reminder of the relevance of financial markets regulation, oversight, and enforcement, in order to protect investors and to encourage compliance with regulations.

Research on the relationship between the publication of financial misconducts and financial performance for corporates has continuously grown, as illustrated by the recent in-depth literature reviews undergone by Amiram et al. (2018) and Liu and Yawson (2020). It is fueling regulatory debates on how to enforce more efficiently financial regulations.

Some specificities of white-collar crimes must be accounted for and support the relevance of this dissertation. Firstly, contrary to many other crimes, they are committed by employees and not by the companies. Still, most frequently, the firms are held responsible (Choi and Pritchard, 2016), justifying market corrections following their publications. Secondly, echoing Becker (1968),[2] a limited share of white-collar crimes is detected (by regulators, analysts, shareholders, stockholders, external auditors, etc.), with an unknown and low probability. Alawadhi et al. (2020) assess that more than a fourth of the Compusat-listed firms

[1] 21, June 2020.

[2] Becker (1968) models the choice to engage in misbehavior like any other decision involving cost-benefit tradeoffs, in light of the expected profits from fraud, the probability of being caught, and the subsequent sanction.

engaged in accounting frauds, but only 3.5% of such financial mis-presentations were eventually caught and sanctioned.[3] The knowledge on frauds is based on those detected. Amiram et al. (2018; p. 737) conclude that "our knowledge of financial misconduct comes almost exclusively from firms that were caught, and the characteristics of those firms may differ from firms that commit fraud without detection." Finally, acting legally can turn into an economic disadvantage for a firm and/or its management (Hawley, 1991, Aupperle et al., 1985). In fact, the costs for abiding the law can stand for an economic disadvantage compared to its competitors/peers. Put it differently, echoing Becker (1968), the expected costs for being sanctioned (fines, litigation costs, reputational penalties, impact on clients and suppliers, HR consequences, etc.) can be lower than the benefits from cheating the law (higher returns on assets, lower risks of doing business, etc.). All in all, it is relevant to enlarge the scope of the existing literature by investigating an overlooked country (France) and by meta-analyzing the existing literature to confirm the relevance of the conclusions of individual studies.

This dissertation focusses on the following financial misconducts, consistent with academic, practitioner, and policy literature: insider trading, price manipulation, dissemination of false information (of which accounting fraud),[4] and any breach to financial regulations. This scope of white-collar crimes is supported by the literature which demonstrated that, amid all corporate crimes, financial crimes trigger the strongest market reactions, and subsequently impact most corporate reputations (Engelen, 2011; Karpoff, 2012, 2020). They can be alleged, investigated, or sanctioned crimes. Corporate frauds can be detected *via* several webs: through the classical corporate governance players (regulators, external auditors, financial analysts), as well as through a large network of people interacting with the firms (shareholders, stakeholders, employees, journalists, whistleblowers, etc.). When detected, they can lead to enforcement or stock exchange procedures, lawsuits, class actions, or accounting restatements depending on the jurisdictions and on the parties at stake.

Overall, the goal of this dissertation is to deliver three original and complementary contributions to the literature on the spillovers of financial crimes to contribute to ongoing debates in financial markets oversight and securities law enforcement: how enforcement can support financial market developments and protect investors? These articles should offer some guidance on future policy markers' decisions by explaining market perceptions of their actions

[3] The authors based their estimates on all U.S. SEC and Department of Justice enforcement actions, over the period 1978 to 2017.

[4] Insider trading, price manipulation, and dissemination of false information are called "market abuses" under the European Market Abuse Directive (MAD 2003/6/EC) and Regulation on market abuse (MAR 596/2014).

and decisions from a specific to a general perspective. In a nutshell, the three articles comprising this dissertation express my strong believe that regulatory authorities' voice can be credible to the markets and hence foster responsible behaviors. Sanctions may also be efficiently complemented by regulatory communication (for example by naming and shaming wrongdoings), which will trigger reputational sanctions at a lower cost (Karpoff and Lott, 1993). By doing so, regulators also reinforce financial education of market participants.

On the one hand, the dissertation investigates, over the next two chapters, the specificities of an overlooked code law country, which has been sanctioning for decades financial misconducts: France and more specifically the sanctions of the French Financial Market Authority (AMF). This includes the market perceptions of the AMF sanction decisions made against listed firms (chapter 2). Complementarily, chapter 3 investigates how the same market reacts to the fact that a listed firm, which was the victim of a regulatory breach, is being avenged, or put it differently that its past executioner(s) is (are) sanctioned by the AMF. On the other hand, the last chapter of the dissertation (chapter 4) broadens the perspective by meta-analyzing an exhaustive set of event studies assessing how financial markets react to the publication of intentional financial crimes committed by listed firms. This meta-analysis enables to benchmark the French results with 16 other jurisdictions, over a long time span (1965-2018).

The three chapters are based on the event study methodology, originally outlined in Ball and Brown (1968) and Fama et al. (1969). The underlying hypothesis behind the market reactions to the publication of financial misconducts is grounded in the semi-strong efficient market hypothesis (Fama, 1970): all the publicly available information (in this dissertation the publication of financial misconducts) should be fully and immediately incorporated into prices. This methodology is widely recognized in the economic and financial literature as an efficient tool to analyze abnormal market reactions to unanticipated news (MacKinlay, 1997). Furthermore, event studies evade the issue of endogeneity and are quite unambiguous with regards to the causal direction of the relationship (Endrikat, 2016). The nature of financial misconducts also means that the sample only contains "bad" news that are priced-in more rapidly than "good" news (Taffler et al., 2004). The event study methodology is particularly relevant for the scope of financial crimes as the event dates are precisely known and are most often communicated *via* official channels. This also facilitates the search for confounding events and their avoidance. Additionally, all three chapters of the dissertation focus on short-term event windows as Kothari and Warner (1997) and Bhagat and Romano (2002), amid others, raised serious concerns about the specification and explanatory power of an event study

with long-term event windows. The key reason is that the signal-to-noise ratio greatly worsens as the time distance from the event date becomes larger. The further from the event, the more likely other confounding events might interfere with the investigated event.

More precisely, chapters 2 and 3 exploit a unique and exhaustive dataset comprising all the sanction decisions made by the AMF since its creation in 2003 (until late 2016 and 2018 respectively). The high level of granularity and regulatory information shared by the AMF contribute to the originality of the studies and support the relevance of the results. The event study methodology investigates for abnormal returns around the dates of the milestones of AMF enforcement procedures.

The results of chapter 2 stress that the confidentiality of the early stages of enforcement procedures is respected by the investigated firm(s) and by the AMF given the lack of significant abnormal returns. They also demonstrate that the French financial markets react negatively to the news of a sanction and its publication. Still, reactions are limited in absolute and relative terms, both compared to past studies and in terms of reputational penalty, as larger firms would gain from being sanctioned. These results question the severity of the verdict (in particular the levied financial penalties for larger firms) and, more broadly, the credibility of the regulator when enforcing the financial laws. Some parameters trigger stronger reactions, but not the most straightforward such as the cash fine or behavioral sanction. The results echo the reputation for leniency of sanctions (scarce procedures, lax verdicts, low fines, ending neglected by analysts and investors), despite consecutive regulatory tightenings and long procedures. They question the efficiency of enforcement as set over the last sixteen years. The following policy recommendations can be made, under the assumption that a credible and efficient enforcement should be priced in by the markets: 1) more communication from the regulator along the enforcement process, as done by the U.S. SEC, to help market participants better and more rapidly assimilate the information on the misconducts being investigated and as a tool to educate and set example ("name and shame", as enforced in the U.K.); 2) more severe and less frequent sanctions (significantly higher fines, closer to the legal maximum, and more disciplinary sanctions), in particular for larger firms, if the regulator believes that the credibility of a sanction should be measured in the market reactions, as happens in the U.S. for example; and 3) more sanctions of individuals (top managers in particular), in order to reinforce accountability and encourage best practices.

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The third chapter exploits the same dataset using an event study to assess how the French financial markets interpret the fact that a listed firm (so called "the victim") is avenged by the AMF, when the latter sanctions past financial misconducts which were committed at the victim's expense (most frequently its stocks). The results demonstrate that, on average, victims experience substantial negative abnormal returns after the sanction, to some extent significant. This reputational sanction for being associated with a sanction decision is larger than the abnormal returns for sanctioned firms estimated in Chapter 2. Victims are named then shamed by the market, despite being avenged by the regulator. Hence, naming victims in sanctions implies a double punishment of victims, as the firms already suffered during the violation period. Alternatively, sanctions could reveal victims' weaknesses worth sanctioning for. Additionally, victims are more penalized when the market manipulator is sanctioned for the transmission of insider trading, is acquitted or anonymized in the sanction report, or appeals the decision. It demonstrates a market failure as victims are not properly differentiated from wrongdoers or signals weaknesses of the former victims, which possibly enabled the breach to be committed. The markets also incorporate the information content of the decision and of the parties at stake. All in all, those results plead for an anonymization of all victims, to protect them from potentially being stigmatized when their past executioner(s) is (are) sanctioned, for naming and shaming market manipulators, as an alternative efficient enforcement tool to sanctions, and for investments in financial education and pedagogy to limit misunderstanding of regulatory decisions.

This article was published in the Journal of Economic Behavior and Organization (de Batz, L., 2020. Financial crime spillovers. Does one gain to be avenged? Journal of Economic Behavior & Organization, 173(C), 196-215).

Finally, the purpose of the last chapter is to broaden the perspective by examining how the publication of intentional financial crimes committed by listed firms is interpreted by financial markets, using a systematic and quantitative review of the existing empirical studies. It is also a way to put the French results of chapter 2 into perspective, compared with other jurisdictions. More specifically, chapter 4 is a meta-regression analysis investigating the extent

and the nature of market reactions to the publication of intentional financial crimes committed by listed firms. The survey is comprised of 111 studies, published between 1978 and 2020, with a total of 439 estimates of event studies from more than 30,000 intentional financial crimes. This meta-analysis is unique in that it covers the offsets of the publication of financial crimes (either before or after being sanctioned), to the widest possible extent in terms of misconducts, types of enforcement procedures, information channels, and geographies by comprising all available literature until May 1, 2020. 17 countries (American, Asian, and European) are comprised within the sample, though the U.S. is by far the most frequent, given the size of the market, the greater transparency of enforcers, and its culture more prone to procedures than other jurisdictions. The relevance of the meta-analysis also steams from the scope which is limited to one methodology: event studies. The latter include a directly available and comparable estimated effect: the abnormal returns following the financial crime publication. The significance of abnormal returns is supported by three factors. Firstly, the event dates are precisely known, most frequently communicated *via* official channels (which also facilitates the search for confounding events). Secondly, the sample is homogeneous with only "bad" news regarding the firms. Thirdly, the sample only comprises short-term event windows, which are the most economically significant and free of confounding events.

The first result of the meta-analysis is that average abnormal returns calculated from this empirical literature are affected by a significant negative publication selection bias. Still, after controlling for this bias, the meta-analysis indicates that financial crimes imply statistically significant negative abnormal returns, but to a lower extent than initially thought. This evidence suggests an informational effect of the publication of financial crimes: returns of listed firms contract, on average, by -1.15% *per* day over the average three-day event window surrounding the news. Finally, the MRA results demonstrate that crimes committed in the U.S. (and in common law countries more generally), and accounting frauds are particularly informational to market participants. This meta-analysis demonstrates how markets react rapidly to any negative news regarding the ethics of listed firms, in particular to an allegation of financial crime. Consequently, enforcers can efficiently use communication and transparency *vis-à-vis* markets participants to serve as a cheaper alternative to sanctions.

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Chapter 2

Financial Impact of Regulatory Sanctions on Listed Companies

Abstract:

We examine the impact of the enforcement of financial regulations by the French Financial Market Authority on sanctioned firms. The early stages of the enforcement process are by law confidential, with an internal investigation and bilateral exchanges between the defendant and its regulator. The public hearing by the Enforcement Committee leads to a single publication of the decision, being the only public communication. Using an event study methodology, we find that the confidentiality of the initial steps of enforcement procedures is respected and that markets account for the publication of sanctions. Still, reactions are limited in absolute and relative terms, both compared to past studies and in terms of reputational penalty. Some parameters trigger a stronger reaction, but not the most straightforward (such as the cash fines, behavioral sanctions, or recidivism). The results echo the reputation for leniency of sanctions (scarce procedures, lax verdicts, low fines, ending neglected by analysts and investors), despite consecutive regulatory tightenings and long procedures. They question the efficiency of enforcement.

1. Introduction

Regulating financial markets targets diverse objectives: encourage sound and transparent financial markets; deter excessive risk-taking; foster market participants to act responsibly; and compensate for past wrongdoings; etc. Being budgetary constrained, regulators focus on the most severe uncovered regulatory breaches (Carvajal and Elliott, 2007). Hence, sanctions are expected to be interpreted as a significant negative information regarding the firm and/or the individual being sanctioned, justifying a reputational cost imposed by market participants. If a potential sanction stands for a credible threat, its mere existence could complement financial regulation by incentivizing market players to abide by the law. Markets would be a channel complementary to enforcement to deter future misconducts and to induce firms, top managers, and individuals to act responsibly (Engelen, 2011). All in all, what are the consequences of regulatory enforcement on sanctioned listed firms?

Due to data constraints, limited research was done to date on jurisdictions other than the United States (U.S.) on this question. Regarding France in particular, previous studies focused on one type of regulatory breach (accounting frauds, Djama, 2008; or insider trading, Fonteny, 2017), or covered few sanctions (45 sanctions of listed companies, Kirat and Rezaee, 2019).[1] The objective of this paper is to provide a comprehensive investigation of market reactions to sanctions of listed companies for the French market, by constructing and exploiting a unique dataset comprised of all the sanctions and settlements made by the French Financial Market Authority (AMF). Our sample is improved compared to prior research as it covers exhaustively the sanctions of the AMF since its creation in 2003, until late 2016, based on public and confidential data.

Beyond its novelty, the use of a database covering the French market is particularly relevant since the French enforcement process is highly compatible with an event study. Indeed, the dates of the consecutive steps of the enforcement procedure are unique and immediately available (publicly or confidentially). The initial steps of enforcement procedures (see Figure 1) are confidential by law, and should not lead to abnormal market reactions.[2] Conversely, the last two steps (Enforcement Committee hearing and publication of the decision) are public information, with the nature and the size of the penalty being precisely identified on the day of

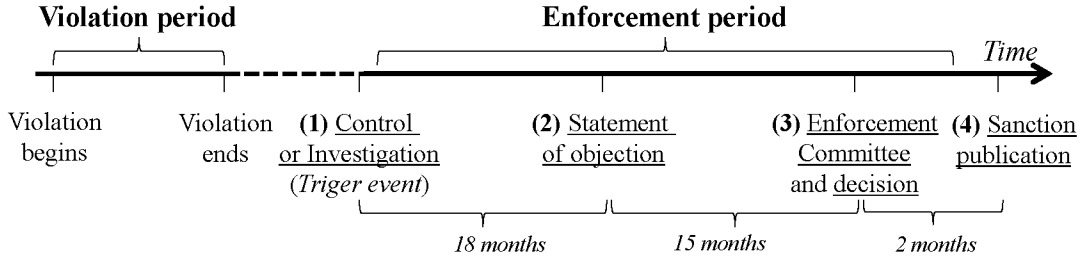
[1] This gap in the literature can be accounted for by the (increasingly) limited open access to data. Indeed, sanction reports are frequently published anonymized (part of the sanction decision of the Enforcement Committee (AMF EC), *i.e. ex ante*) or anonymized *ex post* at the EC AMF Chairman's discretion. The compounded anonymization rate is 57% (de Batz, 2017a and b). Additionally, some dates can be missing in sanction reports. Lastly, in 2018, a regulatory change led to an anonymization of most of the sanctions from 2004 to 2013.

[2] Like in the United Kingdom (U.K., Armour et al., 2017). Conversely, in the U.S., the trigger event can be early communication by the regulator and/or the defendant.

the publication. Hence, they are expected to influence market expectations, should the sanctions signal a credible negative assessment by the regulator. Additionally, sanctions are not private information for the firms: they are revealed by the regulator and exogenous to the firms' agenda. Therefore, there is no self-selection nor optimization process made by the sanctioned companies: the AMF decides independently when to publish its decision.

Figure 1: Timeline of an AMF Enforcement Action

The first two steps of the enforcement are caried by AMF employees, with the ignition of an investigation for market abuses or controls of compliance with professional obligations (*step 1*), followed by the statement of objection (*step 2*), when the incriminated entity(ies) learn about the ongoing procedure and are asked for additional information and justifications. In light of these elements and of the seriousness alleged breach(es), the Board of the AMF may transfer the file to its statutorily independent Enforcement Committee, which starts the judicial part of the enforcement, ending with a public hearing ("trial") (*step 3*) and the publication of the decision (*step 4*).



Sources: AMF, Author

Following the rich literature on the repercussions of corporate misconducts, an event study investigates for abnormal returns following the milestones of sanction procedures (the "events"). Complementarily, the market value losses are estimated, questioning reputational penalties following the sanction. The results are complemented by cross-sectional multivariate analysis of the determinants of the abnormal returns. Rational investors should amend their investment strategies proportionally to the severity of the financial misconduct (Choi and Kahan, 2007).

This article enriches the understanding of market reactions to enforcement by investigating how regulatory decisions are perceived by market players to the largest possible extent: depending on the procedure (sanction or settlement), on the verdict (sanction, acquittal, anonymization), on the offender's characteristics (and its size in particular), on the timing of the enforcement, on the media coverage, and on the legal environment. It questions, over a long and up-to-date time span, potential abnormal returns following the milestones of sanction procedures, from the investigation until the publication of the decision (see Figure 1). Three reasons make it particularly interesting: 1) only the most serious regulatory breaches detected by the AMF end with a sanction procedure, the less severe breaches are delt with bilaterally and confidentially between the AMF and the regulated entity; 2) sanction procedures are long

(close to 3 years on average) hence costly; and 3) firms listed on a stock exchange are likely to be subject to a closer scrutiny by the regulators and to receive more media attention.

The results indicate, on average, statistically significant abnormal reactions to sanctions. Guilty listed firms incur abnormal losses in returns after the Enforcement Committee meeting and the sanction publication. Still, reactions are limited in absolute and relative terms, and smaller firms are more subject to reputational penalties. Conversely, no abnormal reaction follows either the ignition of the procedure, or the statement of objection, stressing a compliance with the confidentiality of enforcement procedures. Cross-sectional regressions show that abnormal returns are unrelated to the main features of the sanctions (cash fines, as in Armour et al., 2017, and disciplinary sanctions). Other aspects contribute to more negative abnormal returns after the publication: procedures initiated with an investigation, longer procedures, the involvement of the top management in the breach(es), a higher media coverage of the sanction, being a financial or technological firm, and better economic times. Complementary event studies conclude with no abnormal reaction following anonymized sanctions or settlements, in line with their confidential or less severe natures. Acquittal decisions do not trigger straightforward reactions.

This article contributes to the existing literature on the impact of enforcement by detailing the timing and transmission schemes of a sanction procedure into the French stock markets. The results contribute to improving the understanding of financial regulation, and of the reasons why French enforcement and sanctions can be said to be scarce and lenient.[3] The current framework can be questioned as: 1) the market reactions are limited in absolute and relative terms, 2) the most straightforward features of the sanctions (cash fines and disciplinary sanctions) do not matter, 3) the fines remain extremely limited compared to maximum legal thresholds (despite consecutive increases along the period under review), though trending upwards (de Batz, 2017a and b), and 4) larger firms would "gain" from being sanctioned. The following policy recommendations can be made, under the assumption that a credible and efficient enforcement should be priced in by the markets: 1) more communication from the

[3] Sanctions by the AMF suffer from a reputation of being scarce (*i.e.* low probability of being caught) and lenient (*i.e.* lax verdicts with low fines). They do not receive a straightforward coverage by the media nor by financial analysts: most identified misconducts are dealt with bilaterally and confidentially between the AMF and the regulated entity. Even the highest sanction in history (35 million euros sentenced in July 2017) did not cast an unequivocal analysis. In fact, financial penalties are low in absolute and relative terms, despite four-consecutive reinforcements of AMF's enforcement powers since its creation in 2003. For example, the maximum legal fines were repeatedly increased (up to 100 million euros, or 10 times the gains realized for firms, see Table 1). In the end, the translation of sanctions into returns of listed companies is *a priori* unclear. This marks a sharp difference with other jurisdictions (Anglo-Saxon countries in particular) or with sanctions by other French Regulatory Authorities (such as the Competition Authority).

regulator along the enforcement process, as done by the U.S. SEC, to help market participants better and more rapidly assimilate the information on the misconducts being investigated and as a tool to educate and set example ("name and shame", as enforced in the U.K.); 2) more severe and less frequent sanctions (significantly higher fines, closer to the legal maximum, and more disciplinary sanctions), in particular for larger firms, if the regulator believes that the credibility of a sanction should be measured in the market reactions, as in the U.S. for example;[4] and 3) more sanctions of individuals (top managers in particular), in order to reinforce accountability and encourage best practices. Better enforcing financial regulations is all the more relevant that market participants are increasingly regulated, partly as a consequence of the Great Financial Crisis. In the end, regulation should support and accompany a healthy development of firms, and not suffocate them. It is a crucial parameter of the attractiveness and strength of securities markets in terms of fund raising (La Porta et al., 2006), of market capitalization (Beny, 2008), and of liquidity (Cumming et al., 2011).

The rest of the article is structured as follows. Section 2 presents a literature review. Section 3 outlines the institutional framework of enforcement in France and formulates the hypotheses. The subsequent section describes the methodologies of the event study and of the cross-sectional regression, and the data. Section 5 presents the results and section 6 concludes.

2. Literature review

Securities regulation for capital markets and the subsequent enforcement aim at informing investors and at deterring and uncovering white collar crimes. Several tools are at the regulator's disposal: market surveillance, bilateral exchanges with regulated entities, settlements, and (monetary and/or non-monetary) sanctions, on which this article focusses. Alternative enforcement tools can also encourage best practices (Berger and Davies, 1998; Barth et al., 2004; La Porta et al., 2006), such as private enforcement and disclosure of information, in particular in a context of imperfect information (Garoupa, 1999).

Rational agents will break the law if the profits derived from crimes exceed the expected costs. In a seminal contribution, Becker (1968) proposes a theoretical framework for the economics of crime to reach an optimal enforcement (deterrence of future crimes, compensation, and vengeance). In his model, sanctions will circumvent frauds and foster compliance with regulation depending on three parameters: 1) the expected profits from committing the fraud (*i.e.* the harm inflicted upon victims or the society, justifying a sanction);

[4] For example, in Karpoff et al. (2008a), only 8% of the 585 firms received a fine from their regulatory agencies over the period 1978-2002. The mean was 107 million dollars (60 million when excluding an exceptional case).

2) the probability of being caught;[5] and 3) the subsequent the total cost for being caught (*i.e.* the cumulated costs of punishment including fines, disciplinary sanctions, jail, higher financing costs, reputational penalty, etc.). This article focusses on this third parameter. Indeed, for firms, sanction procedures are a major legal risk as they convey direct and indirect financial consequences: long and costly procedures, the cash fine set by the regulator, second-round effects such as higher costs of funding and doing business,[6] and possibly a "reputational penalty" from the market. Hence, under the semi-strong efficient market hypothesis (Fama et al., 1969), the share price is expected to contract after a sanction. Still, some contrarian forces may play. Some investors may fail to (or decide not to) react to the news, while risk-seeking investors could search for investments in firms more prone to play with the limits of the law, possibly synonym of higher returns. The literature concurs in concluding that the reputational penalty must be accounted both when setting policy standards and when making business decisions (Karpoff et al., 2008b). On the one hand, financial markets could complement enforcement as a channel to induce firms and market participants to behave responsibly (Engelen, 2011). On the other hand, the threat of a reputational penalty from the market, exceeding by far the legal sanction (for the U.S.: Karpoff and Lott, 1993; Karpoff et al., 2008a; for the U.K.: Armour et al., 2017), could deter regulatory breaches. Otherwise, the perceived under-punishment of frauds might encourage financial misconducts. The question is then whether financial misconducts pay, if the expected profits from regulatory breach(es) exceed the total cost of a sanction (monetary (fines) and non-monetary (reputation) costs), for a given probability of being caught.

The impact of regulatory sanctions on the behavior of financial investors was empirically studied by the literature for numerous jurisdictions,[7] and from different angles,

[5] The (actual or perceived, Garoupa, 1999) detection rate by the regulator (or by other market participants) is low, even though misconducts on financial markets are frequent. The probability of being caught depends on the public expenditures on enforcement, courts, police, etc. They are by nature constrained. No data exists on frauds which went undetected. Bussmann and Werle (2006) estimated, in the global survey, that only 4% of the detected economic crimes were identified by law Enforcement Agencies, most of them being detected by the firms themselves. On average, only 2 to 5% of the American listed companies are investigated *per* year by the Securities and Exchange Commission (U.S. SEC), according to Cumming and Johan (2013). Dyck et al. (2014) stressed that, from 1996 to 2004, out of the 15% of large American publicly traded firms engaged in fraud each year, only 4% are in the end detected.
Similarly, the detection rates for cartels are low, despite being larger in terms of scope and duration. In the U.S., Bryant and Eckard (1991) estimated the annual probability of being caught for a cartel from 13 to 17%. In Europe, Combe et al. (2008) estimated it from 12.9 to 13.1% from 1969 to 2008, based on European Commission data.

[6] The sanctioned entity can face higher insurance premia, more expensive funding conditions, tougher client relationships, and additional investments to compensate for the demonstrated market failure (IT, process improvements, marketing, and communication, etc.).

[7] Such as Canada, China, France, Germany, Japan, Luxembourg, Malaysia, the Netherlands, the U.K., and most importantly the U.S.

either for given populations,[8] for specific regulatory breach(es),[9] or depending on the media coverage.[10] They echo a long literature on corporate regulatory breaches.[11] Studies can specifically investigate the spillovers of a sub-set of financial crimes, most frequently accounting frauds or insider trading. This is particularly the case in the U.S. where more data is available (larger market, long history of sanction, culture more prone to legal procedures, etc.). This is supported by economic and financial implications of the revelation of such crimes (see appendix A for details). Still, in other jurisdictions, the approach is more generally focused on the enforcer, for example the sanctions made by a given entity (as in this study the French AMF or the British FCA). Some investigated the difference between first-time and repeated offenses, with higher market corrections (Gondhalekar et al., 2012). The most studied country is the U.S., thanks to higher transparency from regulators and defendants (along the enforcement procedures), the size of the market, and the easy availability of a wide range of data on financial crimes.[12] The consecutive steps of the enforcement procedures were studied, typically with event studies.[13] Assuming financial markets are informationally efficient (Fama et al., 1969), all the available information (here the regulatory sanctions) should be reflected immediately by the market (in the stock prices of the sanctioned listed companies). Past research shows that U.S. markets react significantly to sanctions, in particular to the earlier stages of the procedures (Feroz et al., 1991; Pritchard and Ferris, 2001). Still, in an in-depth comparative study, Karpoff et al. (2014) stressed that the consecutive nature of the U.S. enforcement process significantly biases abnormal returns estimates. Similar event studies were conducted following the news of a financial frauds and regulatory sanctions for other

[8] Such as listed companies (Karpoff and Lott, 1993; Kirat and Rezaee, 2019), banks (Köster and Pelster, 2017; Caiazza et al., 2018), asset managers (Choi and Kahan, 2007), or the top management of the firm of the sanctioned firm (Karpoff et al., 2008b).

[9] Such as financial and accounting frauds (for France, Djama, 2008), the accounting disclosure (Karpoff et al., 2008b), or insider trading (Rogers et al., 2016; Fonteny, 2017). (See Table 1 and Table A.1 in Appendix A for details.)

[10] This article focusses on the role of dissemination of information played by the press, and not on the creation (Drake et al., 2014). The coverage by mass media can alleviate information problems for listed firms (Fang and Peress 2009), in particular for individual investors (Fang et al., 2014). Miller (2006) demonstrated that an accounting fraud is more likely to be echoed in the press for firms which already receive more attention from the press. Past research typically concludes with higher market reactions. Rogers et al. (2016) showed that the media plays an economically important role in price formation in securities markets, by widening the dissemination of insider trading disclosures.

[11] A wide range of regulatory breaches can damage corporate reputation: financial fraud, corporate malfeasance (anti-trust violation, bribery, tax evasion, illegal political contributions, employer discrimination, etc.), false or misleading advertising, product recalls, airplane accidents, environmental violations, illicit allegations, etc. Their impacts are typically investigated with an event study methodology.

[12] Amid others, ordered chronologically: Feroz et al., 1991; Karpoff and Lott, 1993; Alexander, 1999; Pritchard and Ferris, 2001; Karpoff et al., 2008a; Tibbs et al., 2011; Haslem et al., 2017.

[13] Accounting and Auditing Enforcement (AAER), U.S. SEC formal or informal investigations, Wells Notice issuance, sanctions, and class action filing.

jurisdictions.[14] They are scarcer, possibly due the data availability challenges. On average, whatever the country or region under review, these event studies conclude with negative, rapid,[15] and significant abnormal market reactions to the publication of financial crimes. Still, the extent of the abnormal returns varies substantially, as well as the timing. There can also be some anticipation from the market, possibly resulting from rumors or private information regarding the sanction (for example Pritchard and Ferris, 2001; Djama, 2008; Dyck et al., 2010; Haslem et al., 2017; Armour et al., 2017).

Beyond the impact of sanctions on returns (put it differently the abnormal returns estimated using an event study methodology), some studies isolate the reputational penalty imposed by the market (if any) from the cost of the sanction.[16] To estimate this reputational penalty, a "residual method" is typically used. The financial sanction (*i.e.* the fine, and possibly other related costs like financing costs, compensations, etc.) is deducted from the overall estimated abnormal market reaction following the news of the sanction (Jarrell and Peltzman, 1985; Karpoff and Lott, 1993; Karpoff et al., 2008a; Murphy et al., 2009; Armour et al., 2017). They conclude that the reputational penalty exceeds, by far, the financial sanction set by the regulator.

Some articles distinguish misconducts depending on the relationship between the offender and the offended, to investigate whether and how it influences market reactions. The sanctions are split depending on whether the regulatory breach impacted related parties to the offender (investors, employees, customers, suppliers) or third parties (market participants, the public, etc.). They conclude that the reputational cost of wrongdoings against related parties is significantly higher (for the U.S.: Alexander, 1999; Karpoff et al., 2008a; Murphy et al., 2009; Tibbs et al., 2011; for the U.K.: Armour et al., 2017).

Finally, part of the literature discriminates the reactions depending on the content of the decision or the communication by the regulator: being investigated for alleged financial regulatory breaches or being acquitted. This is particularly relevant to studies on the U.S., where regulators and defendants can (and do) communicate along the enforcement process. Some studies found that allegations of financial misconduct impact negatively returns (*i.e.* the news of being investigated by one's authority), demonstrating a reputational penalty to the mere suspicion of financial misconducts (Feroz et al., 1991; Pritchard and Ferris, 2001; Murphy et al., 2009;

[14] See Table 2 of chapter 4 for an exhaustive list of event studies on financial crimes.
[15] Lin and Rozeff (1995), for example, conclude that 85% to 88% of private information is incorporated into prices within one trading day.
[16] Reputation is a key asset and deserve investments (Fiordelisi et al., 2014; Heidinger and Gatzert, 2018).

Nelson et al., 2009; Dyck et al., 2010; Tibbs et al., 2011; Haslem et al., 2017). The first announcement of an alleged (even if not sanctioned in the future) regulatory breach triggers the highest and most significant negative market reaction, as demonstrated by Feroz et al. (1991) regarding the U.S. Securities Exchange Commission (SEC) investigations of violations of accounting laws or Pritchard and Ferris (2001) regarding the publication of potential securities frauds followed by the class action filings.

3. The French institutional framework of enforcement and the research questions

3.1.Sanctioning powers of the AMF

As part of its mandate, the Enforcement Committee of the French Financial Market Authority (AMF EC) independently sanctions market players which infringe the sets of rules they are subjected to: the Monetary and Financial Code, and the AMF General Regulation. The goal of sanctions, from a regulatory point of view, is to strengthen the marketplace, by condemning wrongdoings and setting examples. Four main regulatory breaches are sanctioned (see Table 1): three market abuses: 1) breaches of insider dealing regulations (the use and/or divulgence of insider information for investment decisions); 2) price manipulations (a deliberate misconduct to influence securities prices and fair price formation); 3) breaches of public disclosure requirements (a failure to comply with financial reporting laws and regulations); and more generally 4) any breach of the Monetary and Financial Code and the AMF General Regulation (a failure to meet with professional obligations). From 2004, when the AMF first sanctioned after its creation in 2003, to 2016, 308 decisions were made and published on the AMF website. They stood for 196 million euros of cumulated fines.[17] Until late 2016, for a given regulatory breach(es), such administrative procedures could be conducted by the AMF, in parallel to criminal prosecutions. All procedures follow the same four milestones (see Figure 1). A sanction decision can be comprised of cash fines,[18] disciplinary sanctions,[19] and its

[17] 24 sanctions were made *per* year on average, to which add 6 settlements per year since 2012, when this new procedure was first concluded. When excluding the 9% acquittals, 94% of the guilty sanctions included a cash fine, for an average 688,320 euros, paid to the French Treasury (or to the guarantee fund to which the professional belongs).

[18] There is neither binding rule nor clear guidelines on how to value fines. Time consistency and the maximums set legally are the two key objective parameters to set a fine, to which add specificities of the respondent (gravity and duration of the financial misconduct(s), financial situation of the defendant, magnitude of the obtained gains or advantages, losses by third parties, the cooperation along the procedure, recidivism, the remedial changes implemented, etc.). Maximum fines were increased three times over the period under review and can amount up to 100 million euros for market abuses committed by professionals, or 10 times any profit.

[19] 1) Warning and/or blame, depending on the seriousness of the wrongdoing(s); and 2) "ban on activity", covering temporary or permanent ban on providing some or all services, suspension or withdrawal of professional license, and temporary or permanent ban on conducting some or all businesses.

publication.[20] The offender (firm and/or individual) and/or the AMF Chairman of the Board can appeal the decision towards four different jurisdictions: the Court of Appeal of Paris, the Court of Cassation, *via* priority preliminary ruling on constitutionality, and the State Council.

Table 1: Taxonomy of the Sanctions

Table 1 lists the regulatory breaches which can be sanctioned by the AMF, through which proceeding, who can be sanctioned with which financial risk. Listed companies, and their employees, can be investigated or controlled for any market abuse or failure to meet their professional obligations. They risk maximum cash fines of 100 million euros, possibly assorted with behavioral sanctions (warning, blame, or bans on activity). The maximum fine ever set was 35 million euros, in 2017 (*i.e. out of the sample*).

Which Procedure for What Regulatory Breach?	
Investigation	**1. Market abuses:** 1.1. Insider dealing (*31% of the sample*[1]): use or dissemination of information which is not publicly available to other investors for personal gain (for example, a director with knowledge of a takeover bid) 1.2. Price manipulation (*10% of the sample*[1]): distortion of the price-setting mechanism 1.3. Dissemination of false or misleading information (about a company's financial circumstances) *vis-à-vis* the regulator or investors (*54% of the sample*[1])
Control	**2. Any failure to meet the professional obligations set out in the Monetary and Financial Code, the AMF General Regulation and AMF-approved professional rules** (*37% of the sample*[1])
Who?	
	1. Any professionals under AMF supervision if they breach their professional obligations under the law, regulations and professional rules approved by the AMF 2. Individuals acting under the authority or on behalf of these professionals 3. Any person that commits market abuse, or any other breach that could impair investor protection or interfere with orderly markets
By How Much?	
	Up to 100 million euros (or 10 times any profit earned) for professionals under the AMF supervision Up to 300,000 euros (or 5 times any profit earned) for individuals acting under the authority (or on behalf of a professional) for failing to meet professional obligations Up to 15 million euros (or 10 times any profit earned) for individuals acting under the authority (or on behalf of a professional) for market abuses Up to 100 million euros (or 10 times any profit earned) for other persons (issuers and their executives, auditors, others) for market abuses

Sources: AMF, Author
Note: See de Batz (2017a and b) for details. [1]*Several breaches can be sanctioned* per *sanction.*

An originality of this article is that it exploits a crucial feature of the French financial regulatory framework. All the enforcement process is, by law, confidential until the Enforcement Committee hearing and the subsequent publication of the sanction decision. The dates of hearings are publicly announced but without naming the defendant(s) in advance. Consequently, like in the U.K. until recently (Armour et al., 2017), there are no private litigation nor class action claims occurring along the enforcement process. Additionally, it is worth stressing that, contrary to the U.S., newspaper articles or a whistleblowing never triggered any enforcement procedure sanctioned by the AMF over the period under review. All (but one in

[20] Most sanctions are published, particularly in recent years, except if such disclosure would seriously jeopardize the financial markets or cause disproportionate damage to the parties involved. The AMF EC decides whether to publish its decision, where to publish it (mostly on the French Official Journal for Legal Notices (BALO) and on its website, possibly in magazines, at their expenses) and whether to anonymize it (entirely or partially).

2017) sanctioned infringements were identified by the AMF.[21] Hence, *a priori*, no speculation on stock returns should be made regarding future financial penalties. Still, this article is an opportunity to investigate for potential leaks of information from part of the AMF (when the procedure starts) and of the defendant(s) (after the statement of objection).

Within this framework, the AMF's legal attributes to sanction have significantly evolved since 2004. On four occasions, its sanction powers were reformed, broadened, and reinforced (de Batz, 2017a and b). Additionally, an alternative procedure to sanctions, the settlement proceeding, was introduced in 2010, and first applied in 2012. The latter implies simpler and shorter procedures, initially only for the less serious regulatory breaches (failures to meet with professional obligations), without guilty *plea* from the defendant(s) nor possibility to appeal the settlement decision. Settlements reduce the costs and risks inherent to a trial, but dilute deterrence from an enforcement perspective. They are clearly preferred by firms (Bussmann and Werle, 2006), when the regulator offers the option. The two latest reforms were enforced in 2016 and have impacted enforcement since 2017.[22] They reorganized legal proceedings and reinforced the sanction powers of the AMF. Therefore, such evolutions make it particularly interesting to assess the impact of sanctions on investors from the first sanction pronounced in 2004 until late 2016, before a new set of tougher rules starts to apply.

3.2. Testable hypotheses

This article contributes to answering to a global research question, based on the chronology of sanction procedures: what are the consequences of regulatory enforcement on sanctioned listed companies? To do so, we investigate the informational content of sanction procedures by testing the following hypotheses:

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[21] In the U.S., a significant share of financial scandals is revealed by the press (Choi and Kahan, 2007), associated with a statistically significant impact on prices (Miller, 2006).
Conversely, in France, the press is mostly a re-broadcaster of scandal news detected by the regulator (and not a producer of news), hence improving the dissemination of information among actual stakeholders and potential investors and contributing to the efficiency of stock markets (Fang and Peress, 2009; Fang et al., 2014).

[22] Law on market abuses of 21, June 2016 (Law n°2016-819) and Law on transparency, the fight against corruption and modernized business life, of 9, December 2016 (Law n° 2016-1691, IV Art. 42-46)
The main changes include: 1) The maximum fine remains 100 million euros but can stand for up to 15% of the annual turnover for a legal entity and has been increased up to 15 million euros or ten times any profit earned for an individual failing to meet his professional obligations. 2) The ban from activity can now exceed 10 years. 3) The powers of the Enforcement Committee have also been broadened to public offerings of unlisted financial instruments (without prospectus) and to crowdfunding. 4) The scope of regulatory breaches eligible to settlement procedures has been widened to all market abuses (insider dealing, price manipulation and dissemination of false information), and no longer only the failures of regulated professions to meet professional obligations. 5) Finally, any decision published on the AMF website should remain online at least for five years (which was already the case), but any reference to personal data should be anonymized after five years (which was only partially the case).

Hypothesis H_1: The confidentiality of the first two steps of the procedures is respected. No abnormal returns follow the ignition of an investigation or a control (*i.e.* from part of the AMF) or the statement of objections (*i.e.* from part of the AMF or of the company/individual being investigated or controlled, the defendant).

Hypothesis H_2: A regulatory sanction for financial misconduct send a negative signal to the markets, which is priced in. The sanction and its publication translate into negative abnormal returns for sanctioned firms, due to the fine imposed, the downward revision of forecasts, and possibly a reputational penalty.

Hypothesis H_3: Sanctioned firms undergo a reputational loss for being sentenced guilty. The publication of the sanction decision is associated with negative abnormal returns, exceeding the fine imposed by the regulator.

Hypothesis H_4: The informational content of the regulatory decision and/or the characteristics of the sanctioned firms impact market reactions.

4. Methodology and data

4.1.Methodology

A standard event-study methodology (MacKinlay, 1997; Kothari and Warner, 2008) is used to investigate the information content of the four main steps of the AMF enforcement procedure (*i.e.* the "events"). The events are assumed exogenous to the firms: enforcement procedures are independent regulatory decisions, and unrelated to corporate agendas.[23] The impact of the event is measured as the daily Abnormal Returns (AR) of the company being sanctioned around the event, by comparing "actual" *ex-post* returns with "normal" estimated returns. The abnormal returns are taken as unbiased estimates of the total financial consequences of the sanction (all expected uninsured future costs, including reputational losses). Under the null hypothesis H_0, the "event" has no impact on the distribution of returns for the sanctioned firms (mean or variance effect). A market model, augmented with a sectoral index,[24] describes the behavior of returns. The model assumes a jointly multivariate normal and temporally independent distribution of returns. On every day t of the event window [-10;+120] including the event day ($t = 0$), the deviation in an individual stock's daily return from what is expected is taken as an

[23] Contrary to events such as annual and quarterly publication, or profit warnings. The exogeneity is also supported by the fact that some sanctions were, in the end, excluded from the sample due to confounding events such as the publication of the results from another judicial procedure or M&As.

[24] The results of the event studies are robust when using a market model not adjusted for the sectors, though lower. Detailed results are available in de Batz (2018). Controlling for the sector is supported by the long period under review (2004-2016, including the Great Financial Crisis), and the wide range of sectors of the sanctioned firms.

unbiased estimate of the financial impact of the "event" on the stock *i* in *t*. This abnormal return $AR_{i,t}$ is defined as:

$$AR_{i,t} = R_{i,t} - \widehat{\alpha_i} - \widehat{\beta_i} R_{m,t} - \widehat{\gamma_i} R_{s_i,t} \quad (1)$$

Where $R_{i,t}$, $R_{m,t}$ and $R_{s_i,t}$ are the returns on day *t* respectively on the stock *i*, on the market portfolio, and on the sector portfolio s_i of company *i*.[25,26] $\widehat{\alpha_i}$, $\widehat{\beta_i}$ and $\widehat{\gamma_i}$ are the Ordinary Least Squares (OLS) estimates for every sanction *i* over the estimation window [-120;-11]. To draw overall inferences for the event of interest, abnormal returns are cumulated over time $[t_1; t_2]$ and averaged across sanctions to get the Cumulative Average Abnormal Returns ($CAAR_{[t_1;t_2]}$), including the event (see equation (2)). All the sanctions are treated as a group.

$$CAAR_{[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n} CAR_{i,[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n}\sum_{t=t_1}^{t_2} AR_{i,t}. \quad (2)$$

Complementarily, for every sanctioned firm *i*, the shareholder loss (or gain) $SL_{i;[t_1;t_2]}$ is estimated over $[t_1; t_2]$ by multiplying the market capitalization of the firm *i* on the day preceding the event window $(t_1 - 1)$ $MV_{i,(t_1-1)}$ (in euros) by the $CAR_{i,[t_1;t_2]}$. Shareholder losses are then averaged across the *n* sanctions ($ASL_{[t_1;t_2]}$):

$$ASL_{[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n} SL_{i,[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n} CAR_{i,[t_1;t_2]} \; x \; MV_{i,(t_1-1)} \quad (3)$$

The (net) reputational loss (or gain) $RL_{i,[t_1;t_2]}$ for firm *i* is proxied with a residual method and then averaged across all sanctions (Jarrell and Peltzman, 1985; Karpoff and Lott, 1993; Karpoff et al., 2008a; Murphy et al., 2009; Armour et al., 2017). Sanctions are published long after the misconducts and their capitalization in prices, as enforcement procedures last for close to 3 years on average. Hence, this wealth loss is not added to the regulatory fines (Armour et al., 2017).[27] We assume that the financial penalty FP_i for sanction *i* only equals the fine imposed by the regulator. It is deducted from the abnormal shareholder loss (or gain) due to the event $SL_{i;[t_1;t_2]}$:

$$ARL_{[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n}(SL_{i,[t_1;t_2]} - FP_i) = \frac{1}{n}\sum_{i=1}^{n}(CAR_{i,[t_1;t_2]} \; x \; MV_{i,t_1-1} - FP_i) \quad (4)$$

Finally, cross-sectional tests investigate the link between the magnitude of the abnormal returns after the event (*i.e.* loss or gain incurred by shareholders) and the features of the events (see detailed explanatory variables in Table 2). It is particularly interesting given the multiple

[25] Equity returns are defined as the daily log difference in value of the equity (including reinvested dividends).

[26] Given the wide range of size of sanctioned companies, the broadest benchmark index for the French stock markets (CAC All-Tradable) proxies the market portfolio. Euronext main sectors are used for each firm. The 10 main sectors are: financials (38% of the sample); industrials (15%); technology (13%); consumer goods (8%); consumer services (8%); health care (6%); basic materials (6%); telecoms (2%); utilities (2%); oil & gas (2%).

[27] Conversely, in Karpoff et al. (2008a), the reputational penalty equals the expected loss in present value of future cash flows, due to lower sales and higher contracting and financing costs.

possible causes for abnormal returns: do higher fines, disciplinary sanctions, appeals, recidivism, higher media coverage, more liquid stocks, etc. lead to more negative abnormal returns? A cross-sectional regression for $CAR_{[t_1;t_2]}$ on each sanction characteristics is estimated using the usual OLS, with White-corrected standard errors:

$$CAR_{i;[t_1;t_2]} = \delta_0 + \delta_1 x_{i,1} + \delta_2 x_{i,2} + \cdots + +\delta_m x_{i,m} + \varepsilon_i, where\ E(\varepsilon_i) = 0 \qquad (5)$$

Where $x_{i,j}$, for $j = 1, \ldots, m$, are the m characteristics of the i^{th} observation ($i \in [\![1; n]\!]$), δ_j, for $j = 0, \ldots, m$, are the $m+1$ parameters of the model, and ε_i is the zero-mean disturbance term, uncorrelated with the explanatory variables $x_{i,j}$. Heteroskedasticity-consistent t-statistics will be derived using White-corrected standard errors (MacKinlay, 1997).

4.2.Description of the data

A unique dataset was constructed covering the 308 publicly available sanction decisions published on the AMF website over the period 2004-2016. It was completed with a second dataset comprising the 32 settlement decisions made from 2012 to 2016. Most variables were extracted or created from the online sanction reports. They were supplemented by publicly available information and by confidential information, shared by the AMF. The latter covers the names of the entities, for anonymized sanction reports (either *ex ante* or *ex post*),[28] some missing dates of procedure, and information on sanctions dating back to before the AMF creation (such as sanctions by AMF's forefathers).[29] Finally, softwares were used for market data (Thomson Reuters), and for media coverage (Factiva).

The dataset includes more than 40 variables (see descriptive statistics in Table 2) which characterize the decision and its echo in the media, the parties at stake, and the environment: 1) the characteristics of the sanction (or settlement) procedure (including the type of procedure at the origin with an investigation or a control, the sanctioned regulatory breaches, the dates of four milestones of the procedure);[30,31] 2) the main features of the verdict (acquittal, cash fine(s), disciplinary sanction(s), ban(s) on activity, anonymization of the sanction, the chairman of the

[28] Sanction reports can be first (*ex ante*) published anonymized or not, depending on the AMF EC decision. Reports can also be anonymized *ex post*, following decisions of the AMF EC Chairmen (de Batz, 2017a and b).

[29] Law of Financial Security n°2003-706, merging *Conseil des Marchés Financiers* (created in 1996), *Commission des Opérations de Bourse* (created in 1967), and *Conseil de Discipline de la Gestion Financière* (created in 1989). It refers to the articles 621-1 to 621-30 of the Monetary and Financial Code.

[30] The categorization of breaches uses the AMF classification: insider trading, price manipulation, failure to meet with the information regulatory requirements *vis-à-vis* investors or the regulator, failure to meet with professional obligations, proceedings, and takeovers.

[31] Complementary variables were built: the duration of the procedure from ignition to the sanction decision, in years, as in Karpoff et al. (2008b), and the lag between the decision and its publication, in months. Two opposite trends were observed over the 2004-2016 period: a lengthening of the duration of procedures and a shortening of the lag between the decision and its publication, synonym of a higher regulatory transparency.

Table 2: Sample Selection from the 52 Sanctions Pronounced by the AMF

The scope covers the 52 sanctions of listed companies which were sentenced guilty by the AMF from 2004 to 2016 and which were daily listed through the whole enforcement process. Some have delisted since the sanction. The dataset was built mostly based on publicly available data. Complementary data were extracted from softwares (Thomson Reuters and Factiva) or shared confidentially by the AMF (anonymized sanctioned companies, missing dates in particular).

The column "Expected impact on abnormal returns" reflects, *a priori* and based on the literature, whether the variable should lead to lower/more negative (-) or higher/less negative or more positive (+) abnormal returns. For example, being investigated for an alleged market abuse (*versus* controlled for a potential failure to meet the professional obligations), reflecting a presumption of more severe regulatory breaches, is expected to lead to more negative abnormal returns. Similarly, a higher media coverage of the sanction should reinforce divestments, hence convert into more negative abnormal returns. Conversely, appealing a decision should signal to the market that the firm pleads innocent, hence it could temper the negative signal of the sanction decision (*i.e.* positive expected impact on stock value).

Number of observations: 52	**Mean**	**Standard deviation**	**Min.**	**Max.**	**Expected impact on abnormal returns**
Origin of the sanction:					
Investigation (not control)	0.81	0.40	0	1	-
Breaches of insider dealing regulations	0.31	0.47	0	1	-
Price manipulations	0.10	0.30	0	1	-
Breaches of public disclosure requirements[0]	0.54	0.50	0	1	-
Breaches of the Monetary and Financial Code and the AMF General Regulation	0.37	0.49	0	1	+
Characteristics of the sanction decision:					
Cash sanction (as '000 euros)[1]	860	1,354	0	8,000	-
Warning	0.25	0.44	0	1	-
Blame	0.04	0.19	0	1	-
Duration of procedure (start to sanction, as years)	2.65	1.01	1.14	5.98	-
Lag from sanction to publication (as months)	1.82	1.69	0.03	8.47	?
Actual[2] state of online anonymization	0.65	0.48	0	1	+
Partial anonymization	0.25	0.44	0	1	+
First publication anonymized	0.35	0.48	0	1	+
Top management involved in the breach(es)	0.46	0.50	0	1	-
Sanctioned individuals	0.69	0.47	0	1	?
Public company victim of breach(es)	0.25	0.50	0	1	?
Sanction report nb. of pages	11.73	5.95	3	34	-
Details of the appeals:					
Appeal	0.48	0.50	0	1	+
Nb of appeals	0.81	0.99	0	4	+
Rejection of the appeal	0.40	0.49	0	1	-
Appeal by AMF	0.04	0.19	0	1	-
Duration of appeals (from the sanction, as years)	0.99	1.40	0	7.17	-
Media coverage of the sanction procedure:					
Media coverage intensity before the sanction	0.06	0.05	0	0.38	-
Nb of articles published between the sanction and its publication	10.5	37.0	0	248	-
Number of articles published during the week following the sanction	13.8	23.0	0	114	-

Number of observations: 52	Mean	Standard deviation	Min.	Max.	Expected impact on abnormal returns
Articles published in *L'Agéfi* or *Les Échos*	0.71	0.46	0	1	-
Recidivism:					
Recidivism pre-AMF (up to 2003)[3]	0.27	0.45	0	1	-
Recidivism post-AMF (2004-2016)	0.29	0.46	0	1	-
Stock market characteristics:					
Market capitalization (on the sanction day, as million euros)	9,812	15,511	8	69,393	?
Survival to sanction (still listed)	0.88	0.32	0	1	?
Euronext Compartment A[4]	0.56	0.50	0	1	?
Euronext Compartment B[4]	0.17	0.38	0	1	?
Euronext Compartment C[4]	0.19	0.39	0	1	?
Financial sector[5]	0.38	0.49	0	1	-
Industry sector[5]	0.15	0.36	0	1	?
Consumer goods or services sector[5]	0.15	0.36	0	1	?
Technological sector[5]	0.13	0.34	0	1	?
Legal environment characteristics:					
Year of the sanction	2009	3.4	2004	2016	-
LME 2008	0.24	0.42	0	1	-
LRBF 2010	0.40	0.49	0	1	-
President J.P. Jouyet[6]	0.35	0.48	0	1	-
President G. Rameix[6]	0.23	0.43	0	1	-

Sources: AMF, Author's calculation, Factiva, Thomson Reuters
*Notes: [0] Breaches of public disclosure requirements are comprised of breaches to public information obligation (*i.e. *accounting frauds), 52% of the sample, and/or breaches to information obligation* vis-à-vis *the AMF (10% of the sample). Only one sanction involved a mere breach breaches to information obligation* vis-à-vis *the AMF;[1] Sanctions which only involved a disciplinary sanction were assigned a zero-euro cash fine, and sanctions involving several listed companies were accounted for twice. [2] State of anonymization before the application of the Law on market abuses of 21, June 2016 (Law n°2016-819) and Law on transparency, the fight against corruption and modernized business life, of 9, December 2016 (Law n° 2016-1691, IV Art. 42-46). [3] Sanctions pronounced by the 3 Authorities which were merged to create the AMF in 2003 (*Conseil des Marchés Financiers, Commission des Opérations de Bourse, *and* Conseil de Discipline de la Gestion Financière*). [4] Compartment A for market capitalizations above 1 billion euros; compartment B for market capitalizations above between 150 million and 1 billion euros; compartment C for market capitalizations above below 150 million euros. [5] According to Euronext classification. [6] J.P Jouyet from December 2008 to July 2012 and G. Rameix from August 2012 to July 2017.*

AMF EC, the length of the sanction report, appeal characteristics, whether other listed companies were victims of the financial misconduct being sanctioned);[32,33] 3) the attributes of the defendant (such as the moral form, whether an individual (employee, manager, other) was sanctioned, the top management involvement, the survival of the firm to the sanction, recidivism before and/or after the AMF creation, place of listing, stock market capitalization,

[32] Three dummies were used to control for the impact of the anonymization: anonymized when first published, partial anonymization, and *ex post* anonymization, at the AMF EC Chairmen's discretion.
[33] Several variables characterize the appeals: whether the decision was appealed or not by the sanctioned entities, as in Karpoff et al. (2008b); whether the AMF appealed the decision of the AMF EC; the number of courts appealed to; whether the decision was confirmed or not; and the duration of the appeal procedure.

business sector);[34,35,36] 4) the media coverage of the sanction (media exposure intensity before the sanction, the number of articles published between the decision and the publication and over the week following the publication, articles on the sanction published in top tier journals, *L'Agéfi* and *Les Échos*); and 5) some time and legal indicators (AMF chairmen of the board, financial regulations, real GDP growth rate). A comprehensive correlation analysis was carried the dataset.[37]

The sample was restricted to sanctioned listed companies, which were historically the most frequently sanctioned population (42% of the sanctions), followed by asset management firms. The initial sample covered 134 cases, in which 129 sanctions impacted 105 companies. Some sanctions involve several listed companies. Some firms were repeatedly sanctioned (*i.e.*, recidivism), when taking into account branches of groups. These repeat offenders were sanctioned on average three times, ranging from two up to nine sanctions. They were most frequently financial institutions.

The final sample covers less than half of the initial sample: 52 sanctions (*i.e.* on average 4 sanctions *per* year) against 40 daily listed companies. 6 of them are no longer listed, following M&As or bankruptcies. The sample is comprised of all the firms which were daily listed on the Euronext Paris stock-markets,[38] from the 120 trading days before ignition of the procedure, until 120 trading days after the publication of the sanction (*i.e.* daily listed on average over 3.4 years). The reasons for exclusion from the sample include: early delisting,[39] late listing,

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[34] Generally speaking, a focus is made on the individuals within an organization convicted of crime, as recommended by Cohen (1996), either employees (with a principal-agent relationship derived from the employer-employee contract) or top managers. From an investor's perspective, the top management involvement in a fraud could be particularly detrimental, illustrating the improper management of the firm and questioning the capacity of the management to handle future challenges. Karpoff et al. (2008b) showed how financial mis-presentation can prejudice careers of top managers: more than 90% of them lose their jobs by the end of the U.S. SEC enforcement procedure.

[35] Recidivism is one of key aggravating factor regularly stated by the AMF to define the size of the sanction. Repeat offenders are sanctioned more severely than first-time offenders.

[36] According to the Euronext classification. The most frequent sectors (dummy variables) are: financial services, industry, consumer goods and services, and technology.

[37] Detailed results and analyses are available on demand or in de Batz (2018).

[38] Euronext is organized around three pillars:

1) The European Union regulated market for equity securities operates in five markets (including Paris). They are segmented by market capitalizations: compartment A (above 1 billion euros), compartment B (from 150 million to 1 billion euros), and compartment C (below 150 million euros).
2) Alternext targets small-and-mid-sized companies by offering a simplified access to capital markets with fewer requirements and less stringent ongoing obligations than on the EU-regulated market.
3) The free market provides the easiest access to capital markets through a direct quotation procedure for any company, whatever the size (from micro-cap to medium-sized international companies) searching to access capital markets (free from the Euronext's eligibility criteria and information disclosure requirements). This market targets primarily sophisticated or professional investors.

[39] In our sample, delisting can be accounted for three main sets of reasons, by decreasing frequency: 1) bankruptcy; 2) mergers or acquisitions with/by another listed company, leading to delisting; and 3) managerial decision to delist due to the regulatory constraints and the legal and financial risks associated, preferring other financing

temporary suspension, or lower-than-daily quotation frequency. Such companies could be already ailing, experiencing financial difficulties (announcing a delisting or a failure in the near future), less traded (hence less liquid, questioning the price formation mechanism around the events), or undergo exceptional events justifying a temporary suspension (such as M&As). All these reasons are likely to interfere with the event and to bias (to the down- or up-side) the market responses to the news of a sanction. Additionally, four sanctions on a multinational bank daily traded in Euronext Paris were excluded, due to the limited share of activities in France.[40] Acquittal decisions (11 cases) were also removed from the initial sample, given the different nature of the verdict. To avoid overlap and enable data clustering, two concomitant sanction procedures were merged (the cash fines and disciplinary sanctions were compounded), to assess the cumulated severity of the regulatory decisions. Finally, a systematic search for confounding events using Factiva around every step of the procedures led to the exclusion of five sanctions due to major confounding events, such as the outcome of a major lawsuit, the start of a safeguard procedure, or changes of name. The risk of introduction of biases through the sample selection is tamed by the comprehensiveness of the sample of sanctioned listed companies. Complementarily, some initially excluded sanctions were included in complementary analyses, as well as settlements with listed companies.

Table 3 compares the descriptive statistics of the initial and final samples of sanctioned listed companies. For the final sample, most sanctions follow investigations (81%), which target the most serious regulatory breaches (*i.e.* the three market abuses). 1.4 regulatory breaches are committed *per* sanction on average, the most frequent being dissemination of false information (*i.e.* accounting frauds, 54%), failures to meet with professional obligations (37%), and insider trading (31%). The great majority of companies are large, as 56% of them are listed on the Compartment A and 17% on the Compartment B of Euronext. The average market capitalization amount to 9.8 billion euros (on the day preceding the sanction), ranging from 8 million up to 69 billion euros, with a standard deviation of 15.5 billion euros. 48% of the decisions are appealed, with an 84% confirmation rate of the AMF EC's decision.

Most of the divergences between the sample and the average for listed sanctioned companies derive from the higher share of financial companies in the sample (38%, against

sources (less regulatory constrained). Karpoff et al. (2008a) also found for the U.S. that there is high delisting rate, which reduces massively the size of the sample. The study also stresses that the delisted companies tend to be associated the poorest stock performance over the whole enforcement period.

[40] Given the size of the bank (14 times the average market capitalization of the sample), and its listing on several stock exchanges, any action from the French AMF would unlikely provoke a significant abnormal reaction from global shareholders. Additionally, confounding events could lead to misinterpret the results. Still, the four sanctions were added in a robustness check.

25%). These sanctions targeted top tier universal banks, with higher-than-average market capitalizations (by 42%),[41] and a lower likelihood of bankruptcy (the central bank being the lender of last resort). The gap in market capitalizations can also be explained by the fact that smaller companies are more frequently not daily quoted (hence excluded from the sample), or experiencing financial difficulties. It can lead to quotation suspension or bankruptcy before or shortly after the sanction, which pleads for their exclusions from the sample. 22% of the full sample of sanctioned firms ended bankrupted. Financial firms are also the most likely to reoffend (de Batz 2017a; de Batz 2017b). All in all, the sample cash fines are 28% higher-than-average, as size and recidivism are two of the few regulatory determinants of cash fines.

Table 3: Characteristics of Sanctions of Listed Companies *versus* the Sample

Table 3 compares the main features of the initial and the final samples of listed companies being sanctioned by the AMF from 2004 to 2016. The final sample ("Sample Listed Companies") is comprised of the decisions involving a daily listed firm, from 120 trading days before the ignition of the enforcement procedure, until 120 days after the publication of the decision. Major confounding events and duplicated procedures were also excluded, as well as abnormally large firms.

	All Listed Companies[3]	**Sample Listed Companies**
Number of sanctions	129	52
Number of sanctioned companies	105	40
Of which bankrupted	*23 (19 before sanction)*	*2*
Investigations (as % of total)	88	81
Number of reg. breaches *per* sanction	1.5	1.4
Main activity sectors:		
Financials *(as % of total)*	25	38
Consumer goods or services *(as % of total)*	22	15
Industrials *(as % of total)*	22	15
Technology *(as % of total)*	13	13
Average cash fine[1] (as thousand euros)	693	882[4]
Average duration of procedure (as years)	2.7	2.6
Average market capitalization (as billion euros, on the day preceding the sanction)[2]	11.9 *(6.9)*[5]	9.8

Sources: AMF, Thomson Reuters, author's calculations. [1] Excluding acquittals and counting only one time sanctions involving several listed companies. [2] For companies still listed when being sanctioned guilty, on the day of the sanction decision. [3] Listed companies cover all the sanctions of listed companies, including acquittals. [4] Excluding the sanctions with only a disciplinary sanction (meaning a null cash fine). [5] Average market capitalization when excluding the 4 sanctions on the major international bank excluded from the sample.

5. Impact of sanctions on listed companies

5.1. Impact on stock returns

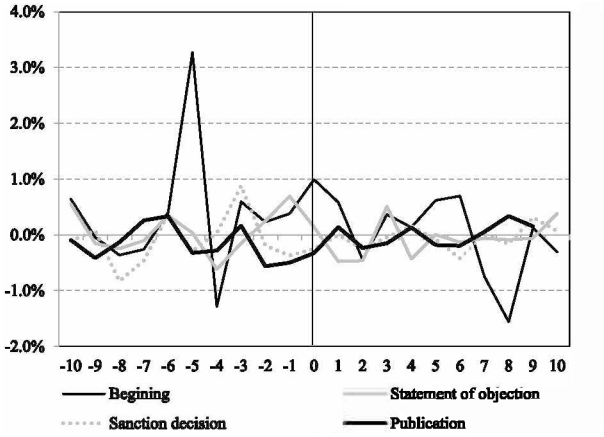
Four event studies are conducted for each step of the enforcement (see figure 1). Step 1 is the beginning of the (AMF internal) procedure, with the approval of an investigation (for alleged

[41] When excluding the 4 sanctions of the major international bank excluded from the sample.

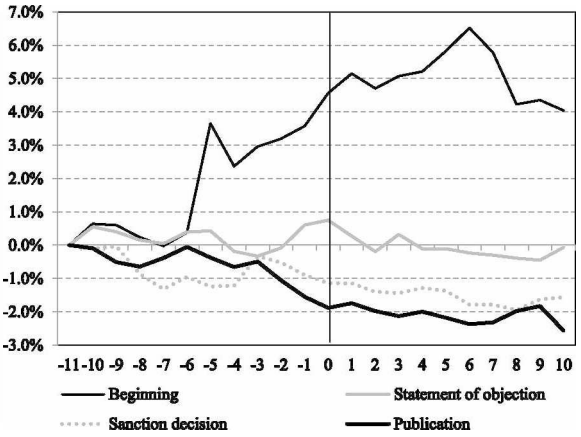
Figure 2: Average Abnormal Returns and Cumulative Average Abnormal Returns for the Different Milestones of the Sanction Procedures

Abnormal returns are computed given the augmented market model parameters estimated with OLS with White-corrected standard errors, through the period [-120;-11] in event time (see Eq. (1)). Event time is days relative to the step of the sanction procedure under review. The sample is composed of 52 sanctions of daily-listed companies over the period 2004-2016. Average abnormal returns AAR_t and $CAAR_{[t_1;t_2]}$ are calculated using the Eq. (2).

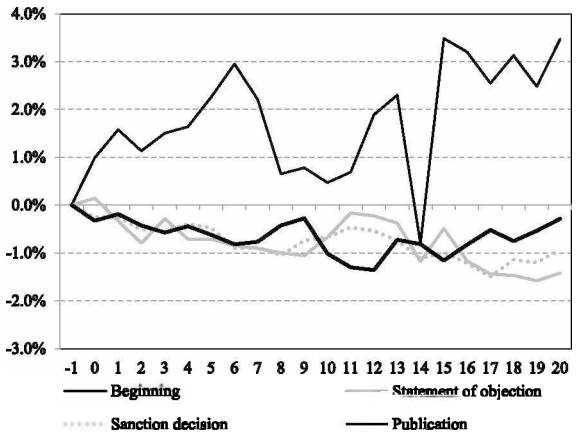
(a) Average Abnormal Returns (AAR_t)



(b) Cumulative Average Abnormal Returns ($CAAR_t$) around the event [-10;+10]



(c) Cumulative Average Abnormal Returns ($CAAR_t$) after event [-1;+10]



Sources: AMF, Thomson Reuters, Author's calculations

market abuses) or a control (for breaches to professional obligations). Step 2 is the statement of objection, when the incriminated firm is notified by the Board of the AMF that it is being investigated for characterized regulatory breach(es) and asked for additional information. Given these elements, the Board may transfer the case to the AMF EC, initiating the "judicial part" of the procedure. Step 3 is the AMF EC hearing (*i.e.* the trial), when the sanction decision is made, followed by the (possibly anonymized) publication of the sanction report on the AMF website (step 4). Since 2010, the AMF EC hearings have been opened to the public, without naming *ex ante* the case(s) under review. Top-tier financial journalists typically attend them. Hence, newspaper articles can be written over the 50-trading-day average lag between the decision and its publication (which happens for 42% of the sample). The echo of sanctions in the press is

even greater after the publication (85% of the sample). Hence, returns can be expected to react to the anticipated publication of the sanction.

Table 4: Cumulative Average Abnormal Returns Along Enforcement Procedures

Table 4 reports the cumulative average abnormal returns ($CAAR_{[-1;t]}$) from the day preceding the event up to a specified day *t* in event time for the four main steps of the sanction procedure, as defined in Eq. (2). Event time is days relative to the step of the sanction procedure being analyzed and *t = 0* is the event itself. Abnormal returns are computed given the augmented market model parameters (Eq. (1)), which are estimated with OLS through the period [-120;-11] in event time. The sample is composed of the 52 companies which were sentenced guilty by the AMF from 2004 to 2016 and were daily quoted all through the enforcement procedure.

	Beginning of procedure (control or investigation)		Statement of objection		Enforcement Committee and sanction decision		Publication of the sanction decision	
t	***CAAR$_t$***	***t-stat***	***CAAR$_t$***	***t-stat***	***CAAR$_t$***	***t-stat***	***CAAR$_t$***	***t-stat***
-1	0.4%	*0.8*	0.7%**	*2.2*	-0.4%	*-1.2*	-0.5%***	*-2.7*
0	1.4%	*0.7*	0.8%	*1.5*	-0.6%*	*-1.7*	-0.8%***	*-3.0*
1	2.0%	*1.0*	0.4%	*0.5*	-0.6%	*-1.7*	-0.7%*	*-2.0*
2	1.5%	*0.7*	-0.1%	*-0.1*	-0.9%*	*-1.9*	-0.9%*	*-1.9*
3	1.9%	*0.9*	0.4%	*0.5*	-0.9%*	*-1.8*	-1.1%*	*-1.7*
4	2.0%	*1.0*	0.0%	*0.0*	-0.8%	*-1.3*	-0.9%	*-1.5*
5	2.6%	*1.3*	0.0%	*0.0*	-0.8%	*-1.2*	-1.1%*	*-1.8*
6	3.3%	*1.6*	-0.2%	*-0.2*	-1.3%	*-1.6*	-1.3%**	*-2.2*
7	2.6%	*1.2*	-0.2%	*-0.3*	-1.3%	*-1.5*	-1.3%*	*-1.8*
8	1.0%	*0.4*	-0.3%	*-0.4*	-1.4%	*-1.7*	-0.9%	*-1.2*
9	1.2%	*0.5*	-0.4%	*-0.4*	-1.1%	*-1.3*	-0.8%	*-0.9*
10	0.8%	*0.3*	0.0%	*0.0*	-1.0%	*-1.1*	-1.5%	*-1.6*
20	3.9%	*1.4*	-0.7%	*-0.4*	-1.3%	*-1.0*	-0.8%	*-0.6*
40	7.4%	*1.5*	-1.8%	*-0.7*	-1.9%	*-1.0*	1.2%	*0.6*
60	9.1%*	*1.7*	-0.2%	*-0.1*	-3.7%	*-1.4*	0.2%	*0.1*
120	11.8%*	*1.7*	3.6%	*0.6*	-7.1%	*-1.5*	-6.6%	*-1.5*

Sources: AMF, Thomson Reuters, Author's calculations
*Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% level.*

As described in the methodology, for every step of the procedure, "abnormal" returns are calculated over the event window [-10;+120] with respect to the event in $t = 0$ from the "normal" parameters estimated over the estimation window [-120;-11] (see Eq. (1)).[42] Including days before the event investigates for anticipation following leaks of information or speculation. Abnormal returns are then cumulated along time and averaged across sanctions to draw some inferences on the abnormal reactions following the milestones of the proceeding (see Eq. (2)). Figure 2 (a), (b) and (c) and Table 4 report, for every step of the procedure, Average Abnormal Returns (AAR_t), and Cumulative Average Abnormal Returns ($CAAR_{[t_1;t_2]}$) for the whole sample ($n = 52$). Complementarily, a set of cumulative abnormal returns for sanctioned firms and for every step is presented in Figure 3 (a) to (e). They demonstrate adverse and genuine

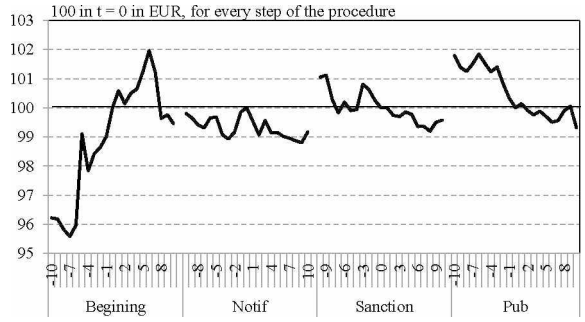
[42] Robustness checks were performed by modifying the length of estimation window (100 and 90 days). The results are not sensitive to such variations. Detailed results are available on demand.

effects of some steps of the sanction procedure on returns of sanctioned listed firms over the period under review.

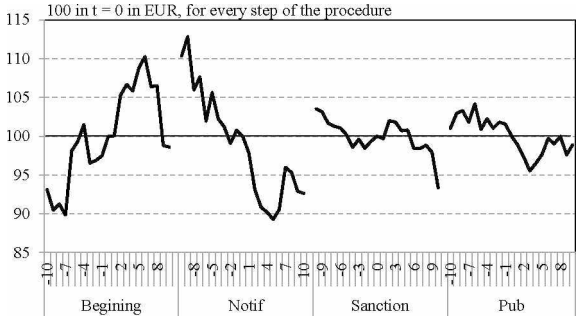
Figure 3: Cumulative (Average) Abnormal Returns

Abnormal returns are computed given the augmented market model parameters estimated with OLS with White-corrected standard errors, through the period [-120;-11] in event time, using Eq. (1). They are then cumulated along time. The figures depict abnormal price developments (on average (figure 3.a) or specific sanctioned firms (figure 3.b to 3.e)), rebased at 100 on the day of the event. Event time is days relative to the step of the sanction procedure under review. The sample (a) is composed of 52 sanctions of daily-listed companies over the period 2004-2016. The 52 sanctions are numbered chronologically (hence the oldest one depicted is SAN-15 and the most recent SAN-42).

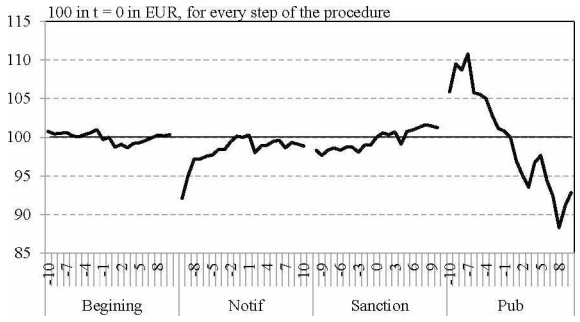
(a) Cumulative Average Abnormal Returns



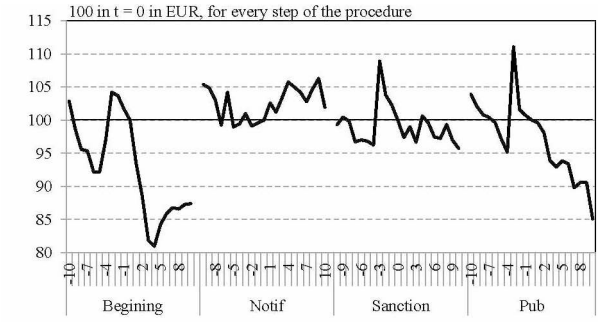
(b) Cumulative Abnormal Returns for SAN-15



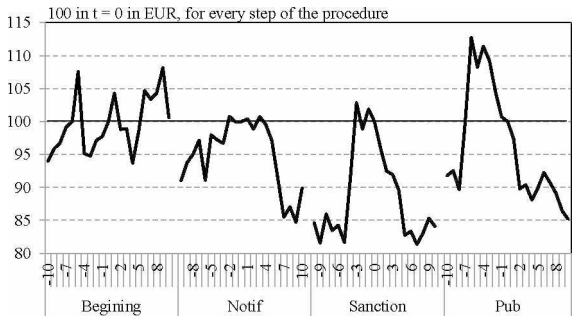
(c) Cumulative Abnormal Returns for SAN-20



(d) Cumulative Abnormal Returns for SAN-26



(e) Cumulative Abnormal Returns for SAN-42



Sources: AMF, Thomson Reuters, Author's calculations

On the one hand, shareholders do not react significantly to the first steps of the procedures: no significant abnormal return follows either the beginning of the procedure, or the statement of objection. We fail to reject the hypothesis H_1, in line with expectations. This result for the beginning of the procedure rejects any breach of confidentiality from part of the AMF

teams in charge of internal procedures. Leaks of information to market players or use of insider information could have caused a reaction in stock returns. Additionally, the absence of abnormal returns following the statement of objection demonstrates the lack of insider trading from part of the AMF and of the investigated firm(s), after learning about a procedure that can end up with a sanction.

On the other hand, also as expected (see hypothesis H_2), the last two steps of the procedure trigger statistically significant reactions: shareholders suffer abnormal losses following the sanction decision, and its publication. The regulatory decision on the guiltiness of a given listed firm is negative signal sent to the market: on average, returns contract by a cumulated abnormal 0.9% over the period [-1;+2] in event time (significant at the 10% level). Additionally, they lose 0.8% over the period [-1;0] following the publication of the decision (significant at the 1% level) and 1.1% over the period [-1;+3] (significant at the 10% level).

Interestingly, there is some anticipation in the reaction, before the publication, as in previous studies.[43] Abnormal returns turn significantly negative on $t = -1$, possibly anticipating the outcome of the decisions and newspaper article, or due to leaks of information to insiders, as seen in other jurisdictions. 62% of the guilty companies exhibit negative abnormal returns on the day of the publication of the sanction, ranging from -5.3% to +5.0% (1.5% standard deviation). Three days after the publication, 63% of the companies suffer cumulated losses, with a wide range of $CARs$, ranging from -12.1% to gains of +7.8% (4.4% standard deviation). The contraction in returns peaks 6 days after the publication ($CAAR_{[-1;+6]} = -1.3\%$, significant at the 5% level).

In the longer run, cumulative average abnormal returns following the sanction decision remain negative though insignificantly ($CAAR_{[-1;+60]} = -3.7\%$). This contraction echoes the lag between the AMF EC hearing and the publication of the decision: 50 trading days on average in the sample. Hence, the cumulated contraction 60 days after the sanction would incorporate the compounded abnormal reactions to the sanction and to its publication, estimated over a window excluding the sanction decision and its publication.[44]

Given the limited (though exhaustive) number of observations, and to ensure that the presence of outliers does not bias the results, two complementary robustness checks are

[43] For example, ordered chronologically: Griffin et al., 2000; Pritchard and Ferris, 2001; Djama, 2008; Dyck et al., 2010; Haslem et al., 2017; Armour et al., 2017.

[44] Still, longer term abnormal returns estimated from event studies must be analyzed carefully as the further from the event, the more questionable the specification and the explanatory power of event studies (Kothari and Warner, 1997; Bhagat and Romano, 2002). The key reason is that the noise-to-signal ratio greatly increases as the time distance from the event date becomes larger. In addition, the further from the event, the more likely other confounding events might interfere with the investigated event.

conducted. A bootstrapped analysis of the robustness of standard errors was conducted 1,000 times, with a confidence interval of 95%. Complementarily, abnormal returns were winsorized before estimating the test statistics, as in Armour et al. (2017): all abnormal returns outliers to a 90th percentile were excluded from the data, meaning that all data below the 5th percentile are set to the 5th percentile, and data above the 95th percentile are set to the 95th percentile. The magnitudes of the $CAAR$ were confirmed and turned out to be slightly more significant and persistent in time with winsorized abnormal returns.[45]

All in all, in the short run, these sequential event studies confirm the reactions observed in previous research. They also contribute to improving the quality of the assessment of the spillovers of sanctions in France. In fact, the exhaustive sample of daily listed guilty companies implies a broader scope of analysis and a higher granularity. No abnormal reaction was measured through the early stages of the enforcement procedure, rejecting breaches of confidentiality either by the regulator and the defendant(s). Subsequently, the results are coherent with past studies on the French sanctions, though to a lower extent: sanction decisions and their publications convey information and impact negatively returns of listed companies in the short run.[46] As in the literature, some anticipation in the outcome was measured, with the negative correction in prices. Additionally, contrary to the efficient market hypothesis, investors' reactions tend to be scaled in time: the spillovers of sanctions on the stock returns take some time to fully materialize. Some investors will react immediately after learning the sanction. Conversely, various reasons can contribute to this inefficiency of financial markets, leading to no or postponed reactions: the time to access information (initially unaware, herd behaviors), the light financial education (misunderstanding of regulatory breaches), or the avoidance of financial consequences (fees due to portfolio rebalancing, deterring fiscal consequences, no investment alternative, etc.). It is also likely that some channels of news scaled in time after the publication, from part of the sanctioned company itself or newspaper articles, will contribute to postponed (or lagged) market abnormal reactions.

[45] Detailed results are available on demand.

[46] Kirat and Rezaee (2019) concluded with a statistically significant -0.7% in AAR_0 on the day of the announcement of the sanction in the press and a $CAAR_{[-2;+2]}$ of -1.7%, with a sample of 47 companies over the period 2004-2017. Djama (2008) found no impact of the beginning of the procedure and a significant negative impact of the publication of the decision (-6.9% in AAR_0, -8.3% in $CAAR_{[0;1]}$), for accounting fraud with a sample of 37 sanctions of 28 listed companies, from 1995 to 2005.

In the longer run, past literature estimates a large range of impacts, from positive[47] to very negative[48]. Some studies conclude that a fraud durably affects returns, up to three years after the news, when using lower frequency data (Leng et al. 2011; Dyck et al. 2010). Such estimates must be taken with caution as the further from the event, the more likely confounding events will interfere with abnormal returns.[44] The impact of French sanctions on guilty daily-listed companies in the longer run remains limited compared with international estimates. Our results demonstrate that, over the six months following the sanction (either decision or publication), $CAAR_t$ remain negative, even though they are not significantly different from zero. That could be explained by the higher volatility in the long run. Finally, it is likely that the reaction following the sanction decision is partly confounded with the reaction following the publication.[49] When cumulating the impacts of the last two steps of the procedure, the magnitude of average abnormal returns becomes more substantial: -3% to -4% cumulated losses 60 trading days after the sanction, estimated over an estimation window excluding any event related to the sanction.

5.2. Complementary results and information content of the sanction decisions

Robustness checks with larger or sub-samples and complementary analysis were conducted to test the sensitivity of the results to the hypotheses. Results are robust and complementary with conclusions previously described.[50] They show that the French enforcement actions are not trivial.

Firstly, including into the initial sample the four sanctions pronounced against a major international bank leads to similar impacts to the central event study. Still, abnormal returns are lower and less significant, supporting the hypotheses which led to their initial exclusion.

Secondly, the impact of the Great Financial Crisis of 2008 was tested, given its magnitude and spillovers. Financial firms, which were at its origin and its main victims, are the most frequently sanctioned listed companies. The crisis also led to a tightening of financial regulation and supervision, in particular regarding sanction powers at the European and French levels (de

[47] Such as +2.96% in one-year stock performance following a 1-standard deviation increase in the financial penalty for 20 country panel, in Köster and Pelster (2017).
[48] The maximum was -34.4% in the U.S. cumulated over the days for which the firms were subject to a regulatory event, in Karpoff et al. (2008a).
[49] As stated by Armour et al. (2017), multi-stage events make it difficult to ensure that the later stages really relate to the original announcement and not to further information that was released during subsequent stages or conversely that relevant information was not released between the reported stages.
[50] Detailed results are available on demand or in de Batz (2018).

Batz, 2017b). The sample was split by publication dates, either before or after the crisis.[51] The re-estimated event studies show that the information content of the publication of sanctions seems to have increased since June 2007, with significant and more negative abnormal returns. They suggest a reinforced market awareness and risk sensitiveness to sanction and regulatory interventions.

Thirdly, following past literature, offenses were sorted into two main categories: whether they hit related parties or not (*i.e.* third parties), based on the AMF split of regulatory breaches.[30] The event studies were re-estimated for every breach. Their results, displayed in Appendix A, demonstrate that the three breaches impacting related parties lead to higher abnormal negative returns after the publication (by declining order of magnitude and significance): 1) insider trading; 2) breaches of public disclosure requirements (a failure to comply with financial reporting laws and regulations); and 3) not complying with one's professional obligations. Conversely, price manipulation (*i.e.* hitting third parties) does not cast significant abnormal returns (though the meaningfulness of the result is questioned by the limited sample size). Such results confirm past studies as investors tend to react more when they are impacted by the financial misconduct (*i.e.* by being a related party).

Fourthly, the event studies were re-estimated for two subsamples based on the "seriousness" of the verdict,[52] capitalizing on the guidelines given by the AMF on how to set the sanction.[18] The results stress that the mere cash fine is uncorrelated to the magnitude of abnormal returns. That may be explained by low level of average cash fines (in absolute and relative terms).[53] Some cumulated components of the seriousness of the decision (subsample "3 factors")[52] point to a more severe financial misconduct, leading to more negative abnormal returns. That confirms the initial hypothesis H_4 that not only will the mere fact of being sanctioned be priced in abnormal returns, but the nature of the sanction will also negatively influence the results.

Fifthly, no significant abnormal returns followed the 7 decisions for which the identities of the sanctioned firms were anonymized when first published, whatever the step of the procedure. This confirms the lack of breaches to confidentiality along the enforcement process.

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[51] As in the literature, two alternative starting dates were tested: June 2007 (Armour et al., 2017), with the beginning of the U.S. subprime crisis, or September 2008, with Lehman Brothers' bankruptcy (Kirat and Rezaee, 2019).

[52] First subsample "Average" (19 sanctions): cash fines higher than the average.
Second subsample "3 factors" (19 sanctions) if two out of the three following conditions: a cash fine higher than the median; a disciplinary sanction (warning or blame); and recidivism (*pre*- and/or *post*-AMF creation).

[53] Compared to the market capitalizations, to fines by other French Regulatory Authorities, or to international standards. Cash fines stand for a limited 0.15% of market capitalizations, on average for the sample.

Finally, two complementary samples of decisions were subjected to the event study methodology: 1) the 11 acquittals of listed companies, and 2) the 5 settlement decisions involving subsidiaries of daily listed companies (three French financial groups).[54] For both samples, the expected information content of the decisions was not straightforward, under the assumption that sanctions convey information to investors. Firstly, an acquittal can be a synonym of innocence, and no fine has to be paid (positive signal). Conversely, it can signal serious doubts from the regulator regarding a firm (negative signal), as only the most severe financial wrongdoings are brought to the AMF EC. Other less serious breaches are dealt with confidentially and bilaterally, between the AMF and the regulated entity. Additionally, acquittals frequently result from procedural irregularities, or prescription limit of the incriminated regulatory breach(es), which do not exonerate the entity from any liability. Secondly, settlements are alternative lighter procedures, dedicated to less serious regulatory breaches than sanctions. They do not imply guilt recognition from part of the defendant. Still, they result from significant financial misconducts, which could not be delt with bilaterally. Under the rationality of investors and efficient market hypotheses, abnormal returns following settlements are expected to be negative, though lower than for the sample of guilty sanctions.

Acquittal decisions convey mixed signals: positive significant abnormal returns on the day of the sanction ($AAR_0 = +1.1\%$, significant at the 10% level), followed by a negative returns after the publication ($CAAR_{[0;+3]} = -3.1\%$, significant at the 10% level). The results could be explained by the limited sample size. They also echo the divergent conclusions on the impacts of allegation of financial misconduct (*i.e.* the mere fact of being investigated) as well as on acquittal decisions, in other jurisdictions.

For the small sample of settlements, no significant abnormal returns followed any step of the proceeding. The markets do not price in the additional information on the firm's compliance with regulation. Similarly, Haslem et al. (2017) found market reactions to settlements being the least negative and negligible, whatever the outcome. The lack of reaction to settlements questions the information content of such procedures, and the credibility of the AMF communication and decisions *vis-à-vis* investors.

[54] 32 settlements were signed from 2012 to 2016. A settlement is an alternative and shorter kind of sanction dedicated to the least severe regulatory breaches (until late 2016), *i.e.* the failures to meet with professional obligations, subject to an AMF proposal and an acceptance by the firm.

5.3.Impact on market values and reputational penalty, following the publication of the sanction

This section investigates the hypothesis H_3: does a reputational penalty explain part of the abnormal returns following the sanctions of listed firms? The focus is limited to the step of the procedure triggering the biggest and most significant reactions in CAR: the publication of the sanction. From Eq. (3), the impact on market capitalizations $SL_{i,[-1;+t]}$ is calculated by multiplying the $CAR_{i,[-1;+t]}$, from the day preceding the event until t days in event time ($t = 0, +1\ and\ +6$) by the market capitalization of every sanctioned firm i. They are then averaged across sanctions ($ASL_{[-1;+t]}$). Detailed results are displayed in Table 5.

Table 5: Average Stock Losses/Gains Following the Publication of the Sanctions

The Stock Losses/Gains ($SL_{i,[t_1;t_2]}$) are calculated sanction by sanction based on Eq. (3), by multiplying the market capitalization of firm i on the day preceding the event by the estimated $CAR_{i,[t_1;t_2]}$, and then averaged across sanctions to get the Averaged Stock Losses/Gains ($ASL_{[t_1;t_2]}$). The Cumulative Abnormal Returns over the event window $[t_1; t_2]$ ($CAR_{i,[t_1;t_2]}$, see Eq. (2)) over three different event windows are used to estimate cash impact of the publication of the sanction for the sample of 52 listed companies. $CAR_{i,[t_1;t_2]}$ are averaged to get $CAAR_{[-1;t]}$. The cash fines are compared to the Stock Losses/Gains ($SL_{[t_1;t_2]}$), and then averaged across sanctions.

	[-1;0]	**[-1;+1]**	**[-1;+6]**
$CAAR_{[-1;t]}$, as %	-0.8%***	-0.7%*	-1.3%**
$ASL_{[-1;t]}$, as million euros	**-45.2**	**-74.6**	**-32.0**
Std deviation, as million euros	*192*	*363*	*617*
Minimum $SL_{[-1;t]}$, as million euros	-834.4	-2,236.0	-3,533.3
Maximum $SL_{[-1;t]}$, as million euros	+478.4	+870.9	+1,192.7
Negative $SL_{[-1;t]}$, as % of total	60%	56%	58%
Cash fines, as % of $SL_{[-1;t]}$	**-6.4%**	**-3.8%**	**-6.0%**

Sources: AMF, Thomson Reuters, Author's calculations
*Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% level.*

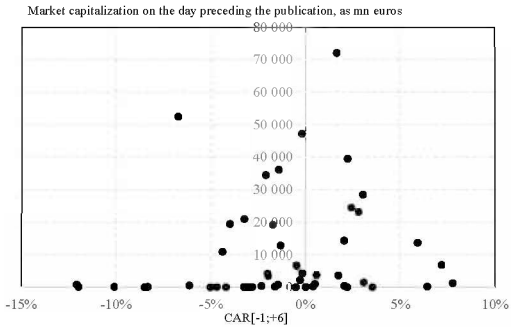
Table 5 shows that sanctioned firms get penalized, on average, by the market. The cash fines set by the AMF (860,000 euros on average) stand for a limited share of these stock losses, synonym of a large reputation loss based on the residual method (Karpoff and Lott, 1993). These averaged results stress that markets do integrate the information of the sanction as a negative signal, and sanctioned firms incur a reputational loss (see Eq. (4)), standing for -1.2% of market capitalizations. We reject the null hypothesis H_3 that there is no reputational penalty after the publication of a regulatory sanction. Still, these results must be interpreted with great prudence given high standard deviations, consecutive to the heterogeneity in market capitalizations (see Table 2). This limits the economic meaningfulness of the averaged results.

In light of the lower abnormal returns of larger firms shown by Figure 4, the sample of sanctions was split into two categories by market capitalizations. Following the Euronext classification, we define as "large firms" those listed on the Compartment A of Euronext Paris,

with market capitalizations above 1 billion euros, and as "smaller firms" the rest of the firms (listed on the compartments B and C, and on Alternext).[38]

Figure 4: Distribution of *CARs* Depending on Market Capitalizations

Figure 4 depicts, for the event window [-1;+6], the distribution of the cumulative abnormal returns ($CAR[-1;+6]$) against respective market capitalizations of the sanctioned firms on the day preceding the publication of the sanction. Different event windows give similar distribution patterns.



Sources: AMF, Thomson Reuters, Author's calculations

Figure 5 illustrates the major divergences in abnormal market reactions between large and small firms of the sample, which put into perspective the averages of Table 5. In fact, averaged reputational losses (or gains) are respectively of -53.2 and -7.4 million euros for large and small firms over the event window [-1;+6]. When controlling for the respective size of the firms, the average reputational penalty increases for smaller firms (-2.9% of market capitalization), while the reputational impact turns moderately positive for larger firms (+0.4% of market capitalization). Larger firms would benefit from being sanctioned with reputational gains, while smaller firms endure reputational costs.

Consequently, sanctions are more informational for the smaller and less liquid companies. The flow of news with their regards is also lower. Hence, the news of a sanction for a financial misconduct is likely to trigger higher (abnormal) reactions from shareholders. Conversely, for larger firms (which are also most inclined to recidivism), the news of a sanction appears to be less informational. It could also be explained by prior information leakage about the misconduct which would have been priced in even before the start of the event window, as it happens frequently in Anglo-Saxon countries.[43] Divergent reputational reactions between size of firms may also be the consequence of an information overload of the market regarding large firms, which can incapacitate investors to discriminate between news. Ripken (2006; p. 187) concluded that "if investors are overloaded, more information may simply make matters worse by causing investors to be distracted and miss the most important aspects of the disclosure".

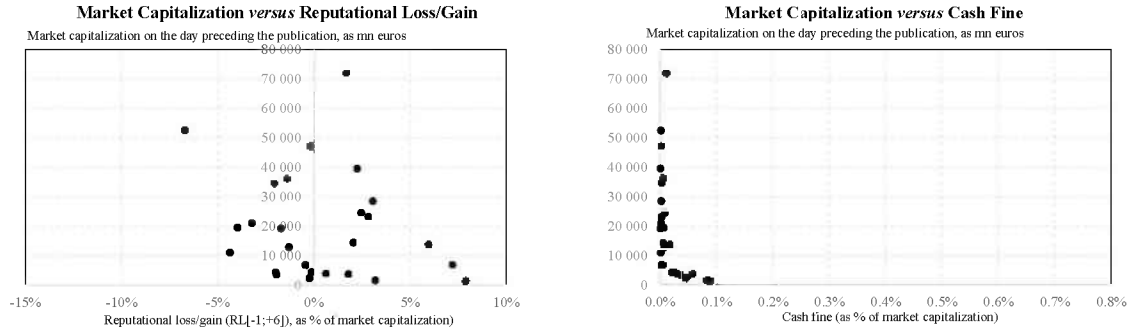
The "reputational gain" from being sanctioned for large French firms questions the severity of the verdict (in particular the levied cash fines) and, more broadly, the credibility of the AMF as a regulator. This market inefficiency echoes the AMF's lenient reputation when

sanctioning. In fact, fines imposed by the AMF are limited compared to the legal thresholds (fines stand on average for 0.86% of the authorized maximums),[55] and in international standards. For example, fines for similar misconducts in the U.K. are close to twice as important as in France. Armour et al. (2017) estimated that the average fine imposed by the Financial Services Authority or the London Stock Exchange amounts to 0.26% of market capitalization, over the period 2001-2011. In comparison, the average fine set by the AMF stands for 0.15% of market capitalization over the period 2004-2016. Additionally, the comparison of samples (a) and (b) of Figure 5 shows how the distribution of cash fines to market capitalizations is skewed to the left (lower values) for larger firms. On average, the sanction decisions are proportionally tougher against smaller firms, as the average financial penalty stands for 10 times more of the market capitalization for smaller firms compared to larger firms (0.2% against 0.02%).

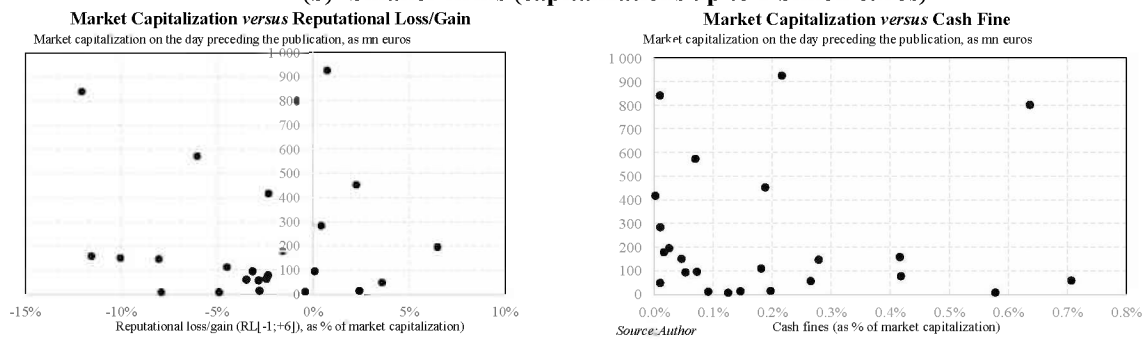
Figure 5: Comparison of Large and Smaller Firms

The sample of 52 sanctions was split by market capitalizations, according to Euronext Paris threshold of 1 billion euros for large firms (*i.e.* listed on the Compartment A): sample (a) is comprised of firms with market capitalizations above 1 billion euros and panel (b) of smaller firms. The sub-samples are respectively comprised of 27 and 25 firms, with average market capitalizations of 19 billion euros and 231 million euros. The following graphs plot, for event window [-1;+6], the ratio of reputational losses/gains (see Eq. (4)) to market capitalizations and the ratio of cash fines to market capitalizations against respective market capitalizations. The distributions are similar across event windows.

(a) Large firms (capitalizations above 1 billion euros)



(b) Smaller firms (capitalizations up to 1 billion euros)



Sources: AMF, Thomson Reuters, Author's calculations

[55] The maximum fines were raised three times over the period under review, up to 100 million euros for any professional under the AMF supervision (see Table 1).

5.4.Cross-sectional determinants of the stock market's reaction

In this section, we use cross-sectional regressions to explain the determinants of the abnormal returns incurred by each sanctioned firm in the aftermath of the publication of the sanction (*i.e.* the most significant results). The dependent variables are the $CAR_{i,[-1;+t]}$, as defined in Eq. (2). For a cross-section of sanctions, we run OLS regressions with robust White-corrected standard errors of $CAR_{i,[-1;+t]}$ against all the explanatory variables from the dataset (firm, sanction, and environment characteristics, see Table 3), as stated in Eq. (5). The results for three following models are presented, robust with the exhaustive cross-sectional test.

Model 1 is estimated from the day preceding the publication ($t = -1$) until the t^{th} day ($t = 0\ and + 6$), for each sanction *i,* with the following explanatory variables: a dummy for sanctions following an investigation (*i.e.* the most serious regulatory breaches); a variable for the length of the procedure from the beginning until the sanction decision (synonym of complexity); a dummy for sanctions anonymized by the AMF; a dummy for the rejection or dismissal of the appeal (*i.e.* a confirmation of the AMF verdict); a dummy for the media attention, when articles are published following the sanction publication of the top-tier financial journals (*L'Agéfi* or *Les Échos)*; a dummy for firms which "survived" the sanction (*i.e.* still listed); a dummy for the largest firms (*i.e.* listed on the Euronext Compartment A); a dummy for Euronext industrial firms; a dummy for Euronext technological firms; and the real quarterly French GDP year-on-year growth rate when the sanction was published (synonym of the economic conditions);

Two alternative models (models 2 and 3) were estimated for the peak in significant cumulative abnormal returns ($CAR_{i,[-1;+6]}$), with the following alternative variables: a dummy if the top management of the firm was involved in the regulatory breach(es); a media intensity variable before the sanction (ratio of articles mentioning the firm over the 20 days preceding the sanction to the number over the preceding year); a variable for the number of articles mentioning the sanction published over the week following the publication; a dummy for Euronext consumer goods or services firms; a dummy for Euronext financial firms; and a dummy for the sanctions published under the financial law LME (from 2008 to 2010).[56]

Table 6 reports the strongly robust results. The fits of the models over the period [-1;+6] are particularly interesting given their robustness, and the fact that more time is given to market players to react to the news of the sanction (*i.e.* inefficient markets). The following takeaways

[56] *Loi de Modernisation de l'Économie* (LME, n°2008-776).

can be drawn regarding the information content of sanctions and their interpretation by the market.

Table 6: Determinants of Cumulative Abnormal Returns Following the Publication of Sanction Decisions: Cross-Sectional Regressions

Table 6 reports results from OLS regressions (using White-corrected standard errors) from Eq. (5) for the model 1 (over the event windows [-1;+0] and [-1;+6]), and the models 2 and 3 (over the event window [-1;+6]). The dependent variables are the Cumulative Abnormal Returns from one day before the publication of the sanction decision ($t = -1$) until t days after: $CAR_{i,[-1;+t]}$, for $i = 1, \ldots, 52$ and $t = 0$ *or* $+6$. Abnormal returns are computed using the augmented market model (Eq. (1)). The sample is composed of the 52 companies which were sentenced guilty by the AMF from 2004 to 2016 and were daily quoted through the whole sanction procedure. Negative coefficients mean a reduction in abnormal returns (*i.e.* higher losses or lower gains), and conversely for positive coefficient.

	$CAR_{[-1;0]}$		$CAR_{[-1;+6]}$					
	Model 1		**Model 1**		**Model 2**		**Model 3**	
	Coef.	***RSE*[1]**	**Coef.**	***RSE*[1]**	**Coef.**	***RSE*[1]**	**Coef.**	***RSE*[1]**
Constant	4.87***	*(1.29)*	11.71***	*(2.38)*	12.29***	*(2.19)*	13.29***	*(2.37)*
Origin of the sanction:								
Investigation (not control)	-1.31*	*(0.73)*	-3.51**	*(1.44)*	-5.13***	*(1.38)*	-3.74***	*(1.25)*
Characteristics of the sanction decision:								
Duration procedure	-0.73***	*(0.24)*	-2.05***	*(0.39)*	-1.95***	*(0.37)*	-2.09***	*(0.44)*
Publication anonymized by AMF	-1.45**	*(0.63)*	-1.02	*(1.00)*				
Top management involved					-2.06**	*(0.93)*	-2.45**	*(0.99)*
Appeals & Media:								
Reject of appeal or withdrawal	0.97*	*(0.53)*	-1.75*	*(0.90)*				
Media coverage intensity before sanction							-11.2***	*(4.07)*
Nb. articles week after pub.					-0.046***	*(0.02)*		
Article(s) in *L'Agéfi* or *Les Échos*	-1.25**	*(0.60)*	0.74	*(0.92)*				
Stock market characteristics:								
Survival to sanction	-0.013	*(0.63)*	-5.62***	*(1.20)*	-5.30***	*(0.78)*	-5.84***	*(1.25)*
Euronext Compartment A	-0.20	*(0.61)*	3.90***	*(0.91)*	3.99***	*(0.98)*	5.46***	*(0.98)*
Industrial sector	-1.16*	*(0.66)*	3.24**	*(1.30)*	4.54***	*(1.25)*		
Technological sector	-2.60***	*(0.55)*	-0.94	*(1.34)*				
Cons. goods or serv. sector					5.79***	*(1.29)*		
Financial sector							-3.33**	*(1.28)*
Legal environment characteristics:								
Real YoY growth rate	-0.49***	*(0.14)*	-0.64***	*(0.22)*	-0.71***	*(0.23)*		
LME law (2008-2010)	-2.20***	*(0.75)*	-4.69***	*(1.52)*	-4.49***	*(1.44)*	-3.79***	*(1.19)*
N	52		52		52		52	
R2	0.479		0.695		0.752		0.638	
Ramsey-test Prob > F	0.415		0.309		0.437		0.442	

Sources: AMF, Thomson Reuters, Author's calculations
*Notes: [1] RSE: White-Robust Standard Errors; *, ** and *** denote statistical significance at the 10%, 5%, and 1% level.*

Four aspects of the sanction contribute to significantly more negative abnormal returns: being investigated (*versus* controlled), longer procedure, the top management's involvement in the regulatory breach(es), and a higher media coverage. Interestingly, negative abnormal

returns appear higher in better economic times, possibly as stronger forces than sanctions may play during an economic crisis and lead to global negative trends.

Regarding the sanctioned firms, size (*i.e.* the fact of being listed on the Euronext Compartment A, which is positively correlated with recidivism) curbs negative abnormal returns. Larger firms are less discriminated by market participants when being sanctioned for misconducts. In terms of sectors, as expected, model 3 shows that financial firms will endure more negative abnormal returns for being sanctioned. This sector is the most frequently sanctioned, and the most prone to recidivism. Being a technological firm will also contribute to more negative abnormal returns, conversely to being a consumer goods or services firm.[57]

Surprisingly, appealing a decision, which could stand for a positive signal (claiming for one's innocence), sends mixed and limitedly significant information: positive in the very short run, before turning negative, at the 10% level. It could be accounted for by the historically low probability of success of appeals (or high rate of confirmation of verdicts). Additionally, the anonymization of decisions leads to significantly more negative abnormal returns, though only in the short run. The consecutive regulatory tightenings did not impact significantly returns.

Two last takeaways can be drawn from insignificant variables. Firstly, the three variables controlling for the most straightforward features of the sanction decision (cash fine, warning, and blame) do not significantly statistically influence market reactions.[58] The fine and disciplinary sanctions do not serve as signals of the seriousness of the misconduct. Nor do the regulatory breaches committed by the sanctioned company, and recidivism (either before or after the creation of the AMF), despite being key parameters considered by the Enforcement Committee to set its verdict. This can be partly accounted for by the fact that the survival to sanctions of listed firms (*i.e.* still being listed) is significantly negatively correlated with abnormal returns. Secondly, the consecutive Chairmen of the AMF, named by Government decree, and the EC AMF chairmen do not appear to have influenced the information content of the sanctions, as perceived by market players. This supports the regulatory independence of the regulatory actions.

[57] In the case of the industrial sector, the estimations of model 1 over the periods [-1;0] and [-1;+6] show that the negative contribution is due to some market anticipation, which is more than compensated in the subsequent period.

[58] Derived variables were also tested, as in Armour et al. (2017), such as the natural log of the cash fine or the ratio of the fine to the market capitalization the day before the sanction. The results were also insignificant.

5.5.Discussion of results

The event studies and the cross-sectional regressions demonstrate that, over the period under review, the markets do price in the information of the sanction, but to a moderate extent. The results on $CAAR$ are limited but consistent with most past studies. They are supported by a precise unique identification of the announcement date, and by the exhaustivity of the data set. Additionally, they show that the most classical seriousness determinants of sanctions were hardly taken into account by the market: cash fines, disciplinary sanctions, regulatory breaches being sanctioned, and recidivism. Still, some complementary signs of seriousness are incorporated into prices, such as being investigated (not controlled), longer procedures, or the involvement of the top management of the firm. It may be due to the fact that the fines set by the regulator are limited in absolute and relative terms, when compared with the maximum authorized, with other French regulatory authorities, and with other jurisdictions. Indeed, in the U.S., the use of fines is less common than in France (8% of the sample in Karpoff et al., 2008a), but the amounts are much more significant (average of 107 million dollars, in Karpoff et al. 2008a). That could plead for scarcer and much more severe sanctions in France, though Armour et al. (2017) concluded, for the U.K., that the reputational penalty is unrelated to the size of the financial penalties levied (0.26% of the market capitalization on average). The results for France are all the more moderate that studies (on the U.S. and other jurisdictions) concluded that financial and accounting issues – which are investigated by the article – triggered the strongest stock market reactions.[59]

The results also stress a discrimination in market reactions and subsequent reputational penalties depending on the size of the sanctioned firm. Smaller firms are proportionally more penalized by the market, while large firms would – to some extent – "gain" from being sanctioned. The reputational gain from being sanctioned echoes the initial statement that AMF sanctions seem misunderstood and neglected by analysts, investors, and shareholders. Hence, the lenient sanctions set by the AMF are not complemented by reputational penalties, as assumed by Karpoff and Lott (1993). All in all, this article questions the information content of the sanctions, the credibility, usefulness, and efficiency of cash fines, and, more generally, of the current regulatory enforcement framework in France. Reputational penalties to sanctions may supplement enforcement for larger firms, like in other jurisdictions, if they were large enough to stand for a credible threat to offenders and to market participants. Conversely, reputational penalties should not threaten smaller firms' financial health.

[59] In the U.S. (Karpoff and Lott 1993; Griffin et al. 2000), but also in Japan and in China.

The limited market reactions to AMF sanctions could also be due to the "person" being sanctioned: mostly companies, despite the frequent involvement of the top management in the regulatory breaches (which would send a negative signal, according to the cross-sectional test results). Recent research suggests focusing more on top managers to gain in credibility and efficiency in deterring future crimes (Jones 2013; Kay 2015; Cullen 2017). In the U.S., past research stressed how enforcement impacts carriers and reputations of top managers. Karpoff et al. (2008b) demonstrated that, in the U.S., 93% of top managers involved in financial misrepresentation lose their jobs before the end of the regulatory enforcement period, mostly explicitly fired. Complementarily, class-actions securities litigations will penalize directors' reputation only if initiated by the U.S. SEC (Helland 2006). In the case of AMF sanctions, no top managers were fired despite their involvement in half of enforcement procedures of the sample.

Additional takeaways derive from the event-study analyses. The results confirmed past studies (Nourayi 1994; Alexander 1999; Murphy et al. 2009; Tibbs et al. 2011; Armour et al. 2017) in that financial wrongdoings linked to related parties induce stronger abnormal market reactions, in particular insider trading, and accounting frauds. It illustrates the key role played by trust in investment relationships. Sanctions seem to have gained in echo in the market since the Great Financial Crisis, implying higher abnormal returns, in line with Armour et al. (2017) in the U.K., but contrary to Kirat and Rezaee (2019) for France.

Three remarks concern the transmission of the news of a regulatory sanction. Firstly, anonymizing the sanction report, when publishing it, appears to protect the sanctioned entity from suffering abnormal returns (all other factors being equal). Secondly, in line with past studies, a higher media coverage of the published sanction will trigger stronger abnormal negative returns. Thirdly, the cross-sectional results stress that the independence from governmental and political process (a key challenge for regulators for Carvajal and Elliott (2007)) seems to be overcome. The successive chairmen of the AMF and of the AMF EC did not impact significantly market reactions.

In light of these results, some policy recommendations can be made in order to improve the credibility and the efficiency of the enforcement of financial regulation: 1) to increase transparency from part of the regulator by communicating more on regulatory breaches, possibly before the sanction itself as done by the U.S. SEC, as a tool to educate and set example ("name and shame"); 2) to sanction more severely larger firms (significantly higher fines, closer to the legal maximum), possibly less frequently, and to resort more disciplinary sanctions, if the regulator believes that the credibility of a sanction should be measured in the market

reactions; and 3) to focus more on individuals (top managers in particular), as a way to question their competences and integrity, possibly with higher fines or resorting to (temporary) bans on activity.

6. Conclusion

This work aimed at investigating the information content of sanctions of listed companies for financial misconducts, as enforced in France, to better understand how enforcement influences markets. It challenges the common view is that financial misconducts and regulatory breaches can be lightly punished by the French regulator, and consequently end neglected by investors. It analyzes the reactions in listed companies returns to the news of a sanction. The results are put into perspective depending on the content of the decision, and on the characteristics of the defendants, and compared with other jurisdictions. More precisely, this paper details the reactions of investors and stakeholders along the sanction proceeding by searching for abnormal returns after the four milestones of sanction procedures. It also strives to understand how the features of the sanctions, and of the sanctioned entities could explain such reactions. To do so, an original dataset was built for the 52 sanction decisions impacting 40 daily-listed companies from 2004 to 2016, completed with similar complementary datasets for acquittal decisions and settlements.

The results first show that the confidentiality of the early stages of the proceeding is respected, by the AMF and the defendant firms: no significant abnormal returns were detected. The market then reacts significantly negatively to the news of a guilty sanction, and to its publication. Such negative abnormal returns are limited in absolute or relative terms, compared to past studies on France and on other jurisdictions. No reputational penalty is assorted to sanctions of large firms. Conversely, smaller firms will proportionally endure reputational costs. Settlements do not trigger abnormal returns. Some features of the sanction and of the defendant will influence the reaction, but not the most straightforward (the cash fine, behavioral sanction, and recidivism).

Overall, the results echo the reputation for leniency of AMF sanctions (scarce procedures, lax verdicts, low fines, ending neglected by investors) in particular for larger market capitalizations, despite consecutive regulatory tightenings and long and costly procedures. They question the enforcement efficiency, bearing in mind that the goal of regulation is to support and accompany a healthy development of firms, and not to impose an unnecessary regulatory burden. In light of the regulatory changes enforced in 2017 granting larger enforcement powers to the AMF, it will be extremely interesting to re-estimate the models and confirm the results

observed from 2004 to 2016. The following policy recommendations can be made to improve the credibility of enforcement: *i)* increasing the communication from the regulator with more transparency on sanctions or with a name and shame of financial crime, for the market to quicker, better, and more comprehensively price the information; *ii)* sanctioning less frequently and more severely, in particular larger firms, with higher cash fines, and possibly completed with more frequent disciplinary sanctions;[60] and *iii)* sanctioning more individuals, and in particular top managers.

This work should be prolonged by other studies on the consequences of enforcement into three main directions: 1) the French results should be re-estimated within a few years to with a larger sample; 2) a complementary study will investigate how sanctions impact asset management firms (the second most frequently sanctioned population), as in Chapman-Davies et al. (2014); and 3) it could be extremely interesting to enlarge the perspective with a cross-country (possible at least European) analysis. It is very good news that ESMA created in 2019 a repository of published sanctions and measures imposed under MiFID II,[61] by National Competent Authorities across Europe.

[60] The introduction of the settlements also supports that trend: dedicate more means to sanction the most severe regulatory breaches, by settling for the least serious – though significant – regulatory breaches. Indeed, since a peak in 2009, sanctions have been trending downwards. Sanctions hit a historical low point in 2016 and 2017 (15 per year, comparing with 23 on average per year over the 2004-2018 period), followed by a slight rebound in 2018 (20).

[61] https://www.esma.europa.eu/policy-rules/mifid-ii-and-mifir

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Appendix A: Abnormal Market Reactions by Regulatory Breaches

Table A.1: Abnormal Market Reactions by Regulatory Breaches

Table A.1 defines and details the economics of every type of breaches sanctioned by the AMF. They are ordered by declining cumulative average abnormal returns following the publication of the sanction decision. Finally, the fourth columns displays the results of the event study estimation for each sub-sample, with the cumulative average abnormal returns (CAAR) over the event window [-1;+6] around the publication of the sanction, where the event take place in *t=0*.

Breaches	Definition	Impact of the breach publication on investors/signal sent	CAAR[-1;+6]
Insider trading (Sample size: 16)	Divulgation and/or use of insider information, in the sense of precise, unknown to the public and likely to be used by a reasonable investor as part of the basis for an investment decision	- Professionalism and ethic of top management and employees => reputational penalty to the firm - Possible fine to pay - Impact of the insider trade on the returns of the firm when committed (against related parties) - No direct impact on the firm's financials	-2.7%*
Dissemination of false information (o.w. accounting frauds) (Sample size: 28)	Failure to comply with financial reporting laws and regulations, implying obligations on periodic and ongoing disclosure to provide the public with accurate, precise and fairly presented information	- Professionalism (and ethic) of top management and employees => reputational penalty to the firm - Possible fine to pay - Publication of accounting restatement (possibly long before the sanction) impacting negatively the value of the firm (at the expense of related parties)	-2.3%**
Failure to meet one's professional obligation (Sample size: 20)	Breaches of the Monetary and Financial Code and the AMF General Regulation, covering regulated professions, as applicable to investment services providers[62], collective saving products and market infrastructures.	- Professionalism of top management and employees => reputational penalty to the firm - Possible fine to pay - Direct impact on the firm's financials: remediation costs to reach higher standards, potential competitive disadvantage, etc. (at the expense of related parties)	-0.9%
Price manipulation (Sample size: 5)	Deliberate misconduct aimed at influencing securities prices and a fair price formation, potentially misleading or attempting to mislead the public or ensuring a dominant position on the market, leading to unfair transactions	- Professionalism and ethic of top management and employees => reputational penalty to the firm - Possible fine to pay - Breach committed at the expense of third parties (manipulated stocks) - No direct impact on the firm's financials	-4.0%

*Sources: AMF, Thomson Reuters, Author's calculations ** $p<0.05$, * $p<0.1$*

[62] Investment services providers are investment firms and credit institutions that have been licensed by the AMF or the *Autorité de Contrôle Prudentiel et de Résolution* (ACPR). Their main activity is to transmit and process stock market orders.

Chapter 3

Financial Crime Spillovers. Does One Gain to Be Avenged?

Abstract:

This paper examines the spillovers of sanctioned financial regulatory breaches on avenged victims. Listed companies can be the victims of market manipulators (*i.e.* regulated entities or individuals), which can get sanctioned by regulators. This research enriches the literature on the unintended repercussions of regulation with a novel and complementary perspective on victims in France. Past work typically focused on investigated and/or sanctioned listed companies, as well as on plaintive firms, in a wide range of jurisdictions. The results demonstrate that, on average, victims experience substantial negative abnormal returns after the sanction. Victims are named then shamed by the market, despite being avenged by the regulator. Hence, naming victims in sanctions implies a double punishment of victims, as the firms already suffered during the violation period. It demonstrates a market failure as victims are not properly differentiated from wrongdoers, or that the sanction reveals victims' weaknesses worth sanctioning for. The markets also incorporate the information content of the decision and of the parties at stake. All in all, those results plead for an anonymization of all victims, to protect from being sanctioned, for naming and shaming market manipulators, as an alternative efficient enforcement tool to sanctions, and for investments in financial education and pedagogy.

1. Introduction

Financial markets are supervised by authorities, typically a securities and exchange commission or a central bank. The enforcement of domestic sets of rules aims at protecting investors, and at ensuring the soundness of the financial system by lowering information asymmetry, adverse selection and moral hazard for investors. Most frequently, the ultimate enforcement tool at the authority's disposal is regulatory sanctions, complemented with financial penalties. Breach perpetrators (referred to as "market manipulators", see Figure 1) can be firms (domestic or foreign, listed or private companies, asset management firms) and/or individuals (top managers, employees, advisers, financial analysts, insider traders, etc.). A limited share of regulatory violations is detected and even less sanctioned, depending on the probability of being caught, on the means at the authority's disposal, and on the seriousness of the misconduct (Becker, 1968).[1] By sanctioning, an authority demonstrates that regulatory breaches are not tolerated, and that the law must be abided. Sanctions play a future deterrent and disciplinary effect, given the risks of being caught and sanctioned.

Firms can be involved in financial misconducts in three different ways (see Figure 1): by committing a regulatory breach (*i.e.* a market manipulator), by suing another market participant for an alleged forfeit committed at their expense (*i.e.* an active victim), or by being a passive victim. This article focusses on the third option, when a regulator (in our case the French Financial Market Authority, AMF)[2] publicly names in sanctions listed firms at the expense of which regulatory breaches were committed and possibly sanctioned (referred to as "victims").

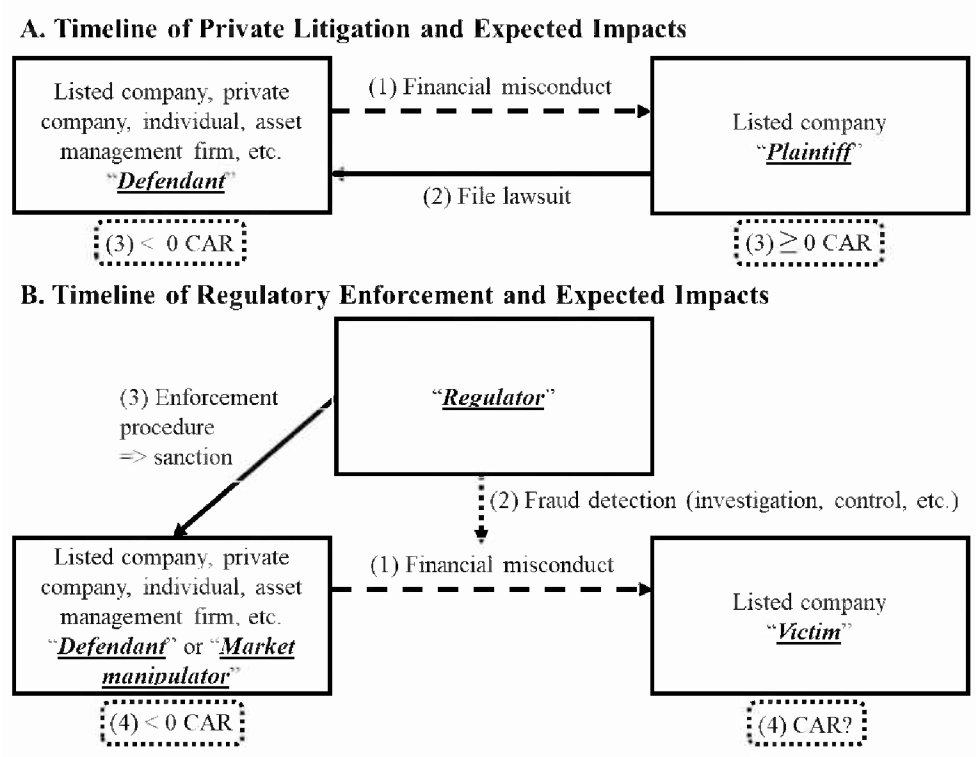
This article brings a novel contribution by investigating the unintended repercussions of a market manipulator's condemnation on its past victim(s).[3] The objective of this study is two folds: to deepen the understanding of the repercussions of financial crimes in a disclosure-based system of regulation and enforcement, and to enlarge the approach of reputational cost of white-collar crime to the point of view of the victims. Regulation and enforcement interact with reputation as "regulatory institutions shape what stakeholders expect of firms" (Brammer and Jackson, 2012). More precisely, beyond the direct impact of sanctions of listed firms (for France: Kirat and Rezaee, 2019; de Batz, 2020), we investigate the second-round effects of

[1] Becker (1968) stresses that the credibility of sanctions in circumventing frauds depends on three parameters: 1) the expected profits from committing the fraud, 2) the probability of being caught (only part of the frauds are detected) and 3) the subsequent costs (fines, disciplinary sanctions, jail, and reputational penalty).
[2] In French, *Autorité des Marchés Financiers*. http://www.amf-france.org/
[3] Mulherin (2007) encourages estimations of the extent to which regulation has unintended consequences.

enforcement procedures (referred to as "spillovers") from a complementary perspective: the victims. How do markets interpret being an avenged victim of market manipulators and why?

Figure 1: Comparison Between the Timelines for Private Litigation and Regulatory Enforcement and Expected Market Reactions

Figure 1 compares the timelines of private litigation (A) and regulatory enforcement (B). The chain of reactions/interactions is numbered chronologically, from the financial misconduct (1) until the legal reactions (2) and subsequent market reactions (3 and 4). Expected market reactions (Cumulative Abnormal Returns, CAR), when the news of such legal developments is first learnt by the market, are presented in botted boxes, based on the literature. For private litigations (A), if the breaches are credible to the market, CAR can be expected to contract when a firm is being sued by a plaintiff firm, as the market anticipates costs related to the suit and then possibly the sanction and subsequent costs (investment to improve internal process, higher cost of doing business, HR turnover, etc.). Conversely, the market could judge such a lawsuit irrelevant, implying null or even positive market reactions. Most frequently, the literature concludes that returns contract for the defendant (< 0) and rise for the plaintiff (> 0), though to a lower extent. For the regulatory enforcement (B), the impact on the defendant's returns has been long documented across geographies (in particular in the U.S.) and is overwhelmingly negative (< 0). Conversely, the impact on the victims' CAR of the sanction of others' regulatory breaches was not yet investigated. This is the contribution of this paper. The sign was expected to be null or positive (one is avenged) but our results point to a negative reaction.



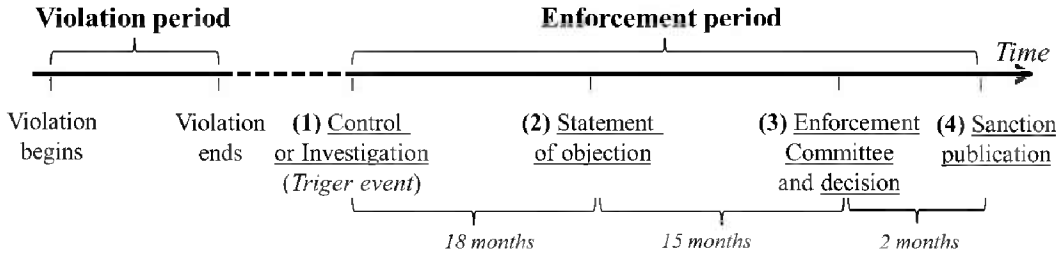
Source: Author

Such perspective was rarely, if ever, envisioned. It is made possible by a specificity of the French enforcement: the victims are named in the sanction report. The results are important in terms of disclosure and of protection of regulated entities, if the victim of market manipulators were found to suffer an undeserved "double punishment" from being avenged with an enforcement procedure. We investigate a major European stock market (Euronext Paris), synonym of liquidity, scrutiny, and efficiency with a full range of market participants,

from individual to institutional investors.[4] We follow the recommendation of Holthausen (2009) by only investigating one country, as one specific environment is more likely to reveal the interactions between institutions and capital markets. Enlarging the perspective of regulatory spillovers is all the more relevant that the sanction powers of most financial market supervisory authorities have been reinforced in the aftermath of the global financial crisis. Additionally, the results may receive a European echo at a time when the European supervision is gaining traction. It is crucial to investigate granularly national repercussions of regulation before generalizing practices at a regional level to reach higher enforcement standards. Since 2019, the European Securities and Markets Authority (ESMA) has been increasingly transparent regarding enforcement, compiling and publishing national and European sanctions on its website. Additionally, enforcement is often cited as a weak point of the ESMA regulation. We also contribute to the current policy debates, at a time when regulatory authorities are increasingly financially constrained in means, and when the "name and shame" stance is gaining traction.

Figure 2: Timeline of an AMF Enforcement Action

The first two steps of the enforcement are caried by AMF employees, with the ignition of an investigation for market abuses or controls of compliance with professional obligations (*step 1*), followed by the statement of objection (*step 2*), when the incriminated entity(ies) learn about the ongoing procedure and are asked for additional information and justifications. In light of these elements and of the seriousness alleged breach(es), the Board of the AMF may transfer the file to its statutorily independent Enforcement Committee, which starts the judicial part of the enforcement, ending with a public hearing ("trial") (*step 3*) and the publication of the decision (*step 4*).



Sources: AMF, Author

This research exploits a unique, exhaustive, and up-to-date (2004-2018) dataset of the AMF sanctions. The data is mostly based on the sanction reports published on the AMF website. The dataset was complemented by confidential regulatory information. The methodology echoes a long history of research on financial misconduct: a daily event study to investigate for potential abnormal reactions in returns following the last two steps of enforcement procedures

[4] According to the World Bank, France ranked 5th by market capitalization of listed domestic companies late 2018 (in USD), after the U.S., China, Japan, and Hong Kong. It was the first European market, followed by Germany and Switzerland. The market capitalization of French listed firms stood for 85% of GDP (*versus* 55% on average in the euro zone). Additionally, Euronext Paris is part of the leading European stock market (Euronext), together with Amsterdam, Brussels, Lisbon, and London.

by the AMF, the Enforcement Committee meeting followed by the publication of the sanction (see Figure 2). It is complemented by diverse robustness checks and a cross-sectional analysis.

The results challenge the efficient market hypothesis as, on average, victims incur substantial abnormal financial losses for being named in a sanction, more sizable than market manipulators. "Naming" a victim in a sanction is understood as "shaming" by the market, implying a double punishment (over the violation period and after the sanction). Additionally, victims are more penalized when the market manipulator is sanctioned for the transmission of insider trading, is acquitted or anonymized in the sanction report, or appeals the decision.

These spillovers can demonstrate market failures as the victims are not properly differentiated from wrongdoers, and can even be blamed instead of the market manipulator (acquittal, anonymization, and appeals). The spillovers can also reflect weaknesses of the victims, which enabled the breach(es) to be committed and are revealed by the sanction. These results contribute to improving the understanding of the unintended consequences of a disclosure-based financial regulation.

The results point to three directions in terms of policy recommendations, in order to better protect regulated entities, to manage the AMF's reputation as a regulator (Gilad and Yogev, 2012), and to come closer to efficient regulations. Firstly, the possibility that this regulatory transparency leads to double punishments of past victims supports their anonymization in the public reports. That would protect them from any abnormal market reaction and avoid blaming regulators for naming victims. Bilateral confidential communication between the regulator and the victim could ensure internal improvements to remedy for the shortages which enabled the breach(es) to be committed. Secondly, the subsequent stigmatization of a victim after being named in a sanction report stresses the efficiency of the "name and shame" approach. The latter could – at least in part – efficiently substitute for sanctions, in a time of increasing financial constraints of regulators (Yadin, 2019). This way, regulatory goals of deterrence and example setting could be achieved more quickly, easily, cheaply, and transparently than with sanctions and settlements. Finally, regulators should invest more in education and pedagogy to avoid their communication to be misunderstood, by assimilating avenged victims to market manipulators.

The rest of this paper is structured as follows. Sections 2 describes the French regulatory framework for enforcement against financial misconduct, followed by a literature review on financial crime and victims, and by the hypotheses. Section 3 summarizes the methodologies, while the section 4 details the data samples. Section 5 presents and discusses the results. Finally, section 6 concludes.

2. French legal framework, literature review, and hypotheses

2.1.Enforcement of financial laws in France

The Enforcement Committee of the AMF (EC AMF) has received, since its creation in 2003, the mandate to sanction market players which do not comply with the set of rules they are subjected to,[5] by committing regulatory breaches. Sanctions aim to strengthen the marketplace, by improving practices and by setting examples. For a given regulatory breach(es), the AMF pronounces administrative sanctions, which could be complemented – until 2016, when the *non bis in idem* principle was enforced in France – by criminal prosecutions.[6] From 2004, when the AMF first sanctioned, to 2018, 342 decisions (of which 29 acquittals) were made and published on the AMF website, standing for 242 million euros of cumulated fines.[7]

Four main regulatory breaches are sanctioned by the AMF: 1) any breach of the Monetary and Financial Code and the AMF General Regulation (*i.e.* a failure to meet with professional obligations by regulated professions) and three market abuses (*i.e.* the most serious breaches): 2) breaches of insider dealing regulations (use and/or divulgation of insider information for an investment decision); 3) price manipulations (deliberate misconduct to influence securities prices and a fair price formation); and 4) breaches of public disclosure requirements (failure to comply with financial reporting laws and regulations), *vis-à-vis* investors or regulatory authorities.[8] Only the most severe breaches go through the sanction process. The less severe financial misconducts are dealt with bilaterally between the AMF and the alleged market manipulators.

All sanction procedures follow the same milestones (see Figure 2). If a control (to check the compliance with one's professional obligations, 32% of the sanctions) or an investigation (to identify market abuses, 68% of the sanctions) concludes that a regulatory breach(es) is (are) characterized, the Board of the AMF sends a statement of objection to the incriminated entity/person, asking for additional information. In light of these complementary elements, the Board may transfer the case to the EC AMF, initiating the "judicial part" of the procedure. The latter ends with a public hearing of the EC AMF followed by the decision (acquittal or sanction,

[5] The Monetary and Financial Code and the AMF General Regulation.
[6] According to the *non bis in idem* principle, no one can be condemned twice for the same offence.
[7] 23 sanctions were made by year on average, to which add 8 settlements by year since 2012. Settlements are a lighter and quicker procedure, proposed for least serious regulatory breaches, without guilt recognition.
[8] For details see de Batz, 2017a and 2017b.

comprised of cash fines and/or disciplinary sanctions)[9,10] and its (possibly anonymized) publication.[11] The sanctioned market manipulator (firm and/or individual) and/or the AMF Chairman of the Board can appeal the decision towards four different jurisdictions.[12] Sanctions are frequently appealed (45%), with a limited success (rejection rate of 79%).

The legal environment of the AMF evolved over the period under review, with enlarged powers. The AMF enforcement powers were reinforced along the four consecutive financial laws.[8] The two latest complementary reforms were enforced in 2016, implying higher maximum legal fine thresholds, longer bans from activity (beyond 10 years), and a larger scope of sanctioned breaches.[13,14]

2.2.Literature review and hypotheses

The detection of a financial misconduct can lead to two types of legal procedures, depending on the parties involved (see Figure 1): a private litigation or a (public) regulatory enforcement. In the former setting, the victim of alleged misconducts initiates a legal procedure against a market manipulator. In the latter, a regulator intervenes directly to condemn a market

[9] There is neither binding rule nor clear guideline on how to value fines. Time consistency and the maximums set by legal are the two key objective parameters to set a fine. Some specificities of the respondent will also be taken into account: gravity and duration of the financial misconduct(s), financial situation, magnitude of the obtained gains or advantages, losses by third parties, recidivism, etc. The thresholds for fines were increased on three occasions over the period under review. They can amount up to 100 million euros for market abuses committed by professionals, or 10 times any profit. The fines are paid to the French Treasury in majority, or to the guarantee fund to which the professional belongs. In practice, 95% of the guilty sanctions (*i.e.* when excluding the 8% acquittal decisions) included a cash fine, for an average 817,000 euros. Fonteny (2017) demonstrated that cash fines are positively correlated with the insider profits.

[10] 1) Warning or blame, depending on the seriousness of the wrongdoing(s); and 2) "ban on activity", covering temporary or permanent ban on providing some or all services, suspension or withdrawal of professional license, and temporary or permanent ban on conducting some or all businesses.

[11] Most sanctions are published, in particular in recent years, except if such disclosure would seriously jeopardize the financial markets or cause disproportionate damage to the parties involved. The Enforcement Committee decides whether or not to publish its decision, where to publish it (mostly on the French Official Journal for Legal Notices (BALO) and on the website of the AMF), and whether or not to anonymize it (entirely or partially). Moreover, the sanctioned entity and/or person can be required to publish the decision, at its own expenses, in a given set of magazines. Finally, as off 2017 and retrospectively, any decision published on the AMF website should remain online at least for five years (which was already the case), but any reference to personal data should be anonymized after five years (which was only partially the case previously, at the discretion of the Chairman of the EC AMF).

[12] State Council, Court of Appeal of Paris, Court of Cassation, and *via* priority preliminary ruling on constitutionality

[13] Law on market abuses of 21, June 2016 (Law n°2016-819) and Law on transparency, the fight against corruption and modernized business life, of 9, December 2016 (Law n°2016-1691, IV Art. 42-46), labeled "Laws 2016". Earlier reforms included in 2008 Law of Modernization of the Economy ("LME 2008") and in 2010 the Law on Banking and Financial Regulation ("LRBF 2010").

[14] The maximum fine remains 100 million euros but can stand for up to 15% of the annual turnover for a legal entity and has been increased up to 15 million euros or ten times any profit earned for an individual failing to meet his professional obligations. Additionally, the AMF enforcement scope was enlarged to public offerings of unlisted financial instruments without prospectus, and crowdfunding.

manipulator. This misconduct may have been perpetrated at the expense of victims, possibly without their knowledge. This is the setting investigated by this article. Information about the identity of violators allows private lawsuits. In reality, the victims frequently ignore who injured them, and, in extreme cases, they do not even know they were injured. This justifies socially public enforcement to identify and condemn market manipulators (Becker and Stigler, 1974).

Under the semi-strong efficient market hypothesis (Fama, 1970), all the available information should be fully and immediately incorporated into prices. The market should revise its forecasts when learning about legal proceedings and react proportionally to the degree of severity of the (alleged) financial misconduct (Choi and Kahan, 2007). Subsequently, a sanction of a financial misconduct can imply a double penalty to shareholders: firstly, by being cheated by market manipulators and, then, when the market discounts the sanctioned misconduct.

A long history of research on white-collar crimes investigated the spillovers of suing the alleged perpetrator of breaches (see Figure 1), in particular the market reactions to suing another entity (the gains for being avenged) or to being sanctioned by one's regulator (the cost of being caught). The plaintiffs are either active victims, who resort to the legal system to defend their rights, or regulatory authorities. Market reactions (mostly returns, but also volumes, volatility, and spreads) to the news of corporate financial misconduct (alleged fraud, securities class-action, lawsuit filling, accounting restatements for fraud, regulatory enforcement, settlements, etc.) are typically investigated using an event study methodology. They concord in finding statistically significant negative abnormal returns for the defendants but diverge for the plaintiffs.

On the one hand, private litigations are a negative-sum game with asymmetric wealth effects: plaintiffs damage more defendants than they gain through the legal proceeding. Defendant firms typically suffer statistically significant abnormal negative returns around the lawsuit filings (see Figure 1). Plaintiff firms show lower insignificant positive abnormal performance (Bhagat et al., 1994; Bizjak and Coles, 1995; Koku et al., 2001) or even negative returns (Bhagat et al., 1998). This penalty is possibly due to high litigation costs in the United States (U.S.), beyond the expected gains.

On the other hand, regulatory enforcement penalizes returns of market manipulators, from alleged regulatory breaches to sanctions (see Figure 1). Most studies investigate the U.S. markets, given the greater capitalizations and the higher transparency of enforcers. Every steps of the different proceedings were studied, from the very first suspicion of wrongdoings until regulatory sanctions (Feroz et al., 1991; Karpoff and Lott, 1993; Pritchard and Ferris, 2001; Karpoff et al., 2008a). They conclude with statistically significant negative abnormal returns

(or higher volatility and traded volumes), possibly assorted with a higher cost of doing business (insurance, risk premium, lower sales, more expensive inputs, etc. as in Karpoff, 2012). Beyond financials, some articles stressed additional negative repercussions, such as the dismissal of top managers (Karpoff et al., 2008b) or the demotivation of employees (Jory et al., 2015).[15] Similar event studies covered other jurisdictions (European and Asian countries). They concurred with negative abnormal reactions following the last (and public) steps of the enforcement procedure, though with a lower magnitude (for AMF sanctions: Djama, 2013; Kirat and Rezaee, 2019; de Batz, 2020).

This article complements past research by adding a new perspective on the spillovers of enforcement and financial misconducts. It investigates the unintended repercussions that the revelation of sanctioned financial misconducts has on investors' perceptions regarding past victims (Mulherin, 2007). In the AMF enforcement setting (see Figure 2), victims are passive: the procedure (from the detection of the regulatory breach until the sanction publication) is exclusively carried by the regulator against the market manipulator. Based on noteworthy hints on regulatory breaches, the regulator directly sues the market manipulator, while the avenged passive "victim" is merely named in the sanction report as such.

To clarify who the victims were, the following four examples of sanctioned financial misconducts were extracted from sanction reports: 1) large scale dissemination and use of insider information (from the financial director of the acquiring firm, members of his family, and his former bankers) in the course over the preparation phase of a takeover bid over a listed firm (the victim), leading to abnormal volumes of trades; 2) numerous sanctions of individuals and firms after the transmission and use of insider information over the month preceding the takeover bid over a listed firm (the victim); 3) a bank employee, head of research on European oil services sector, published false information on a listed firm (the victim), after taking a long position on this firm and without communicating on his existing conflict of interest, and to the use of insider information; and 4) an asset management firm, owning 11% of a firm A, manipulated on a large the stocks of a competitor of A (the victim), leading to daily strong appreciations (ranging from +7% up to 40%).

To our knowledge, no study has directly addressed the issue of potential gains or losses for passive victims to be avenged for financial crimes committed at their expense, despite their potentially important financial or reputational consequences. The central hypotheses are the rational expectations theory and efficient markets (Fama et al., 1969): as for market

[15] 93% of managers are fired by the end of the regulatory (U.S. Securities Exchange Commission and Department of Justice) enforcement period for financial misrepresentation.

manipulators, the market is expected to incorporate into the victim's stock price all relevant information regarding the enforcement procedure and to adjust further following the publication of the verdict. Most frequently, victim's returns were already hampered at the time when the breaches (price manipulation or insider trading most frequently) were committed (referred to as "violation period", see Figure 2). Given this framework, based on the signaling theory, investors are likely to focus higher attention on firms associated to the sanction. Each firm possesses observable attributes that reduce investors' uncertainty about its value. In our case, the first research question is how will investors interpret the news that a firm was the victim of a sanctioned market manipulator? Or put it differently, does a victim gain to be avenged by the regulator or endure a double punishment?

Hypothesis 1: The news of a sanction of a financial misconduct impacts negatively the returns of former victims.

Investors can react in three ways when learning that a victim of past financial misconducts is avenged by a regulatory sanction: positively, negatively, or no reaction. The results will question the extent to which regulators should be transparent regarding the victims. Numerous arguments plead for a disclosure-based system of regulation (Ripken, 2006; Enriques and Gilotta, 2014): 1) to induce managers to behave more diligently and honestly (wrongdoings will end becoming public information); 2) to allow investors to make fully informed investment decisions (lower informational asymmetry); 3) to increase transparency, efficiency, and growth of the securities markets; 4) to reinforce investors' trust and confidence in the market; 5) to reduce investors' risks and protect public interest. Still, Enriques and Gilotta (2014) concluded that "in an efficient market, unsophisticated investors take a free-ride on the efforts of sophisticated ones and thus do not need, and would not really benefit from equal access to information".

Being avenged could lead the market to upside readjustments of the outlooks on the victim, as observed for active victims over private litigations. In that sense, the market would interpret the regulatory sanction as the vengeance of victims, compensating for past misconduct.

Conversely, negative abnormal returns could materialize after the condemnation of their past executioner. Victims would suffer a "double punishment", given the initial wrongdoings committed at their expense. Past studies stressed that the market could generalize the breach(es) to other market participants, beyond the impact on the market manipulator. Jonsson et al (2009) built a model of "undeserved losses" due to a "generalization": the discovery of a corporate deviance damages the legitimacy of the given firm, as well as other organizations presenting similar characteristics (belonging to the same industry sector in particular). Some empirical

work complementarily investigated the contamination or spillovers of financial misconduct on (innocent) peer companies (Paruchuri and Misangyi, 2015). They also conclude that investors generalize a financial misconduct to the industrial peers, in a heterogeneous manner, depending on the characteristics of the firm and on the misconduct. Similarly, past victims could suffer from a generalization, by being assimilated to others' financial misconduct and their subsequent regulatory sanction. Additionally, financial fraud increases regulation costs for all firms (including non-fraud), because companies have to spend more money on the supervision.

A third possibility could be that investors fail to (or decide not to) react to the fact that a firm was avenged from others' past misconducts. A wide range of factors could contribute to the lack of reaction from investors: unaware, misunderstanding of the financial market misconduct, not concerned about the wrongdoing, avoidance of the hassle of selling and reinvesting the proceeds elsewhere, or avoidance of the tax consequences or an exit fees, etc. There could also be a "prescription of the past sins", given the length of enforcement procedures (close to 3 years). Hence, justice is done years after the forfeit, possibly weighting on the information content of the sanction for the past victim.

Under the hypothesis of perfect rationality of market participants, more disclosure is always better than less. This assumption may not hold true in certain contexts that involve complex decision-making (Ripken, 2006) as "information is beneficial only to the extent that it can be understood and utilized effectively by the individual to whom it is directed". Past literature stressed three cognitive bias that limit investors' abilities to process information.

Firstly, due to a bounded rationality, financial markets can fail to discriminate between published news. For example, Solomon and Soltes (2019) underlined the limited investor's attention in the case of SEC financial fraud investigations. Firms voluntarily disclosing a SEC investigation suffer significant double-digit negative returns, even when no charges are ultimately brought.

Secondly, for a disclosure-based regulatory regime to be effective, 1) mandatory information has to be disclosed and 2) the disclosed information has to be used effectively by investors to whom it is directed. Otherwise, the information will not improve the quality of investors' decision. Too much information can be worse than too little when investors are overloaded with information and unable to discriminate. They can miss the most important aspects of the disclosure (Ripken, 2006) such as the difference between market manipulators and their victims. Past literature demonstrated that, beyond a given threshold, information becomes counter-productive: investors are overloaded and unable to properly assimilate it (Paredes, 2003), as if they were "blinded by the light". More precisely, regarding the regulation

of securities markets, an information overload can lead to an incapacity of investors to discriminate between positive and negative regulatory signals. Ripken (2006; p. 187) concluded that "if investors are overloaded, more information may simply make matters worse by causing investors to be distracted and miss the most important aspects of the disclosure".

Finally, multiple condemnation and lawsuits for white collar crimes (*i.e.* recidivism) can turn firms "judgement proof" (Koku et al., 2001). There would be a high cost of cheating once, and then the marginal cost of recidivism contracts.

Complementary to market reactions to white-collar crimes, part of the literature investigated the reputational penalty for being caught. A corporate reputation is a collective assessment of a company's attractiveness to a specific group of stakeholders relative to a reference group of companies with which the company competes for resources, in particular within an industrial sector (Fombrun, 2012). Reputation also interacts with regulation, regulatory institutions shape what stakeholders expect of firms (Brammer and Jackson, 2012). Regulatory external communication (for example by publishing sanction reports) is an integral part of regulation and a reputational management tool (Gilad and Yogev, 2012). Reputational penalties can also deter future corporate crimes (education). From a financial perspective, a corporate reputation is defined as the present value of the cash flows earned when a firm eschews opportunism and performs in line with explicit and implicit contracts (Karpoff and Lott, 1993). Hence, the news of an enforcement proceedings and, all the more, of a sanction should imply a downwards revision of the forecasts on the firm and make its competitors more alluring (*i.e.* a reputational cost). Negative abnormal returns measure the total costs to the firm from the news of its misconducts expected by investors. They may include a reputational loss (Karpoff, 2012). Indeed, research on Anglo-Saxon financial crimes demonstrated that the direct costs of a sanction (fine, behavioral sanctions, insurance, legal fees, etc.) account for a limited share of the market corrections the firms bear. The difference stands for the reputational penalty from the market for breaches (so-called residual method by Karpoff and Lot, 1993; Karpoff et al., 2008a; Alexander, 1999; Desai et al., 2006; Murphy et al., 2009; Dyck et al., 2010; Karpoff, 2012; Armour et al., 2017).[16] In France, no reputational cost followed the AMF sanctions, despite the low level of fines in international standards (de Batz, 2020). When applying this

[16] In the U.S., according to Karpoff and Lott (1993), the reputational penalty represents 90% of the equity loss. In Karpoff et al. (2008a), the reputational penalty for cooking the books in the U.S. stands for 7.5 times all penalties (legal and regulating system). Firms lose 38% of their market values when the news of their misconduct is reported, 2/3 of which being reputational losses (*i.e.* not reassessment of the financial situation of the sanctioned firm nor the expected legal penalties). Similarly, Armour et al. (2017) estimated that not only the reputational cost exceeds, by far, the fine in the U.K. (by a factor of 9) but also that the reputational sanction is unrelated to the size of the financial penalties levied.

residual method to victims of sanctioned breaches, there is no costs to deduct from the estimated abnormal market reactions to assess the reputational gain or loss for being a victim. The victim is passive: the enforcement procedure only involves the market manipulators and the AMF. Hence, the potential abnormal market reactions of victims equal the reputational consequences for being the victim of market manipulators. The second research question is whether victims endure reputational penalties for being named in sanction reports?

Hypothesis 2: Victims endure a reputational cost from being avenged.

Event studies are typically complemented by cross-sectional regressions on the abnormal returns or reputational losses, in order to investigate the determinants of the results (Griffin et al., 2004; Karpoff and Lott, 2008a; Armour et al., 2017). For white-collar crimes, a wide range of explanatory variables was used such as the seriousness of the breach (depending on the regulatory breach(es), on the enforcement procedure, on the sanction features, on the parties involved, and on the media coverage), the characteristics of the defendants (depending on size, recidivism, industrial sectors (financial in particular)), and some control variables given the wide range of firms and the long period under review (sector, time and legal variables). The third research question is whether market reactions can be accounted for?

Hypothesis 3: The market reaction differs depending on the characteristics of the financial misconduct, and of the victim.

3. Methodology

Standard event-study techniques are used to measure the wealth effects of being an avenged victim of others' financial misconduct. The goal is to challenge the information content of the two public steps of the AMF enforcement procedure (*i.e.* "events"): 1) the public hearing by the Enforcement Committee, which sets the verdict, and 2) the publication of the sanction. We follow a long and well-established methodology (Dolley, 1933; MacKinlay, 1997; Campbell et al., 1997; Kothari and Warner, 2008). The impact of the event is measured as the abnormal returns of the victim company. For every "event", the abnormality of daily returns is tested over an event window, by comparing "actual" *ex-post* returns with "normal" returns. The latter are the expected returns without conditioning on the event occurring, estimated over an estimation window preceding the event window. The abnormal returns consecutive to a given step of the procedure are taken as unbiased estimates of the total financial consequences of the event (all expected uninsured future costs, including reputational repercussions).

A market model augmented with a sectoral index describes the behavior of returns. This model assumes a stable linear relation between the security returns, the market returns, and the

industry returns, as in Sharpe (1970), Sharpe et al. (1995), and Gold et al. (2017). The rationale for controlling for the sector is to sort out, to the maximum possible extent, changes in returns caused by the "event" itself, from those caused by any other unrelated movement in prices (overall market effects or industry specific developments). Theoretical and empirical articles stressed the key sectorial aspect of firm's reputations and the possible spillovers of misconducts to peer companies (Jonsson et al., 2009; Fombrun, 2012; Paruchuri and Misangyi, 2015). Augmenting the market model is also supported by the long period under review (2004-2018), and the wide range of sectors of the victim firms. In fact, macro-economic and sector-specific cycles occurred over those 15 years, the most important being the Global Financial Crisis.[17]

The events are assumed exogenous with respect to the firms, as the timing of the sanction procedures results from regulatory decisions, made independently by the AMF. They are unrelated to the corporate agenda, contrary to events such as financial communication, or profit warnings.[18] The model assumes a jointly multivariate normal and temporally independent and identical distribution of returns over time. The parameters are estimated under general conditions for every sanction with Ordinary Least Squares (OLS), over the estimation window [-120;-11] prior to the event in $t = 0$ (MacKinlay, 1997; Campbell et al., 1997). On every trading day t of the event window [-5;+10], the deviation in an individual stock's daily return (including reinvested dividends) from what is expected (*i.e.* the prediction error or "abnormal" returns) is taken as an unbiased estimate of the financial impact of the "event" on the stock i in t:

$$AR_{i,t} = R_{i,t} - \widehat{\alpha_i} - \widehat{\beta_i}\, R_{m,t} - \widehat{\gamma_i}\, R_{s_i,t} \qquad (1)$$

$AR_{i,t}$ stands for the estimated abnormal returns for the firm i in t. $R_{i,t}$, $R_{m,t}$ and $R_{s_i,t}$ are respectively the returns in time t of the actual security i, of the market (CAC All-Tradable index), and of the sector (Euronext sector index of firm i).[19] $\widehat{\alpha_i}$, $\widehat{\beta_i}$ and $\widehat{\gamma_i}$ are the estimates of α_i, β_i, and γ_i over the estimation window. The event window of 16 trading days intends to capture potential anticipation by the market (following leaks of information over the days preceding the event for example), as well as the delays to react and the persistence over time of the price effect.

[17] Using an augmented market model reduces significantly the variance of the abnormal returns (MacKinlay, 1997). The results of the event studies are robust when using a simple market model, not adjusted for the sectors. See Panel B in Table 4 for detailed comparison.

[18] The exogeneity is also supported by the fact that some mentions of sanctions were, in the end, excluded from the sample due to confounding events such as the concomitant corporate events (such as M&As), the publication of the results from another judicial procedure, or major external news (Brexit, industry evolution, etc.).

[19] The CAC All-Tradable (which replaced in 2011 the SBF 250) is the largest and most liquid index for listed firms on Euronext Paris. It is comprised of all the firms for which at least 20% of the floating stocks were exchanged over the last year. The goal is to account for the wide range of victims in the sample.

Under the null hypothesis H_0, the "event" (*i.e.* step of the sanction procedure) has no impact on the distribution of returns for the victim firms (mean or variance effect).

Individual parametric t-statistics are calculated for each victim's abnormal return, and for every day of the event window. Abnormal returns are aggregated to draw overall inferences for the event of interest, through time and across individual firms. In fact, on a sanction-by-sanction basis, the statistical significance is difficult to detect because of the volatility in stock returns. Hence, abnormal returns are then cumulated over time and averaged across the n sanctions to get the Cumulative Average Abnormal Returns ($CAAR_{[t_1;t_2]}$) over the period $[t_1; t_2]$, including the event. All the victims are treated as a group, for which p-value on the constant of the regression for every period gives the significance of the CAR across all sanctions, with robust standard errors.

$$CAAR_{[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n} CAR_{i,[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n}\sum_{t=t_1}^{t_2} AR_{i,t} \ . \qquad (2)$$

Complementarily, for every victim firm i, the shareholders' wealth impact (Share Loss or Gain) $SL_{i;[t_1;t_2]}$ is estimated over $[t_1; t_2]$ by multiplying the market capitalization of the firm i (MV_{i,t_1-1} in euros) on the day preceding the event ($t_1 - 1$) by the cumulative abnormal returns over the period $[t_1; t_2]$ ($CAR_{i,[t_1;t_2]}$). The average abnormal shareholder loss (or gain) due to the event ($ASL_{[t_1;t_2]}$) over the period $[t_1; t_2]$ is then calculated by averaging all the cumulative market value losses ($SL_{i,[t_1;t_2]}$) for the sample of n victim firms (in euros):

$$ASL_{[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n} SL_{i,[t_1;t_2]}, \text{ where } SL_{i,[t_1;t_2]} = CAR_{i,[t_1;t_2]}\ x\ MV_{i,t_1-1} \qquad (3)$$

Finally, event studies are typically complemented by cross-sectional multivariate regression analyses to investigate the determinants of the reactions of financial markets (CAR). The goal is to understand the relationship between the magnitude of the abnormal returns estimated in the aftermath of the event (*i.e.* the cross-sectional differences in the loss or gain incurred by shareholders) and the features of the event (see Table 1). It is particularly interesting given the multiple possible hypotheses on the causes for these abnormal returns (see Figure 1). After suffering from others' misconduct, the victim is avenged when the AMF sanctions the market manipulator. Hence, its creditworthiness could be reinforced, possibly implying positive abnormal returns. Conversely, being a victim could send a weakness message or confusing signals regarding the victim and the market manipulator, justifying a negative abnormal market correction and, to some extent, a double punishment. Finally, no significant reaction could follow the mention of victims in sanction reports, if investors clearly differentiate executioners from victims. Hence, a cross-sectional regression for cumulative abnormal returns for every

victim *i* over the period $[t_1; t_2]$ ($CAR_{i,[t_1;t_2]}$) on the *m* characteristics of the sanctions and of the victim is estimated using the usual OLS, with White-corrected standard errors:

$$CAR_{i,[t_1;t_2]} = \delta_0 + \delta_1 x_{i,1} + \delta_2 x_{i,2} + \cdots + +\delta_m x_{i,m} + \varepsilon_i, where\ E(\varepsilon_i) = 0 \qquad (4)$$

Where $x_{i,j}$, for $j = 1, \ldots, m$, are the *m* characteristics of the i^{th} observation, δ_j, for $j = 0, \ldots, m$, are the *m+1* parameters of the model, and ε_i is the zero-mean disturbance term, that is uncorrelated with the x's. As advised by MacKinlay (1997), heteroskedasticity-consistent t-statistics will be derived using White-corrected standard errors.[20]

4. The data

4.1.Sanctions by the AMF (2004-2018)

A unique and exhaustive dataset was built covering the 342 sanction decisions, from January 2004 (the AMF was created in 2003 and first sanctioned in 2004) until December 2018. Most of these distinctive characteristics of sanctions were drawn from the online sanction reports.[21] The dataset was enriched with publicly available information and regulatory confidential data, thanks to the collaboration of the AMF. The latter mostly covered the names of the anonymized sanctioned entities,[22] and some missing dates of the procedures. Finally, softwares were used for market data (Thomson Reuters for stock prices, market capitalization, and market indices), and for media coverage (Factiva). All in all, over the period under review, more than 40 variables were included in the dataset (see Table 1 for descriptive statistics). A comprehensive correlation analysis was carried of the variables in the dataset.[23]

A large set of variables describes the sanction, the defendant, and the global environment: 1) the characteristics of the enforcement (including the type of procedure with an investigation or a control, the sanctioned regulatory breach(es),[24] the length of the sanction procedure (as in Karpoff et al., 2008a), the lag to publish the decision (Figure 2)); 2) the main features of the decision (acquittal, cash fine, warning, blame, ban on activity, anonymization of the decision report,[25] the chairman of the EC AMF, the length of the sanction report, appeal

[20] No assumption is made on identical finite variance of residuals. In fact, there is no reason to expect the residuals of Eq. (4) to be homoscedastic.

[21] https://www.amf-france.org/fr/sanction-transaction/Decisions-de-la-commission-des-sanctions/listing_sanction

[22] Sanction reports can be first (*ex ante*) published anonymized or not, depending on the EC AMF decision. Additionally, reports can be anonymized *ex post*, following decisions of the EC AMF Chairmen (de Batz, 2017a b).

[23] Detailed results and analyses are available on demand.

[24] According to the AMF classification: transmission of insider information, use of insider information, price manipulation, failure to meet with the information regulatory requirements *vis-à-vis* investors or the regulator, failure to meet with professional obligations, proceedings, and takeovers.

[25] Three dummies cover the anonymization: anonymized when first published, partial anonymization, and *ex post* anonymization, at the EC AMF Chairmen's discretion.

Table 1: Features of the Sample: 61 Victims of Market Manipulators

The sample is comprised of the 61 firms which were named as victim of other market participants in AMF sanction reports (whatever the verdict) from 2005 to 2018 and which were listed all through the sanction process. Some have delisted since the sanction. The dataset was built based mostly on publicly available data. Complementary data were extracted from softwares (Thomson Reuters and Factiva) or shared confidentially by the AMF (anonymized sanctioned companies, missing dates in particular). A detailed description of the variables is available after the table.

Number of Observations: 61	Mean	Std. Dev.	Min	Max
Origin of the Sanction and Sanctioned Regulatory Breaches:				
Investigation procedure (not Control)[1]	98%	0.13	0	1
Transmission of Insider Information[1]	18%	0.39	0	1
Use of Insider Information[1]	41%	0.50	0	1
Price Manipulations[1]	38%	0.49	0	1
Breaches of Public Disclosure Requirements[1]	20%	0.40	0	1
Breaches of the Monetary and Financial Code and the AMF General Regulation[1]	20%	0.40	0	1
Characteristics of the Sanction Decision:				
Acquittals[1]	10%	0.3	0	1
Average Cash Fine (as 000 EUR)[2]	473	827	0	4,000
Warning[1]	14.7%	0.36	0	1
Blame[1]	8.2%	0.28	0	1
Ban on Activity[1]	3%	0.18	0	1
Duration of Procedure (Start to Sanction, as Years)	3.0	1.1	1.1	11.8
Lag from Sanction to Publication (as Months)	1.8	2.7	0.0	11.8
Sanction Report Number of Pages	11	5.5	4	35
Partial Anonymization[1]	15%	0.36	0	1
First Publication Anonymized[1]	33%			
Top Management Involved in the Breach(es)[1,3]	30%	0.45	0	1
Sanctioned Individuals[1]	82%	0.39	0	1
Sanctioned Public Firms1	8%	0.28	0	1
Chairmen of the Enforcement Committee (EC AMF):				
Chairman C. Nocquet[1]	28%	0.45	0	1
Chairman D. Labetoulle[1]	23%	0.42	0	1
Chairman M.H. Tric[1]	31%	0.47	0	1
Details of the appeals:				
Appeal[1]	57%	0.50	0	1
Number of Appeals	1.3	0.52	0	3
Rejection of the Appeal[1]	60%	0.50	0	1
Duration of Appeals (from the sanction, as years)	1.7	0.71	0	4.5
Media Coverage of the Sanction Procedure:				
Media Coverage Intensity before the Sanction[4]	0.05	0.03	0	0.14
Number of Articles Published Between the Sanction and its Publication	11	24	0	160
Number of Articles Published during the Week Following the Sanction	5	8.5	0	56
Articles Published in *L'Agéfi* or *Les Échos*[1]	54%	0.5	0	1

Number of Observations: 61	Mean	Std. Dev.	Min	Max
Characteristics of the Victim:				
Market Capitalization (on the Sanction Day, as 000 EUR)	8,820	19,972	8	103,367
Euronext compartments:				
Compartment A[1,5]	49%	0.50	0	1
Compartment B[1,5]	21%	0.41	0	1
Compartment C[1,5]	13%	0.41	0	1
Euronext industrial classification:				
Financial Sector[1,6]	13%	0.34	0	1
Industry Sector[1,6]	25%	0.43	0	1
Consumer Goods or Services Sector[1,6]	23%	0.42	0	1
Technological Sector[1,6]	16%	0.37	1	1
Victims and the AMF:				
Firm Victim Several Times[1,7]	38%	0.49	0	1
Firm Both Sanctioned and Victim[1,8]	15%	0.36	0	1
More than One Victim per Sanction[1,9]	47%	0.50	0	1
Legal Environment Characteristics:				
Year of the Sanction	2013	3.8	2005	2018
Financial laws enforced:				
LME 2008[1]	28%	0.45	0	1
LRBF 2010[1]	34%	0.48	0	1
Laws 2016[1]	30%	0.46	0	1
AMF chairmen:				
J.P. Jouyet[1,10]	38%	0.49	0	1
G. Rameix[1,11]	20%	0.40	0	1
R. Ophèle[1,12]	23%	0.42	0	1

Sources: AMF, Factiva, Thomson-Reuters, Author's Calculations

Notes: [1] Dummy variables equal to 1 if corresponding to the variable description, to 0 otherwise; [2] Sanctions which only involved a disciplinary sanction or acquittals were assigned a zero-euro cash fine; [3] Top management involved in the breach(es) can include the Chairman, the Chief Executive Officer, the Chief Financial Officer, and the Human Resources Director; [4] The Media Coverage Intensity is the ratio between the number of headlines mentioning the victim over the twenty days preceding the event and the total number of headlines received in the previous year. This variable is meant to capture the visibility of the firm at the time of the event. Using the ratio should control for the fact that some firms are more present in the media; [5] Three dummy variables control for the Euronext market segment on which the victim firms are listed. In fact, Euronext is organized around three pillars: 1) The European Union regulated market for equity securities operates in five markets (including Paris). They are segmented by market capitalizations: compartment A (above 1 billion euros), compartment B (from 150 million to 1 billion euros), and compartment C (below 150 million euros). 2) Alternext targets small-and-mid-sized companies by offering a simplified access to capital markets with fewer requirements and less stringent ongoing obligations than on the EU-regulated market. And 3) The free market provides the easiest access to capital markets through a direct quotation procedure for any company, whatever the size (from micro-cap to medium-sized international companies) searching to access capital markets (free from the Euronext's eligibility criteria and information disclosure requirements). This market targets primarily sophisticated or professional investors; [6] Euronext classifies firms into the 10 following sectors: basic materials; consumer goods; consumer services; financials; health care; industrials; oil & gas; technology; telecoms; utilities; [7] This dummy variable equals to 1 when the firm was a recurrent victim, i.e. *more than one time named in sanction reports as victim of market manipulators; [8] This dummy variable equals to 1 when the firm was both a market manipulator and a victim, for different sanction procedures; [9] This dummy variable equals to 1 when several victims were named in a given sanction report; [10] This dummy variable equals to 1 when J.P. Jouyet was AMF Chairman of the Board (December 2008 to July 2012); [11] This dummy variable equals to 1 when G. Rameix was AMF Chairman of the Board (August 2012 to July 2017); [12] This dummy variable equals to 1 when R. Ophèle was AMF Chairman of the Board (since July 2017).*

characteristics)[26]; 3) the attributes of the respondents (such as the moral form, whether an individual (employee, manager, other) was sanctioned, the top management involvement);[27] and 4) some time and legal indicators (AMF chairmen of the board, financial regulations in force, real GDP growth rate, dummies for years, peak years, global financial crisis).

Specific variables characterize the victims, mentioned in the sanction reports. In fact, a fourth of the sanctions named at least one listed firm as the "victim" from others' financial misconduct: most frequently, their stocks were manipulated due to insider trading and price manipulation. For that reason, market manipulators are being investigated and possibly sanctioned by the AMF. Their characteristics comprise: the market compartment on which it is listed, the market capitalization on the day preceding the sanction, and the business sector.[28]

Additionally, dummy variables were added for cases of multiple victims (more than one firm suffered from the regulatory breach(es)), for firms which were both sanctioned and victim of others over the period under review, and for firms which were victim of others more than one time (*i.e.* recurrent victims). Finally, the media coverage of the victim over the proceeding is taken into account, based on Factiva searches: the media exposure intensity of the firm before the sanction, the numbers of articles mentioning the firm as a victim published between the decision and its publication and over the week following the publication, and whether articles were published in top-tier journals (*L'Agéfi* and *Les Échos*).

4.2.Sample of victim firms (2005-2018)

No listed company was victim in 2004. On average, over the period under review (2005-2018), a fourth of the sanctions involved at least one listed company which was the victim of others (see Table 2).[29] In fact, 114 firms listed in France were mentioned 142 times in 88 sanction decisions as victims of other market participants' regulatory breaches.

In order to conduct the event studies and to limit biases, the sample was limited to the firms which were daily listed, from 120 days before the hearings of the enforcement committee

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[26] Several variables characterize the appeals: whether the decision was appealed or not by the sanctioned entities, as in Karpoff et al. (2008b); whether the AMF appealed the decision of the EC AMF; the number of courts appealed to; whether the decision was confirmed or not; and the duration of the appeal procedure.

[27] From an investor's point of view, such implication could be a particularly worrying signal, demonstrating the improper management of the company and questioning the capacity of the management to deal with future challenges. Karpoff et al. (2008b) showed how financial mis-presentation can prejudice careers of top managers: more than 90% of individuals responsible for fraud lose their jobs by the end of the Securities and Exchange Commission enforcement procedure.

[28] Following the Euronext classification of listed companies. The most frequent sectors, with dummy variables, are: financial sector, industry, consumer goods and services, and technology.

[29] In 2019, 11% of the sanctions involved victims, one of which could be added to the sample. A robustness check was conducted including this 62nd victim, without changing the results and their significance.

until 120 days after the publication of the sanction. Corporate specificities led to the exclusion of 52 victims: 18 due to data frequency problems (either not daily listed, suspended during the process, or listed through the process), 16 delisting during the procedure, 14 mergers and acquisitions (M&As) over the enforcement process (hence delisting), 2 foreign firms, and 2 firms were simultaneously victims of other companies' regulatory breaches, leading to two parallel sanction procedures. Complementarily, a systematic one-by-one Factiva search for major confounding events (around the sanction and the publication) resulted in the exclusion of 30 victims.[30] In fact, the occurrence of any other significant event around the event window could bias the analysis. Possible sources of confounding events can be sorted into two categories: corporate specific news (*i.e.* positive or negative such as the publication of the annual or quarterly results, profit warnings, a confounding condemnation of the victim firm by the AMF, or M&As involving the company) or external events (such as significant evolutions in the competitive environment, the possible spillovers of Brexit on financial companies, and a surge in geopolitical risks).

All in all, the final sample is comprised of 61 occasions on which 50 daily listed companies were mentioned in 42 AMF sanction reports as victims of market manipulators.

Table 2: 12% of the Sanctions in the Scope of the Event Study

Table 2 describes how the initial exhaustive sample of sanctions pronounced by the AMF from 2004 to 2018 was reduced to the final sample of 61 cases when 50 daily listed companies were victim of other market participants' misconduct sanctioned 42 times. Additionally, 30 occurrences of victims had to be expelled from the sample due to major confounding events (major events specific to the company such as financial communication publication, M&As, etc. or external events such as other sanctions, Brexit, etc.).

342 sanctions 2004-2018	88 sanctions with listed companies named as victims (114 firms)	**42 sanctions in the sample** **(50 listed companies "victim")**
		15 sanctions involving 30 confounding events (27 firms) ⇨ Robustness check
		31 sanctions out of the sample Causes: data problem (not daily listed, not listed over the whole period, M&As, foreign firms)
	254 sanctions without "victims"	

Source: AMF, Author's Estimations

4.3.Features of the sanctions of the AMF mentioning victims

For the sample of sanctions under review (see Table 3), market manipulators received lower fines than the average (617,000 euros, with a median of 215,000 euros). Still, the sanctions resulted overwhelmingly from investigations, which target the most severe regulatory breaches.

[30] The range of dates investigated covered the 10 days preceding the sanction decision until two weeks after the publication of the decision, echoing the event window.

Table 3: Characteristics of All the Sanctions, of All Sanctions Involving Victim Listed companies, and of the Sanctions in the Sample

Table 3 compares the main features for 3 different samples of sanctions: 1) the whole set of sanctions made by the AMF from its creation in 2003 until late 2018; 2) the sub-sample of sanctions in which listed companies (at least one) were named as victims of market manipulators (either guilty or acquitted in the end); and 3) the final sample of victims which were daily listed over the estimation and the event windows and were not subject to confounding events.

	All sanctions	All sanctions with victim firms	Sanctions with victim daily listed firms
Number of sanctions	342	88	42
Sanctioned listed companies	-	115	50
Number of times victim	-	1.23	1.22
Main features of the sanctions			
Investigations (as % of sanctions)	68.4	94.0	97.6
Average cash fine* (as thousand euros)	775	1,123	617
Warning, blame, activity (as % of sanctions)	33	31	21
Publication anonymized (as % of sanctions)	27	40	30
Acquittals (as % of sanctions)	8.5	10	12
Average duration of procedure (as years)	2.7	2.9	3.0
Appeals (as % of sanctions)	45	61	55
Rejection of appeals (to date, as % of appeals)	79	76	87
Number of reg. breaches per sanction	1.3	1.3	1.2
Sanctioned regulatory breaches (as % of sanctions):			
Insider trading	28	55	52
Non-compliance with regulatory rulebooks	48	28	29
Information	36	22	26
Price manipulation	9	15	17
Top management involved (as % of sanctions)	50	33	43
Individuals sanctioned (as % of sanctions)	71	90	86
Main features of victims (as % of total victim listed companies if not specified)			
Average market capitalization (as billion euros)	-	9.8	8.8
Median market capitalization (as billion euros)		0.5	0.6
Listed on Euronext Compartment A	-	43	49
Euronext main industrial sectors:	-		
Consumer goods and services		22	23
Industry	-	21	25
Finance	-	16	13
Technology	-	16	16

*Sources: AMF, Thomson Reuters, author's calculations. * Excluding acquittals*

This can be accounted for by the fact that individuals (and not top managers) were much more frequently than the average the defendants (86% *versus* 71%). This is also consistent with the sanctioned regulatory breaches: 52% for insider trading and 17% for price manipulation (comparing with 28% and 9% on average). In 12% of the sanctions, the verdict was an acquittal. Additionally, behavioral sanctions (warning, blame, and ban on activity) were less frequent than on average (21%). The sample decisions were appealed more frequently than on average

(55% *versus* 45%), but with a lower rate of success. 87% of the appeals were rejected, against 79% on average.

The victims are large firms (average market capitalization on the day preceding the sanction of 8.8 billion euros, half of them being listed on the biggest stock market, the Compartment A of Euronext Paris). Half of them are either consumer goods and services or industrial firms, followed by technology and financial firms (respectively 16% and 13%). These companies were on average victim 1.2 times of others' financial misconducts. Put into differently, 18% of the firms were victims several times, on average 2.3 times. Finally, 18% of these companies were both sanctioned by the AMF and victims of others' wrongdoings, 21% being financial companies.

5. Impact on victims of sanctions of market manipulators

The consequences for listed firms of being named in a regulatory sanction report as a victim of sanctioned market manipulators are investigated in this section. These victims may have already endured losses over the violation period (see Figure 2), due to past regulatory breaches (for example insider trading or price manipulation). Most frequently, the market surveillance of the AMF detects abnormal price developments, leading to an investigation regarding the returns of a given entity. In the end, the AMF enforcement committee decides whether the market manipulator should be sanctioned or acquitted. The research questions are whether and why being mentioned as a victim in a sanction procedure against market manipulators will trigger abnormal reactions in the market? Will the victims gain to be avenged by the regulator or conversely undergo additional losses (*i.e.* double punishment)?

5.1.Impact on the victims' returns of others' sanctioned financial misconducts

Daily listed companies were, on 61 occurrences, victims of market manipulators over the period 2005-2018. A classical event study methodology is used to test the reaction in returns of listed companies to the fact of being named in enforcement procedures as victims of others' wrongdoings. The scope of the study is limited to the reactions to the last two steps of the enforcement procedure: 1) the Enforcement Committee hearing making the sanction decision, followed by 2) its publication. In fact, the initial steps of the enforcement procedure (the ignition of an investigation or a control, followed by the statement of objection) are, by law, confidential. Past studies (Djama, 2013; Kirat and Rezaee, 2019; de Batz, 2020) concluded that, even for market manipulators, these early steps did not significantly impact returns. There was no breach of confidentiality, either from part of the regulator or the defendant(s).

The augmented market model (Equation (1)) is estimated to test the first two hypotheses regarding the information content of sanctions for victims, and potential reputational repercussions. Individual abnormal returns are estimated and averaged across victims over the event window [-5;+10] around the enforcement committee and the publication of the sanction (Eq. 2). Cumulative average abnormal returns are also calculated over four different event windows ([-1;+1], [-3;+3], [-5;+5], and [-1;+10]), to investigate some anticipation and the time persistency of abnormal returns.

The results (Panel A in Table 4) demonstrate market failures for two reasons. Firstly, contrary to the semi-strong efficient market hypothesis (Fama, 1970), statistically significant reactions take time to materialize, with statistically significant average abnormal returns over the second week following the sanction decision. It may be accounted for the fact that some channels of news are scaled in time after the publication, from part of the sanctioned company itself or newspaper articles, hence contributing to postponed (or lagged) market abnormal reactions. Secondly, whatever the event window and the investigated event (sanction or publication), cumulative average abnormal returns are negative, and their impacts are substantial and time persistent. Over the event window [-1;+10] around the sanction, cumulative average abnormal returns lost a statistically significant 2.6%. 56% of the sample suffered negative abnormal returns.

As previously described, the sample was purged from any confounding event. Hence, the average negative reaction is most likely the consequence of being mentioned as a victim of market manipulators. The magnitude is additionally greater than for market manipulators (de Batz, 2020): abnormal returns contracted by -1.3% over the [-1;+6] event window, statistically significant at the 5% level. So, we can infer, to some extent, that being named as a victim of financial misconduct sends a negative signal to the market. These economically significant results exhibit unintended negative repercussions of enforcement. Specifically, as most of these companies already suffered over the violation period, the results point to a double punishment of the victims.

Additionally, to assess the subsequent reputational loss or gain based on the residual method (Karpoff and Lott, 1993), we can assume that the costs for being named in a sanction procedure as a victim are null. No financial fine is imposed on the victims of market manipulators, nor legal costs for the AMF enforcement procedure. Consequently, echoing the literature on financial crime, the negative abnormal returns for the victims equal their reputational penalty for being named as such. All in all, answering the second research question,

Table 4: Market Reactions to Being Named a Victim

Table 4 reports the average abnormal returns (AAR_t) from five day preceding the event until 10 trading days following the event. *t = 0* stands for the day of the sanction decision or of the publication of the decision. The abnormal returns (AR_t) are computed over the event window, given the augmented market model parameters (panel A) using Eq. 1 or the simple market model (panel B), as follow: $AR_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t}$. The parameters of the models are estimated with OLS with White-corrected standard errors over the estimation window [-120;-11] *vis-à-vis* the event. The table also reports cumulative average abnormal returns ($CAAR_t$) for four event windows ([-1;+1], [-3;+3], [-5;+5], and [-1;+10]) to test some anticipation by the market and the time persistency of the reactions. The sample of panel A and B is composed of the 61 daily listed companies which were mentioned in sanction reports of the AMF as victims of others' financial misconduct from 2004 to 2018 (excluding all confounding events). Complementarily, abnormal returns were computed for a larger sample (91), including 30 victims which may be associated with confounding events (panel C).

	(A) Augmented Market Model						(B) Simple Market Model				(C) Augmented Market Model Including Confounding Events			
	Sanction			Publication			Sanction		Publication		Sanction		Publication	
	Coef.	*t-stat*	*Rank Test*[1]	Coef.	*t-stat*	*Rank Test*[1]	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*
AAR(-5)	-0.2%	*-0.94*	*-1.61*	-0.2%	*-0.61*	*0.60*	-0.3%	*-1.13*	-0.1%	*-0.53*	-0.3%	-1.17	0.1%	0.33
AAR(-4)	0.1%	*0.26*	*-1.52*	-0.2%	*-0.60*	*0.39*	0.1%	*0.30*	-0.2%	*-0.54*	0.0%	0.16	-0.3%	-1.11
AAR(-3)	0.0%	*-0.06*	*-1.25*	-0.2%	*-0.84*	*0.53*	-0.1%	*-0.13*	-0.1%	*-0.54*	0.0%	-0.01	-0.4%	-1.61
AAR(-2)	-0.3%	*-1.15*	*-1.38*	-0.3%	*-0.70*	*0.15*	-0.2%	*-0.88*	-0.3%	*-0.82*	-0.6%***	-2.86	-0.3%	-1.11
AAR(-1)	0.0%	*-0.06*	*-1.25*	-0.7%**	*-2.18*	*-0.25*	-0.1%	*-0.26*	-0.7%**	*-2.04*	-0.2%	-1.01	-0.5%*	-1.93
AAR(0)	**-0.1%**	***-0.40***	***-0.94***	**0.4%**	***1.23***	***0.32***	**-0.1%**	***-0.41***	**0.4%**	***1.10***	**-0.3%**	**-1.02**	**0.4%**	**1.37**
AAR(1)	-0.1%	*-0.38*	*-1.05*	-0.3%	*-0.73*	*-0.02*	-0.1%	*-0.37*	-0.2%	*-0.46*	-0.2%	-0.64	-0.5%*	-1.71
AAR(2)	-0.3%	*-0.80*	*-1.35*	0.1%	*0.24*	*0.40*	-0.3%	*-0.69*	0.1%	*0.43*	-0.6%*	-1.85	-0.1%	-0.47
AAR(3)	-0.1%	*-0.28*	*-1.09*	0.5%	*1.16*	*0.59*	0.0%	*-0.07*	0.5%	*1.20*	-0.2%	-0.74	0.3%	1.0
AAR(4)	-0.4%	*-1.33*	*-1.25*	0.2%	*0.83*	*0.96*	-0.4%	*-1.41*	0.2%	*0.90*	-0.2%	-0.66	0.0%	0.07
AAR(5)	0.1%	*0.32*	*-1.07*	-0.4%	*-1.51*	*0.64*	0.1%	*0.28*	-0.3%	*-1.24*	-0.1%	-0.54	-0.5%	-1.54
AAR(6)	0.0%	*-0.03*	*-0.87*	-0.2%	*-0.75*	*0.67*	0.0%	*0.07*	-0.3%	*-0.93*	0.1%	0.64	-0.1%	-0.54
AAR(7)	-0.5%*	*-1.68*	*-0.96*	-0.1%	*-0.30*	*0.63*	-0.5%*	*-1.78*	-0.1%	*-0.19*	-0.5%**	-2.24	-0.1%	-0.41
AAR(8)	-0.6%*	*-1.81*	*-1.23*	-0.5%	*-1.52*	*0.08*	-0.7%*	*-1.88*	-0.6%**	*-2.11*	-0.8%**	-2.50	-0.6%**	-2.20
AAR(9)	0.2%	*0.46*	*-1.38*	-0.4%	*-1.10*	*-0.37*	0.1%	*0.20*	-0.4%	*-1.22*	-0.1%	-0.33	-0.6%**	-2.22
AAR(10)	-0.7%**	*-2.13*	*-1.54*	0.2%	*0.50*	*-0.29*	-0.7%**	*-2.11*	0.2%	*0.43*	-0.7%***	-2.91	0.2%	0.58
	Coef.	*t-stat*	*Sign Test*[2]	Coef.	*t-stat*	*Sign Test*[2]	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*
CAAR[-1;+1]	-0.3%	*-0.51*	*0.13*	-0.5%	*-0.70*	*0.38*	-0.3%	*-0.59*	-0.4%	*-0.60*	-0.7%	-1.55	-0.7%	-1.18
CAAR[-3;+3]	-0.9%	*-1.06*	*-0.38*	-0.9%	*-0.96*	*-0.13*	-0.9%	*-1.06*	-0.7%	*-0.81*	-1.9%***	-2.66	-1.5%*	-1.88
CAAR[-5;+5]	-1.5%	*-1.14*	*-1.15*	-1.0%	*-0.76*	*0.90*	-1.4%	*-1.21*	-0.6%	*-0.57*	-2.7%**	-2.56	-1.9%	-1.64
CAAR[-1;+10]	-2.6%*	*-1.99*	*-0.90*	-1.1%	*-0.97*	*-1.41*	-2.7%**	*-2.11*	-1.1%	*-0.96*	-3.8%***	-3.40	-2.1%**	-2.10
Observations	61			61			61		61		91		91	

*Sources: AMF, Thomson Reuters, Author's calculations. Notes: *, **, and *** denote statistical significance at the 10%, 5% , and 1% levels. Two non-parametric tests were conducted:[1] Corrado (1989) rank test and [2] Corrado and Zivney (1992) sign test.*

the spillovers on victims of financial misconduct and the subsequent reputational impact are negative and large and exceed those for market manipulators.

5.2.Robustness tests

We performed two series of robustness checks (parametric and non-parametric) to challenge the market sanction for being named as a victim of market manipulators. Parametric robustness checks confirm the significance of the results. The significance of the results is supported by the exhaustiveness of the dataset and the detailed analysis of every case to exclude confounding events which could bias the results. All in all, the results are insightful in terms of enforcement: a regulator should avoid at all costs hurting unintentionally past victims by naming them in others' sanctions.

Two complementary robustness tests were conducted on the sample in light of the limited (though exhaustive) number of observations. The goal is to ensure that the presence of outliers does not bias the results. The results confirm that, on average, victims experience substantial negative abnormal returns after the sanction.

Table 5: Cumulative Winsorized Abnormal Returns for the Sanctions Involving Listed Companies as Victims

Table 5 reports the winsorized cumulative average abnormal returns ($CAAR_t$) up to a specified day *t* in event time for the last two steps of the sanction procedure, the Enforcement Committee hearing with the sanction decision and the publication of the sanction report. Event time *t* is days relative to the step of the sanction procedure being analyzed and *t = 0* is the event itself. Abnormal returns are computed given the augmented market model parameters (Eq. 1), which are estimated with OLS through the period [-120;-11] in event time. Abnormal returns were winsorized before estimating the test statistics. Results were winsorized at 4 different levels, echoing past literature: 10, 5%, 2%, and 1%.[32] For example, at the 10% level, all abnormal returns' outliers to a 90th percentile were excluded from the data, meaning that all data below the 5th percentile are set to the 5th percentile, and data above the 95th percentile are set to the 95th percentile. The sample is composed of the 61 daily listed companies which were victim of market manipulators' financial misconduct as mentioned in sanction reports of the AMF from 2005 to 2018.

	Central		**Winsorized 10%**		**Winsorized 5%**		**Winsorized 2%**		**Winsorized 1%**	
	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*
Sanction:										
CAAR[-1;+1]	-0.3%	*-0.51*	-0.3%	*-0.92*	-0.2%	*-0.55*	-0.2%	*-0.38*	-0.2%	*-0.35*
CAAR[-3;+3]	-0.9%	*-1.06*	-1.2%**	*-2.05*	-1.2%*	*-1.69*	-1.1%	*-1.41*	-1.0%	*-1.22*
CAAR[-5;+5]	-1.5%	*-1.14*	-1.8%**	*-2.12*	-1.7%*	*-1.68*	-1.5%	*-1.37*	-1.4%	*-1.19*
CAAR[-1;+10]	-2.6%*	*-1.99*	-2.3%***	*-2.85*	-2.4%**	*-2.35*	-2.5%**	*-2.12*	-2.5%**	*-2.05*
Publication:										
CAAR[-1;+1]	-0.5%	*-0.70*	-0.4%	*-1.10*	-0.5%	*-1.08*	-0.5%	*-0.80*	-0.4%	*-0.72*
CAAR[-3;+3]	-0.9%	*-0.96*	-0.6%	*-1.21*	-0.7%	*-1.09*	-0.7%	*-0.97*	-0.7%	*-0.92*
CAAR[-5;+5]	-1.0%	*-0.76*	-1.2%	*-1.52*	-1.2%	*-1.29*	-1.0%	*-0.92*	-0.8%	*-0.74*
CAAR[-1;+10]	-1.1%	*-0.97*	-1.7%**	*-2.33*	-1.8%**	*-2.01*	-1.4%	*-1.37*	-1.2%	*-1.14*

Sources: AMF, Thomson Reuters, Author's calculations
*Note: *, **, *** denotes statistical significance at the 10%, 5%, and 1% levels.*

Firstly, a bootstrapped analysis of the robustness of standard errors was undergone 1,000 times, with a confidence interval of 95%.[31] Secondly, abnormal returns were consecutively winsorized at 4 different levels (10%, 5%, 2%, and 1%), before estimating the test statistics.[32] For example, at the 10% level, all abnormal returns' outliers to a 90th percentile were excluded from the data, meaning that all data below the 5th percentile are set to the 5th percentile, and data above the 95th percentile are set to the 95th percentile. The magnitudes of the cumulative average abnormal returns were confirmed and turned out to be more statistically significant and more persistent in time with winsorized abnormal returns (see Table 5).

Table 6: Cumulative Abnormal Returns for the Sanctions Involving Listed Companies as Victims for the Years 2011 and 2018

Table 6 reports the cumulative average abnormal returns ($CAAR_t$) up to a specified day *t* in event time for the two last steps of the sanction procedure for two subsets of the sample: all the decisions which impacted listed companies as victim in 2011 (10 cases) and in 2018 (13 cases). In fact, in these years there were the highest number of victims, partly due to the fact that, in some cases, several firms were victims of a given breach investigated by the AMF (up to 40 victims for a given sanction procedure). Event time *t* is days relative to the step of the sanction procedure being analyzed and *t = 0* is the event itself. Abnormal returns are computed given the augmented market model parameters, which are estimated with OLS through the period [-120;-11] in event time.

	2011				2018			
	Sanction		Publication		Sanction		Publication	
	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*
AAR(-5)	0.0%	*0.051*	0.1%	*0.15*	-1.6%***	*-3.75*	-1.7%**	*-2.80*
AAR(-4)	0.3%	*0.28*	1.0%	*1.19*	-1.8%**	*-2.83*	-1.1%	*-1.21*
AAR(-3)	0.0%	*0.05*	-0.1%	*-0.12*	-1.1%	*-1.28*	-0.4%	*-1.25*
AAR(-2)	-0.1%	*-0.11*	0.0%	*0.06*	-0.4%	*-1.24*	-0.3%	*-0.33*
AAR(-1)	0.8%	*0.98*	-0.1%	*-0.20*	-0.3%	*-0.39*	0.1%	*0.12*
AAR(0)	**0.7%**	***1.30***	**-0.5%**	***-0.91***	**0.0%**	***0.06***	**0.4%**	***0.55***
AAR(1)	-0.4%	*-0.44*	0.8%	*1.34*	0.4%	*0.60*	-0.7%	*-0.53*
AAR(2)	0.2%	*0.31*	-0.1%	*-0.40*	-0.8%	*-0.57*	-0.9%	*-0.71*
AAR(3)	-0.5%	*-1.38*	0.4%	*0.51*	-1.0%	*-0.75*	-0.5%	*-1.36*
AAR(4)	-0.2%	*-0.81*	0.5%	*0.57*	-0.5%	*-1.34*	0.0%	*0.06*
AAR(5)	0.3%	*0.56*	0.1%	*0.16*	0.0%	*0.00*	0.1%	*0.12*
AAR(6)	-0.2%	*-0.31*	0.7%**	*2.97*	0.1%	*0.10*	-0.5%	*-0.64*
AAR(7)	-0.2%	*-0.51*	-0.6%	*-1.27*	-0.5%	*-0.66*	0.5%	*0.73*
AAR(8)	-0.7%	*-1.18*	-0.7%*	*-1.97*	0.5%	*0.67*	0.4%	*0.31*
AAR(9)	0.0%	*0.10*	-0.2%	*-0.27*	0.4%	*0.31*	-1.7%*	*-2.15*
AAR(10)	0.4%	*0.77*	0.0%	*0.12*	-1.7%*	*-2.12*	-1.4%***	*-3.26*
CAAR[-1;+1]	1.1%	*0.78*	0.2%	*0.22*	0.1%	*0.10*	-0.2%	*-0.11*
CAAR[-3;+3]	1.2%	*0.78*	0.1%	*0.06*	-2.2%	*-0.74*	-1.9%	*-0.65*
CAAR[-5;+5]	1.1%	*0.55*	2.2%	*1.09*	-7.0%	*-1.77*	-5.1%	*-1.27*
CAAR[-1;+10]	0.2%	*0.12*	0.2%	*0.12*	-3.4%	*-1.05*	-4.3%	*-1.36*
Observations	10		10		13		13	

*Sources: AMF, Thomson Reuters, Author's calculations *, **, *** denotes statistical significance at the 10%, 5%, and 1% levels.*

[31] Detailed results are available on demand.

[32] These levels were used in the literature: 10% (Armour et al., 2017); 5% (Cumming et al., 2013); 2% (Drake et al., 2015); and 1% (Drake et al., 2015; Dechow et al., 2016).

Complementary robustness tests included re-estimations for sub-samples or larger samples. Firstly, splitting the sample depending on ignition date of the global financial crisis demonstrated that reactions after the sanction decision could have increased since the crisis, with more negative abnormal returns.[33] Still, the very limited size of the pre-crisis samples (with respectively 2 and 6 victims for the sanction before the outburst of the crisis) pleads for prudence regarding the interpretation of the results. Secondly, given the density distribution of events over time, the event study was re-estimated for the sub-samples of peak years of events (2011 and 2018). The results (see Table 6) do not point to bias due to these years. Finally, the 30 daily-listed victims initially excluded due to confounding events were reintegrated into the sample, to challenge the robustness of their exclusion hypothesis. The results for the 91-victim sample (see Panel C in Table 4) also confirm negative reaction of markets, which turned out to be higher and more statistically significant, in particular following the sanction (CAAR[-3;+3] of -1.9%) and, in the longer run, the publication (CAAR[-1;+10] of -2.1%).

Finally, two series of non-parametric tests challenged the statistical significance of abnormal reactions: Corrado (1989) rank test for abnormal returns and Corrado and Zivney (1992) sign test for cumulative abnormal returns. (Cumulative) abnormal returns turned statistically insignificant (see Panel A in Table 4).

5.3.Impact on market values of sanctioned companies

The average market value loss for victims is estimated for the sample of 61 victims based on Eq. (3). The most statistically significant cumulative abnormal returns are used: CAR[-1;+10], from the day preceding the sanction decision and over the next trading 10 days (-2.6% on average), statistically significant at the 10% level. The market capitalization of the victims lost 296,100 euros on average over this period of 12 trading days (with a standard deviation of 1.5 million euros, ranging from -10.1 up to +1.7 million euros).

5.4.Cross-sectional differences in reputational losses

Finally, we employ a cross-sectional multivariate regression analysis (based on Eq. 4) to investigate whether the seriousness of the breaches and/or some characteristics of the victims contribute to the abnormal returns (or reputational losses) incurred by each victim in the aftermath of the sanction decision (hypothesis 3).

[33] Two dates were tested, following the literature, for the ignition of the global financial crisis: June 2007 (Armour et al., 2017), with the beginning of the US subprime crisis, and September 2008, with Lehman Brothers' bankruptcy Kirat and Rezaee, 2019). Detailed results are available on demand.

The dependent variable is the most statistically significant cumulative abnormal returns for every victim i $CAR_i(-1;+10)$, over the event window [-1;+10]. For a cross-section of victims of sanctions, we run OLS regressions with robust standard errors. Four models were tested, based on the literature. Model 1 and model 2 investigate respectively whether the "seriousness of the financial misconduct" and the "characteristics of the victim" determine the victim's abnormal losses (see Table 1 for detailed description of variables). Complementarily, two models mix the two sets of independent variables to test for combined effects, with a dominant for each of them (model 3 for the victims and model 4 for the seriousness of the misconduct). In parallel, a set of variables controls for industrial sectors and the time dimension, in light of the wide range of sectors and the long period under review. The results are displayed in Table 7. They are robust with the exhaustive cross-sectional test.[34] The models were tested for omitted variable, multi-collinearity and heteroskedasticity biases.

The following underlying hypotheses justify the chosen explanatory and control variables. Four dimensions characterize the seriousness of the financial misconduct. Firstly, three dummy variables indicate the sanctioned market abuses (the most serious breaches and the most frequent for victims): transmission of insider information, use of insider information, and price manipulation. In fact, Karpoff and Lott (1993) demonstrated that the abnormal returns for market manipulators vary depending on the types of financial misconducts.

The second dimension characterize the sanction decision. 4 variables describe the seriousness of the decision, based on the French legal framework: a dummy variable for the verdict (acquittal or sanction), the financial penalty (natural log of the cash fine, in euros), and two dummy variables for behavioral sanctions (warning and blame). More severe verdicts could hit more severely victims, if they were assimilated to victims, echoing the generalization described by Jonsson et al. (2009) and the subsequent underserved losses. Conversely, tougher sanctions could trigger more favorable market reactions for victims which are avenged by the regulatory decision. Complementarily, a dummy variable controls for the anonymization of the market manipulator in the sanction report (whereas the identity of the victims is never anonymized). Such anonymization could possibly deport the blame to the victim. The length of the sanction reports is taken as a proxy to the complexity of the cases, which could impact market reactions. Drake et al. (2014) stressed that the high level of complexity of accrual mispricing of annual earnings announcement would be the reason why of the lack of influence of their press coverage. Karpoff et al. (2008a) also demonstrated that the reputation loss

[34] Detailed results are available on demand.

Table 7: Determinants of Abnormal Returns Following the Sanction Decision

This table reports cross-sectional ordinary least squares (OLS) regressions (with robust White-corrected standard errors) with the Cumulative Abnormal Returns from the day preceding the sanction decision until the 10th day: $CAR_{i,[-1;+10]}$, for $i = 1, \dots, 61$ as a dependent variable. The latter are computed using the augmented market model. The sample is composed of the 61 victims from 2005 to 2018. A negative coefficient (as percentage) means a reduction in abnormal returns (a higher loss or a lower gain), and conversely for a positive coefficient.

	Model 1		**Model 2**		**Model 3**		**Model 4**	
	Coef.[1]	*RSE*[2]	Coef.[1]	RSE[2]	Coef.[1]	RSE[2]	Coef.[1]	RSE[2]
1. Seriousness of the Financial Misconduct								
Origin of the Sanction:								
Transmission of Insider Information	-16.09***	*(4.56)*			-15.27***	*(4.93)*	-13.28***	*(4.89)*
Use of Insider Information	0.49	*(3.32)*					1.60	*(3.76)*
Price Manipulation	-0.79	*(3.30)*					1.61	*(4.10)*
Characteristics of the Sanction Decision:								
Acquittal	-2.86	*(5.07)*					-6.13	*(5.21)*
Cash Fine (as log)	0.29	*(0.91)*						
Warning	1.36	*(3.89)*						
Blame	9.33***	*(3.37)*			14.24***	*(4.23)*	6.87*	*(4.09)*
First Publication Anonymized	-5.87*	*(3.06)*			-3.37	*(2.85)*	-3.04	*(2.82)*
Sanction Report Nb. of Pages	0.82**	*(0.34)*			0.84***	*(0.31)*	0.63**	*(0.30)*
Sanctioned Public Firm	10.29	*(6.51)*						
Appeal:								
Decision appealed	-5.00	*(3.85)*					-3.55	*(3.09)*
Media Coverage of the Sanction Procedure:								
Media Coverage Intensity Before the Sanction	-0.65	*(0.67)*			-0.41	*(0.60)*	-0.41	*(0.62)*
Articles Published during the Week Following the Sanction	2.61	*(2.89)*			-0.66	*(3.29)*	0.97	*(3.27)*
2. Characteristics of the Victims								
Stock Market Listing:								
Listed on Euronext Compartment A			-0.52	*(5.74)*	7.22	*(7.07)*		
Listed on Euronext Compartment B			-3.55	*(6.46)*	5.67	*(6.47)*		
Listed on Euronext Compartment C			-5.05	*(7.75)*	4.43	*(9.46)*		
History of the Victim with the AMF:								
Victim Several Times			4.20	*(3.17)*	0.28	*(2.88)*	2.62	*(2.98)*
Victim and Market Manipulator			-3.72	*(5.26)*	-2.15	*(4.75)*	-3.62	*(5.37)*
Several Victims named in the Sanction			-2.08	*(3.19)*	-1.88	*(3.54)*	-2.55	*(3.87)*
3. Control Variables								
Victims' Sectors (Euronext):								
Industrial Sector			-1.39	*(3.21)*	0.45	*(4.00)*		
Consumer Goods and Services			1.60	*(4.67)*	3.28	*(4.73)*		
Technological Sector			0.15	*(5.35)*	-6.93	*(5.79)*		
Financial Sector			-2.87	*(4.32)*	-3.49	*(4.57)*		
Financial Laws Enforced by the AMF:								
LME 2008[1]	-4.07	*(5.16)*	-8.86**	*(3.79)*	-4.58	*(4.51)*	-4.67	*(4.76)*
LRBF 2010[1]	-6.11	*(4.07)*	-3.15	*(2.08)*	-3.72	*(5.53)*	-3.22	*(4.74)*
Laws 2016[1]	-4.11	*(4.38)*	-3.65	*(3.43)*	-4.64	*(5.22)*	-3.99	*(4.68)*
Constant	**-0.86**	***(4.58)***	**4.40**	***(5.97)***	**-6.74**	***(7.03)***	**0.27**	***(4.89)***
Sample Size	61		61		61		61	
R-Square	0.42		0.17		0.45		0.38	
Mean VIF (Multicollinearity)	2.87		2.68		3.29		2.61	
Cameron & Trivadi's IM-White test (p value Heteroskedasticity)	0.99		0.22		0.44		0.39	
Ramsey-test Prob > F (Omitted Var.)	0.32		0.57		0.13		0.41	

*Sources: AMF, Factiva, Thomson Reuters, Author's calculations. Notes: [1]As %; [2] RSE: White-Robust Standard Errors; *, ** and *** denote statistical significance at the 10%, 5%, and 1% level.*

increases with the severity of the financial mispresentation. A dummy variable controls for the presence amid the sanctioned entities of a listed company. The latter is more likely to receive a

high echo in the press than individuals, which are more frequent in our sample than on average. In parallel, the victim of the listed firm may also receive more media attention. Thirdly, by appealing a decision, a market manipulator signals its disagreement with a regulatory decision. The appeal could lead to a revision of the verdict, and possibly an acquittal (though 60% of the appeals are rejected). Finally, a higher media coverage of a news is typically assumed to lead to stronger market reactions, as the media scrutiny contributes to the dissemination of the news and to investors' knowledge. This positive correlation has long been documented regarding financial crime (Miller, 2006; Barber and Odean, 2008; Fang and Peress, 2009; Fang et al., 2014; Dai et al., 2015; Rogers et al., 2016). Still, this correlation holds until a given level of information: for larger firms and more mediatized firms, the (reputational) cost of being sanctioned could be smaller (in the U.S.: Griffin et al., 2004; in the United Kingdom (U.K.): Armour et al., 2017). Their larger amount of information in the market proportionally reduces the informational value of a regulatory communication regarding their misconduct. Consequently, two variables capture the media exposure of the victims. Firstly, a dummy variable indicates if newspaper articles mentioned the victim as such, over the week following the sanction. Secondly, a media coverage intensity variable captures the media visibility of the firm at the time of the event. It is the ratio between the number of headlines mentioning the victim over the twenty days preceding the event and the total number of headlines in the previous year (Capelle-Blancard and Laguna, 2010).[35]

The characteristics of the victims of market manipulators call for the following observations. As in Karpoff et al. (1993), three dummy variables (depending on which market segment the victim is listed) investigate the impact of size on market reactions. In the literature on market manipulation, the market capitalization is frequently an explanatory variable, either in absolute terms (Miller, 2006; Kirat and Rezaee, 2019), or in log (Murphy et al., 2009; Armour et al., 2017). Palmrose et al. (2004) and Armour et al. (2017) concord with a negative correlation between market reactions and size of market manipulators: size would limit negative market reactions. Past research also demonstrated that firms with bigger market capitalization and more liquid stocks are more likely to be manipulated (Shah et al., 2019). Complementarily, three dummy variables describe the history of the victims with the AMF over the period under review: 1) whether the firm was victim several times (*i.e.* recurrent victims of sanctioned market manipulators, 38% of the sample), with firms possibly becoming sanction-proof; 2) whether

[35] Using the ratio should control for the fact that some firms are more present in the media, contrary to the press intensity variable of Miller (2006), which is a ratio of the number of articles over the violation period to the number of months of this period.

the victim was also sanctioned for market manipulation (15% of the sample); and 3) whether there was more than one victim named in the sanction (47% of the sample). The last two variables may have respectively contributed to dilute the information or conversely to reinforce the media coverage of the news, in a context of information overload and limited investors' attention due to their bounded rationality.

Finally, two sets of control variables are introduced: the industrial sectors of the victims (for the same reasons as for augmenting the market model) and the financial laws enforced by the AMF. The following rationales support the use the regulatory changes to control for the time dimension: they stand for the progressively enlarged enforcement powers granted to the AMF; they control for the period after the global financial crisis; and they are independent from the political agenda and the peak years. Additionally, controlling for the time dimension is key when investigating corporate reputation and regulation, as their interactions might evolve over time (McKenna and Olegario, 2012).

The following takeaways can be made regarding the information content of being a victim of a sanctioned regulatory breach and its interpretation by financial markets (see Table 7).

On the seriousness of the sanction, the results of models 1, 3 and 4 demonstrate that victims benefit from being avenged for the more serious financial misconducts. Tougher verdicts (cash fines, assorted with warning or blames), and longer sanction reports (indicator of complexity and seriousness of the financial misconduct) alleviate the market sanction on the victim. In that sense, a tougher sentence can be understood as a vengeance of the victim, which returns will benefit from being avenged. Conversely, being named in a sanction which verdict was an acquittal or appealed, or in which the market manipulator was anonymized, penalizes the returns of the victims. Hence, the market reacts as if the market manipulator's innocence (acquittal), the market manipulator's claim for innocence (appeal), or the lack of market manipulator to blame (anonymization) would imply or suggest a guilt of the victim. Additionally, being the victim of the transmission of insider information, one of the most severe market abuses, will statistically significantly dampen victims' returns. Such confusions could result from a general tendency to generalize (assimilating victims to market manipulators) in context of an information overload and limited investors' attention. Finally, regarding the media coverage of the sanction procedure, being more under the media scrutiny before the sanction will slightly more penalize market reactions for victims. In that sense, investors would again assimilate the victim and the mention of an AMF sanction to being guilty, generalizing misconduct without discriminating more into the details. But surprisingly, this is not confirmed

by the other media variable, which controls for articles published after the sanction publication mentioning the victim.[36]

Regarding the characteristics of the victims (models 2, 3 and 4), the size of the victim is related to a more positive (or less negative) effect on returns. This result can be explained by conflicting market influences: on the one hand, bigger companies get a higher media coverage and, thus, the fact of being a victim might result in wider and quicker public information; on the other hand, in case of assimilation of victims to market manipulators, size can serve as a protection because the fundamentals of the firms are likely to be more resilient to any negative news on the victims. This observation echoes the results of Palmrose et al. (2004) in the sense that the analysts' coverage of bigger firms may be more accurate. This limits the risks of misinterpretation of sanction reports and of assimilation of victims to market manipulators. Conversely, smaller firms receive less media attention. The mere mention of their names in a sanction could send a stronger negative message, as market participants could fail to distinguish the defendant from its victim. Being a recurrent victim (2.3 times on average) has a substantial positive impact on abnormal returns, possibly as firms become sanction-proof (Koku et al., 2001). Conversely, being one out of many victims is interpreted negatively. In fact, sanctions involving numerous victims may be more attention grabbing and, in the meantime, investors can assimilate victims to market manipulators. Finally, having a dual history with the AMF, as a market manipulator and as a victim, is also associated with substantial negative effect on returns.

5.5.Comments on the results

All in all, the results question the usefulness of naming victims over enforcement procedures. In fact, financial markets react negatively to such information. This reaction takes more time to be incorporated into prices (1 to 2 weeks) than for guilty listed firms, and is persistent in time. Such inflection suggests a double punishment of the victims, far from the alternative hypotheses of a premium for being avenged (positive abnormal returns) or from being neglected by the markets (no abnormal reaction). The victim company most probably suffered from others' financial wrongdoing over the violation period: its returns possibly already abnormally underperformed during the violation period due to insider trading or price manipulations. The victim is penalized again when the market manipulator is prosecuted by its regulator, as a result of its transparency.

[36] Robustness checks with other variables for the media coverage of the sanction (such as the number of articles mentioning the sanction, or articles published in the two leading economic journals) confirmed this observation.

Why victims are named and shamed, as an unintended consequence of enforcement? Two sets of hypothesis are possible, and may jointly account for the results of this research. On the one hand, this research can stress a market failure where victims are not properly differentiated from wrongdoers; they are literally named then shamed. It could, for example, be the result of newspaper articles mentioning both the wrongdoer(s) and its victim(s), which end up being associated. While reputation plays a key role of disciplining financial misconduct, and promoting financial market development in a dynamic way along time (Karopff and Lott, 1993; Karpoff, 2012), complementarily to regulation and enforcement, the misunderstanding of financial misconducts and/or parties at stake should not lead to unintended reputational losses for victims. Regulators could be blamed for unnecessary transparency. Several factors could account for such losses and informationally inefficient markets: the bounded rationality of investors (with limited attention, low general financial education and processing power, Dietrich et al., 2001); a market tendency to generalize, leading to underserved losses (Jonsson et al., 2009); and, generally, an information overload, leading to an impossible discrimination between victims and market manipulators (Ripken, 2006; Paredes, 2003). On the other hand, the news of a sanction could also reveal victims' weaknesses, which may have enabled the breach to be committed, leading to a downward revision of compared to market consensus before the news of the sanction. In that sense, the four financial misconducts comprised in the sample could send different messages about past victims. For example, the news that one's stock could be manipulated by traders (leading to a regulatory sanction) can signal that the firm's shares are not as deep and liquid as previously believed. Stocks victim of insider trading could stress poorer than estimated data security management, or weaker internal governance than thought. To investigate such possibility, we split the sample by sanctioned regulatory breaches and estimate the subsequent cumulative average abnormal returns for different event windows. The results are displayed in Table A.1 of Appendix A. Given the limited size of the sub-samples, they must be interpreted with prudence. Still, it is interesting to note that, to some extent, the market does discriminate by breaches, with higher abnormal contractions in returns after insider trading (as in the cross-sectional regression, see Table 7) and price manipulations.

The results point to three directions in terms of policy recommendations, in order to protect better regulated entities, to manage the AMF's reputation as a regulator (Gilad and Yogev, 2012), and to come closer to efficient regulation. The possible unintended repercussions of enforcement, when a victim could be unfairly assimilated to its past executioner, support a systematic anonymization of victims in the sanction reports, to protect victims from any abnormal market reaction and to avoid blaming regulators for naming victims. This is all the

most relevant that there is an increasing regulatory shift toward "naming and shaming" practices, by which a regulator expresses its disproval with the intent of invoking condemnation by others, instead of sanctioning a misbehavior. Additionally, anonymization of victims would echo a compulsory anonymization of sanctioned individuals after 5 years, as a result of the French regulatory changes enforced in 2016. In that sense, victims should be anonymized also retrospectively, contributing to the prescription of past sins. Secondly, the subsequent stigmatization of victims after being named in a market manipulator's sanction report (whatever the reason, either being wrongly associated to sanctioned firms and/or individuals, or due to the internal weaknesses demonstrated by the breach committed at their expense) demonstrates the efficiency of the "name and shame" approach, from another perspective. Echoing the U.K.'s stance, naming and shaming could – at least in part – efficiently substitute for sanctions, in a time of increasing financial constraints of regulators (Yadin, 2019). This way, regulatory goals could be achieved more quickly, easily, cheaply, and transparently than with sanctions and settlements. Finally, given the misinterpretation of regulatory information leading to a confusion between market manipulators and their victims, the regulatory efficiency could benefit from investments in financial education and in pedagogical tools.

6. Conclusion

This research exploits a French specificity of the enforcement of financial laws and regulations. It challenges the information content, for a listed company, of being named as a victim of sanctioned market manipulators. A fourth of the sanction decisions names at least one public firm which suffered from others' regulatory breaches. More specifically, it investigates spillovers of sanction procedures on the victims. To do so, events studies are conducted to investigate for abnormal market reactions for victims following the Enforcement Committee meeting and the publication of its decision. Complementarily, it aims at understanding whether the seriousness of the financial misconducts and the characteristics of the victims contribute to such reactions.

For the exhaustive sample of sanctions involving victims published since the AMF creation, the event studies demonstrate negative, persistent in time and – to some extent – statistically significant negative abnormal returns for the victims following the sanction of the market manipulators. Consequently, those firms, which possibly already suffered over the violation period from the investigated regulatory breaches, get penalized for a second time when their executioner is sanctioned. In that sense, victims are double sentenced when being avenged. Victims are more penalized when the market manipulator is sanctioned for the transmission of

insider trading, is acquitted, or anonymized in the sanction report, or appeals the decision. The results demonstrate either a market failure, where victims are not properly differentiated from wrongdoers and can even be blamed instead of the market manipulator (acquittal, anonymization, and appeals), or that the sanctions also reveal weaknesses of the past victims, which possibly enabled the breaches. "Naming" a victim in a sanction is understood as "shaming" by the market.

Consequently, in terms of policy recommendations, the results suggest a systematic anonymization of victims of market manipulators. The goal would be to protect victim firms from suffering a double punishment when being avenged from past regulatory breach(es) they endured from regulated market participants. Complementarily, naming and shaming market manipulators could prove efficient in terms of enforcement. Finally, investments in financial education and pedagogy could avoid regulatory communication to be misunderstood, by assimilating victims to market manipulators. As recommended by Mulherin (2007) and Holthausen (2009), first, this work should be prolonged by other studies on the unintended consequences of enforcement on victims at national levels, to challenge the French results. As a second step, a broader perspective with cross-country analysis could be envisioned, in particular from a European perspective. This is key in a time when the enforcement powers of the ESMA are getting traction.

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Appendix A: Market Reactions by Regulatory Breaches

Table A.1: Cumulative Average Abnormal Returns by Regulatory Breaches

Table A.1 reports the cumulative average abnormal returns (CAAR) over the four different event windows ([-1;+1], [-3;+3], [-5;+5], and [-1;+6] in event time, with the event occurring in *t=0*) for the last two steps of the enforcement procedure the Enforcement Committee Hearing ("sanction") and the publication of the sanction report ("publication"). Abnormal returns are computed given the augmented market model parameters (Eq. 1), which are estimated with OLS through the estimation window [-120;-11] in event time. The 61 sample of victims is split depending on the breaches which they were victims of: insider trading (transmission and/or use of), price manipulation, breaches to public disclosure requirements ("public disclosure", including accounting frauds), and breaches to Monetary and Financial Code and of the AMF General Regulation ("breaches to professional obligations"). They are sorted by declining size of samples.

	Insider trading		**Price manipulation**		**Public disclosure**		**Breach to prof. oblig.**	
	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*	Coef.	*t-stat*
Sanction								
CAAR[-1;+1]	-1.7%**	*-2.26*	0.7%	*0.70*	-1.1%	*-1.31*	-0.1%	*-0.12*
CAAR[-3;+3]	-1.9%	*-1.69*	-0.5%	*-0.28*	-1.0%	*-0.64*	0.1%	*0.09*
CAAR[-5;+5]	-1.3%	*-0.73*	-2.7%	*-1.07*	0.5%	*0.21*	0.8%	*0.42*
CAAR[-1;+10]	-4.5%*	*-1.86*	-2.0%	*-0.99*	-0.7%	*-0.35*	0.2%	*0.13*
Publication								
CAAR[-1;+1]	-1.6%	*-1.13*	0.1%	*0.04*	0.1%	*0.10*	-0.1%	*-0.09*
CAAR[-3;+3]	-1.1%	*-0.79*	-1.1%	*-0.60*	-1.6%	*-1.40*	0.9%	*0.45*
CAAR[-5;+5]	0.0%	*-0.02*	-3.2%	*-1.30*	2.7%	*1.20*	0.5%	*0.21*
CAAR[-1;+10]	0.3%	*0.13*	-3.6%*	*-1.84*	2.7%	*0.96*	-0.3%	*-0.18*
Sample size	25		23		12		12	

Sources: AMF, Thomson Reuters, Author's calculations ** $p<0.05$, * $p<0.1$

Chapter 4

Financial Crime and Punishment: A Meta-Analysis

Abstract:

We examine how the publication of intentional financial crimes committed by listed firms is interpreted by financial markets, using a systematic and quantitative review of existing empirical studies. Specifically, we conduct a meta-regression analysis and investigate the extent and nature of the impact that the publication of financial misconducts exerts on stock returns. We survey 111 studies, published between 1978 and 2020, with a total of 439 estimates from event studies. Our key finding is that the average abnormal returns calculated from this empirical literature are affected by a negative publication selection bias. Still, after controlling for this bias, our meta-analysis indicates that the publication of financial crimes is followed by statistically significant negative abnormal returns, which suggests the existence of an informational effect. Finally, the MRA results demonstrate that crimes committed in the U.S. (and more generally in common law countries) and accounting frauds carry particularly weighty information for market participants. The results call for more transparency from enforcers along enforcement procedures, to foster timely and proportionate market reactions and support efficient markets.

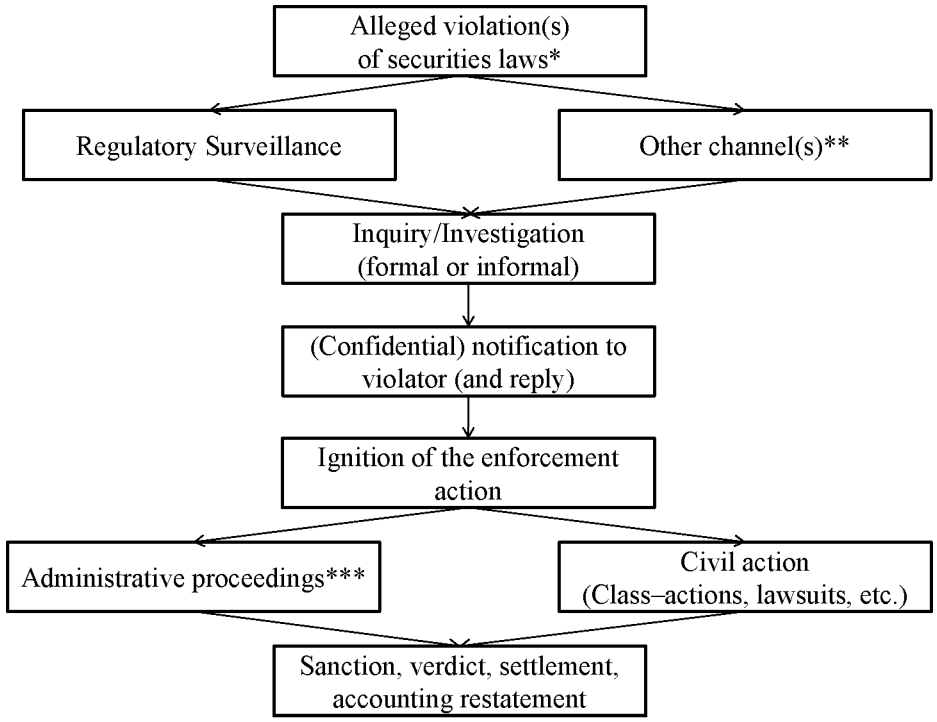
1. Introduction

Recent in-depth reviews by Amiram et al. (2018) and Liu and Yawson (2020) document a substantial growth of the empirical literature assessing the adverse link between financial crimes and corporate financial performance. This research literature has been fueling regulatory debates on how to enforce financial regulations more efficiently, and specifically on how to deal with financial crimes (La Porta et al., 2006; Jackson and Roe, 2009). The reason is that, amid all corporate crimes, financial crimes trigger the strongest market reactions and subsequently impact corporate reputations severely (Engelen, 2011; Karpoff, 2012 and 2020). For listed firms, the market reaction materializes after a financial crime becomes public and implies that such misconduct should be reflected in the firm's stock prices. In fact, based on the semi-strong efficient market hypothesis, all publicly available information (in this case the financial misconduct(s) of a listed firm) should be fully and immediately incorporated into prices (Fama, 1970). Consequently, when the financial crime of a listed firm becomes public, this firm should experience negative abnormal returns, reflecting the forecasted subsequent cumulated costs (fines, legal fees, compensations, higher costs of doing business, reputational penalty, etc.). Such market reaction is typically measured with the help of an event study that isolates and quantifies abnormal returns within a specific time interval following public announcement (McKinlay, 1997; Kothari and Warner, 2008). However, such evidence in individual empirical studies (of the abnormal returns following the publication of the financial crime) can be often mixed or less than fully observed (Karpoff et al, 2017). These shortcomings can be surmounted by a quantitative synthesis of the event-studies literature, as accentuated by Geyer-Klingeberg et al. (2020). However, to date, no meta-analysis has consolidated, synthesized, and evaluated the empirical findings from event studies assessing whether and to what extent stock markets react to the publication of financial misconducts committed by listed firms. In our meta-analysis, we strive to deliver exactly such synthesis.

In line with the academic, practitioner, and policy literature (such as the American (U.S.) Securities and Exchange Commission (SEC), the British (U.K.) Financial Conduct Authority (FCA), or the French *Autorité des Marchés Financiers* (AMF)), we define financial crimes committed by listed firms as the following misconducts: insider trading, price manipulation, dissemination of false information (of which accounting fraud), and any breach of financial regulation. These misconducts can be alleged, investigated, or sanctioned crimes (see Figure 1). When they are detected, they can lead to regulatory or stock exchange procedures, lawsuits, class actions, or accounting restatements. Once these financial crimes become public, they leave a substantial trace.

Figure 1: Common features of Financial Crime Prosecution

Figure 1 presents a simplified view of the consecutive steps of public or private prosecution for financial crimes. Most of code law countries (France, Germany, Italy, Spain, etc.) do not communicate any information before the sanction is pronounced. Conversely, the common law countries, and most frequently in the U.S., enforcers and defendants can communicate through official ways along the procedures. For example, for the U.S., the following steps were investigated by the literature: Accounting and Auditing Enforcement (AAER), and SEC formal or informal investigations and sanctions, Wells Notice issuance, sanctions by Department of Justice and Securities Exchange Commission, class action filing, and accounting restatement publications.



* Securities laws, including enforced accounting standards (U.S. GAAP in the U.S., IFRS, etc.).

** Self-regulatory organizations (stock exchanges, Justice Ministries, etc.), media, external auditors, complaints from shareholders or shareholders, whistleblowing, etc.

*** Examples of securities law enforcers: Australian ASIC, Canadian OSC, Chinese CRSC, French AMF, German BaFin, U.K. FCA, U.S. SEC, U.S. Department of Justice, U.S. Comptroller of Currency.

Source: Authors

The purpose of this study is to systematically and quantitatively synthesize previous empirical results regarding market reactions to intentional financial crimes, specifically when a listed firm (or some of its managers or employees) deliberately cheats on investors. Specifically, we employ a meta-regression analysis (MRA) and investigate the extent and the nature of the effect that materializes on a stock market after intentional financial misconducts become public. Our meta-analysis is unique in that it covers the impacts of the public announcements of financial crimes (either alleged or sanctioned), to the widest possible extent in terms of misconducts, types of enforcement procedures, information canals, and geographic locations by covering all available literature until May 1, 2020. The majority of studies investigate crimes committed in the U.S., given the size of the market and the high regulatory transparency. Still, it is of great interest to put these results into perspective with a wider

geographical scope, and for that we also cover Asian and European countries. Meta-analyzing this literature is also a way to challenge the robustness of research on financial misconduct given the pervasiveness of partial observability in research on such misconducts, as developed by Karpoff et al. (2017), and database problems stressed by Amiram et al. (2018).

For our analysis, we surveyed 862 articles published from 1978 to 2020. In the end, we work with a large sample of 439 estimates extracted from 111 articles. The impacts of a total of 31,800 news of financial crimes are estimated, which enlarges considerably the takeaways from individual studies. Despite the richness of this literature, no consensual result can be identified. This is so either regarding the presence of abnormal returns after an intentional financial crime becomes public, or, in terms of magnitude and, to a lesser extent, of direction of the stock price reaction. Based on the large number of studies in hand, we ask how important the differences are due to heterogeneity among studies in terms of numerous factors relevant to specific studies. Do the reported impacts of financial misconduct on returns represent the features of the investigated countries, or of the regulatory breach(es)? The data in studies span over a long period – from 1965 to 2018 – and a wide range of financial crimes, at different stages of enforcement. The scope is comprised of 17 countries: most studies investigate the U.S., but the data covers also (alphabetically) Australia, Belgium, Canada, China, France, Germany, Japan, Luxembourg, Malaysia, the Netherlands, South Korea, Spain, Sweden, Thailand, Turkey, and the U.K. Hence, in accordance with a general introduction and overview of meta-analysis applications in financial economics (Geyer-Klingeberg et al., 2020), our dataset represents an international sample in terms of market reactions to financial crimes, even though an international evidence is not available at primary study level. Finally, we include articles published in peer-reviewed journals and working papers to investigate the publication selection bias and the sensitiveness of reported effects (abnormal returns) to the research quality. Veld et al. (2018) concluded that articles published in top journals conclude with higher abnormal market reactions than working papers, regarding seasoned equity offerings.

Our meta-analysis is also relevant as it is targeted on the literature that employs one specific methodology: an event study (see Appendix A for details). This means that the studies we survey include a directly available and comparable estimated effect in a form of the abnormal returns due to the financial crime publication, which is crucial for an effective meta-study (Geyer-Klingeberg et al., 2020). The event study methodology, originally outlined in Ball and Brown (1968) and Fama et al. (1969), is widely recognized in the finance and economic literature as an efficient tool to analyze abnormal market reactions to unanticipated news (MacKinlay, 1997). Further, event studies evade the issue of endogeneity and are quite

unambiguous with regards to the causal direction of the relationship (Endrikat, 2016). The event study methodology is particularly relevant for the scope of this meta-analysis on financial crime as the event dates are precisely known and are most often communicated *via* official channels, which also facilitates the search for confounding events and their avoidance. The nature of the financial crime news also means that the sample only contains "bad" news, that are priced-in more rapidly than "good" news (Taffler et al., 2004). Additionally, we limit the scope of the surveyed studies to short-term event windows because Kothari and Warner (1997) and Bhagat and Romano (2002a), amid others, raised serious concerns about the specification and explanatory power of an event study with long-term event windows. The key reason is that the noise-to-signal ratio greatly increases as the time distance from the event date becomes larger. In fact, the further from the event, the more likely other confounding events might interfere with the investigated event.

Our contribution to the literature can be summarized in several types of findings that represent the true state of reality assessed *via* a meta-analysis. At first glance, we find that the involvement of a public firm in a financial crime substantially affects the wealth of shareholders quantified as negative abnormal returns over the few days around the event. However, our assessment of the publication selection bias indicates that the collected estimates from the empirical literature are affected by a significant publication bias, which leads to biased estimates and distorted inferences: negative results are more likely to be published than others. After controlling for this bias, our meta-analysis still evidences informational effect of the intentional financial crimes (statistically and economically significant) but to a lower extent (Karpoff et al., 2017). On average, loss in returns represents minus 1.15% *per* day over the event window following the publication of financial crimes (or a cumulated -3.5% in returns). Our results also indicate that crimes committed in the U.S. (and more generally in common law countries, where enforcement is more transparent), and accounting frauds foster market corrections. In terms of policy implication, our analysis demonstrates how transparent enforcement actions are priced-in by market participants. Hence, if an enforcer's goal is that markets react to their decisions and communications, then enforcement actions serve as a regulatory tool *per se*.

The rest of the article is structured as follows. We first detail the literature review in section 2, and, based on the analyzed literature, we formulate the hypotheses tested. Information on individual studies constituting the grounds for our analysis is reviewed in the section 3, together with the tools of the meta-analysis used in our study. The assessment of the extent of

the publication selection bias and the results of the meta-analysis are presented in section 4. Finally, section 5 concludes and proposes policy-related interpretations.

2. Theoretical and empirical background and hypotheses

2.1 Regulation, enforcement, and deterrence of white-collar crimes

Securities markets are regulated so that investors, from large institutional to retail investors, have access to quality information about listed firms prior to and after an investment (Black, 2000). The arrangement sets the base for investors' trust. Trust is formed by the *ex-ante* belief that one's counterpart will suffer consequences for opportunistic or fraudulent behavior (Dupont and Karpoff, 2020). Enforcement also aims to provide incentives for market participants' compliance with the law, by detecting breaches, sanctioning violators, and setting example. Violation of securities laws belongs to one of the six possible causes of corporate failures (Soltani, 2010). In that sense, the legal system is fundamental to investors' protection (La Porta et al., 2000).

2.1.1 White-collar crime

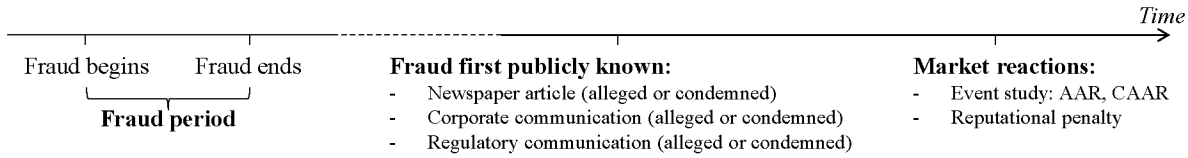
Edelhertz (1970; p. 3) defines white-collar crimes as "illegal act(s) or series of illegal acts committed by non-physical means and by concealment or guile, to obtain money or property, to avoid the payment or loss of money or property, or to obtain business or personal advantage". According to Cressey (1950, 1953), three prerequisites can lead to a white-collar crime based on the fraud triangle: 1) a private non-sharable financial problem; 2) contextual opportunities to commit fraud, which would allow the perpetrator to commit the fraud and escape detection; 3) the ability to justify to oneself that the fraudulent actions are not necessarily wrong. Gottschalk (2010) categorizes white-collar crimes into four main forms: fraud, manipulation (on which this article focuses), theft, and corruption. Such crimes can also be classified by victims, as in Karpoff and Lott (1993): 1) fraud of stakeholders (by cheating on implicit or explicit contracts with suppliers, employees, franchisees, or customers); 2) fraud of government (by cheating on contracts with a government agency); 3) financial reporting fraud (by mispresenting the firm's financial condition); and 4) regulatory violations (by violating regulations enforced by federal agencies, mostly financial services agencies). The scope of our analysis is limited to the last two categories, as long as they fall under the scope of supervision of securities market supervisors or central banks, depending on the jurisdictions.

Four specific features of white-collar crimes provide further support for the relevance of our study. Firstly, contrary to many other crimes, white-collar crimes are committed by

employees, and not by the companies. Still, most frequently, the firms are held responsible, rather than the employees themselves (Choi and Pritchard, 2016), justifying market corrections after a misconduct become public. Secondly, and echoing Becker (1968),[1] a limited share of white-collar crimes is detected (by regulators, analysts, shareholders, stockholders, whistleblowers, etc.), with an unknown probability. Alawadhi et al. (2020) assess that only 3.5% of financial mis-presentations are eventually caught and sanctioned. Consequently, Amiram et al. (2018; p. 738) conclude that "our knowledge of financial misconduct comes almost exclusively from firms that were caught, and the characteristics of those firms may differ from firms that commit fraud without detection." Specifically, this imperfect observability makes the meta-analysis a relevant tool to aggregate existing literature and to put into perspective the conclusions of individual studies. Thirdly, corporate frauds can be detected *via* several channels: through the typical corporate governance players (regulators, external auditors, financial analysts), as well as a large network of people interacting with the firms (shareholders, stakeholders, employees, journalists, whistleblowers, etc.). The specific channel of detection may impact the subsequent spillovers of the fraud. The intensity of the media coverage of an unanticipated event typically triggers stronger market reactions (Fang and Peress, 2009 and 2014; Peress, 2014). Finally, acting legally can turn into an economic disadvantage for a firm and/or its management (Hawley, 1991, Aupperle et al., 1985). In fact, the costs for abiding by the law can represent an economic disadvantage when compared to competitors/peers. To state alternatively in line with Becker (1968), the expected costs of being sanctioned (fines, litigation costs, reputational penalties, impact on clients and suppliers, HR consequences, etc.) can be lower than the benefits from cheating the law (higher returns on assets, lower costs of doing business, etc.).

Figure 2: Chronology of Financial Crimes

This figure shows the typical succession of events that lead to market reactions when learning about a corporate financial crime. The sequence of events is representative for most crimes in the scope, but may differ in certain cases.



Source: Authors

[1] Becker (1968) models the choice to engage in misbehavior like any other decision involving cost-benefit tradeoffs, in light of the expected profits from fraud, the probability of being caught, and the subsequent sanction.

All in all, it is particularly relevant to enlarge the scope of past studies by meta-analyzing the existing literature to draw more general conclusions on market reactions to white-collar crimes, which occur after such crimes become public (see Figure 2).

2.1.2 Public *versus* private enforcement

Table 1: Main Features of Some Securities Enforcers

Table 1 compares the main features of securities law enforcement in the four most frequent countries in the sample: the U.S., China, the U.K. and France.

	U.S.	China	U.K.	France
Securities regulator	Securities and Exchange Commission (SEC)	China Securities Regulatory Commission (CSRC)	Financial Conduct Authority (FCA, FSA until 2012)	*Autorité des Marchés Financiers* (AMF since 2003)
Civil actions can be taken by the securities regulator	Yes	No	Yes	Yes
Major types of sanctions	Cease and desist orders, suspension or revocation of broker-dealer and investment advisor registrations, censures, bars from association with the securities industry, monetary penalties and disgorgements	Warning, fines, disgorgement of illegal gains, banning of market entry, rectification notice, regulatory concern and letter of warning, public statements and regulatory interview	Variation/cancellation/refusal of authorization/approval/permissions, financial penalties, public censure, prohibition and suspension	Warning, blame, prohibition and suspension from activity, financial penalties
Most frequent type of sanction	Monetary penalties	Non-monetary penalties	Non-monetary penalties	Monetary penalties
Possibility of class actions	Yes	Yes	No	No
Regulatory communication before sanction	Yes	No	No	No
Settlements	Yes	Yes (mediations)	Yes	Yes (since 2012)
Types of laws	Common laws	Code laws	Common laws	Code laws
Legal origins	English	Socialist	English	French

Source: Authors

Enforcement is always country-specific and can be characterized by various dimensions (see Table 1 for some stylized facts). Additionally, enforcement standards evolve along time. Each country has its own enforcement mix, with different weights given to public (higher in civil law countries) or private (conversely higher in common law countries, typically the U.S.) enforcement, and by difference to self-regulation of the market (Djankov et al., 2008). Financial regulations can be enforced by either several bodies (for example at the federal, province, or state levels, or depending on the sector with splits between banks, insurance companies, etc.) or one single financial supervisory agency. Enforcement can also rely more on informal discussions and administrative guidance (such as in the U.K., Japan, and France), or on formal

legal actions against wrongdoers (like in the U.S.).

A long-time academic debate – at the intersection between accounting, finance, law, and economics – investigates the costs and benefits of public *versus* private enforcement, with proponents on both sides. Both enforcement styles could be more supportive of financial market development (respectively Jackson and Roe (2009) and Johnston and Petacchi (2017) against Becker and Stigler (1974), La Porta et al. (2006), Djankov et al. (2008), and Bai et al. (2010)).

Public enforcement is supported by the existence of externalities, by economy-wide cost savings, by public-regarding and expert-in-their-domains policymakers, by the possibility to cooperate with defendants (Choi and Pritchard, 2016), and by criminal, financial, and reputational penalties that deter wrongdoings. But public enforcement is degraded by the difficulties of implementation of securities regulations. Public enforcers have mixed-to-low incentives (Scholz, 1984): resource constraints, difficult access to information, low competences compared to the industry, corruption and collusion with the industry, and political influence. Conversely, private enforcement actions could be brought by well-informed actors with well-aligned incentives. But, in parallel, private enforcement is subject to collective action and free-rider effects among dispersed investors, to slow and inept judiciaries, to lawyers' rent-seeking (costly litigation for investors, commitment problems), to less information than enforcers (Choi and Pritchard, 2016), and to insufficient private monetary penalties. In this respect, our analysis also contributes to the academic debate of whether markets significantly discriminate between public and private enforcement. Additionally, given the long timespan of the dataset, and the global trend towards regulatory tightening, it is interesting to investigate for trends in market reactions to the publication of financial crimes along time. Over the period under review (1965 to 2018), information channels and the volume of news dramatically increased, to a point that more and more research investigates the consequences of information overload (Ripken, 2006).

2.2 Intentional financial crimes, not errors

The scope of our analysis on white-collar crimes is limited to violations of securities laws (referred to as "financial crimes"). This scope is supported by the argument of Haslem et al. (2017) that, amid all types of legal corporate violations in the U.S.,[2] securities litigation triggers – by far – the largest (and statistically significant) reactions. Amiram et al. (2018) also stress that financial crimes threaten the existence and efficiency of capital markets, which are based

[2] The others being: antitrust, contract, environmental, intellectual property, labor, product liability, personal injury, and civil rights.

on trust from diverse market participants (investors, stakeholders, financial analysts, etc.). Such crimes cover a wide range of misconducts: the dissemination of false/misleading information (of which financial statement errors),[3] price manipulation (circular trading, reference price influence, improper order handling, boiler-room operation), insider dealing (collusion and information sharing, use of insider information), and any other violation of securities laws. Financial crimes can be motivated by the pressure to meet financial targets, the dishonesty of the management, or the search to maximize personal gain (for example, to protect bonuses). In this article, financial crimes are split into two categories, according to Karpoff and Lott (1993): accounting frauds (*i.e.* financial statement errors, when firms mispresent their true financial condition); or other violations of securities laws. This split is supported by the direct balance sheet consequences of an accounting restatement contrary to other violations, which will trigger fines, legal costs, etc. and question the ethic and professionalism of the firm. When detected, financial crimes can lead to major corrective actions: changes in the financing mix due to higher costs of doing business, changes in the top management, impact on remunerations and teams' commitment, replacement of auditing firms, etc.

The literature (Guy and Pany, 1997; Karpoff et al., 2017; Liu and Yawson, 2020) typically splits financial misconducts between "serious" (*e.g.*, frauds) and "trivial" (*e.g.*, errors). All securities frauds share a common trait: the existence of deliberate or "intentional" dishonesty or deceit (Sievers and Sofilkanitsch, 2019), which would cause market participants (shareholders, stakeholders, analysts, etc.) to alter their opinion of the firm. Otherwise, they are unintentional errors, which can be corrected (and possibly sanctioned). Such errors can result, for example, from the enforcement of new accounting standards (IFRS, U.S. GAAP for example), a modification in the consolidation perimeter (in the aftermath of stock splits, M&As, or divestitures for example), or presentation issues (due to changes of the accounting periods, or changes in business segment definitions for example). Hennes et al. (2008) found that 24%

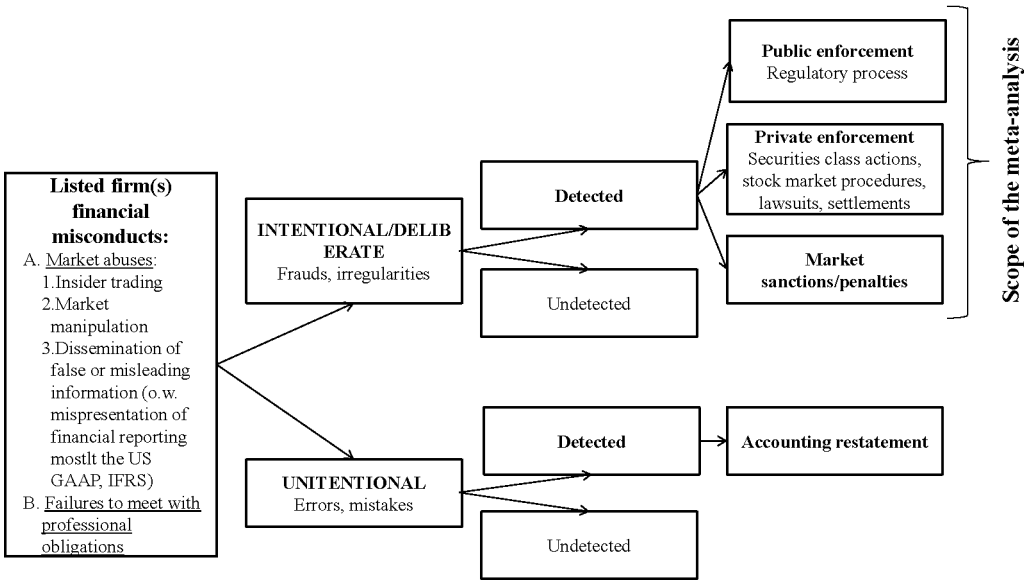
[3] The Financial Accounting Standards Board (FASB) in the Statement of Financial Accounting Standards n°154, "Accounting Changes and Error Corrections" (2005) defines errors in previously issued financial statements as "an error in recognition, measurement, presentation, or disclosure in financial statements resulting from mathematical mistakes, mistakes in the application of the Generally Accepted Accounting Principles (GAAP), or oversight or misuse of facts that existed at the time of the financial statements were prepared". Accounting frauds are distinct from aggressive earning management (Desai et al., 2006; Blythe, 2020) propose the following taxonomy of financial statement frauds: 1) falsification, alternation or manipulation of financial records, related documents or business transactions; 2) intentional omissions or misrepresentations of events, transactions, accounts or other information from which financial statements are prepared; 3) deliberate misapplication of accounting principles, policies and procedures used to measure, recognize, report and disclose economic events and business transactions; and 4) intentional omissions of disclosures or presentation of inadequate disclosures pertaining to accounting principles and policies and related financial amounts.

of the restatements in the U.S. filed between 2002 and 2005 were intentional frauds, and not errors.

The scope of this analysis is limited to intentional financial crimes (see Figure 3 for a graphical illustration of the scope of the sample), as unintentional errors are unlikely to send a comparable message to the market (Hennes et al., 2008).[4] Lev et al. (2007) demonstrated that restatements involving admitted fraud have considerably more adverse implications for investors than non-fraud restatements.

Figure 3: Graphical Presentation of the Scope of Meta-Analysis

This figure graphically describes the inclusion criteria into the meta-analysis. From a wide range of studies on financial crimes by listed firms, the scope was reduced to the literature investigating detected and intentional crimes and the subsequent market reaction, based on an event-study methodology. Financial crimes cover the following range of misconducts: 3 market abuses with insider trading (insider dealing, soundings, research), price manipulation (spoofing/layering, new issue/M&A support, ramping, squeeze/corner, bull/bear raids, circular trading,[5] improper order handling,[6] and improper price influence[7]), and the dissemination of false information (collusion and information sharing with pools and information disclosure; misleading customers with guarantees, window dressing, mis-presentation), to which add any breach to the regulation enforced and professional obligations for listed firms.



Source: Authors

2.3 Event studies to assess market reactions to the news of financial crimes

The empirical literature typically uses three different methodologies to investigate the spillovers of corporate crimes on corporate financial performance: portfolio analyses, multivariate

[4] For this reason, we excluded studies on earning restatements when "fraud", "irregularity", or "investigation" were not mentioned.

[5] Circular trading includes wash trades, matched trades, money pass and compensation trades, and parking/warehousing.

[6] Front running, cherry picking and partial fills, and stop losses and limits.

[7] Benchmarks, closing prices, reference prices, portfolio trades, and barriers.

analyses, and event studies. Our meta-analysis focusses on the event studies, which have proven to be particularly adequate in policy analysis (Fama, 1990; Bhagat and Romano, 2002a, b) as well as financial analysis (Geyer-Klingeberg et al., 2020).

The event study methodology (see appendix A for details) estimates firm-specific movements in security prices (so called "abnormal returns") after an unexpected event. The price movements around the event are typically corrected for recent trends in the security price and in the market. Stock prices reflect the time- and risk-discounted present value of all future expected cashflows for shareholders. Under the semi-strong efficient market hypothesis (Fama, 1970), all publicly available information (such as a financial crime) is reflected completely and in an unbiased manner in the stock price. For that, it is not possible to earn economic profits on the basis of this information. Hence, event studies provide a way for measuring the impact of financial crimes on investors' wealth.

2.4 Spillovers of financial crimes: does it cost to be bad?

A rich literature documents the cost of crime under the hypotheses of investors' rationality and of efficient financial markets. Nonetheless, the net impact of enforcement actions on the market remains to some extent controversial (Christensen et al., 2016). Morris et al. (2018; p. 318) stress that "theory suggests that regulator action may result in limited or no benefits, and the empirical evidence to this effect is mixed. If the investigations make investors more concerned about internal problems or future prospects, market quality should deteriorate. However, the SEC's investigation can be an opportunity for the firm to correct internal problems and bad behaviors. Market participants may then respond positively during the investigation thereby revising forecasts to the upside." Christensen et al. (2016) empirically validate the "no-effect" hypothesis of SEC enforcement actions on market quality, presented by Stigler (1964) and Peltzman (1976). Finally, Amiram et al. (2018) challenge the rational for the monetary payments by the defendant firm to either regulators (public enforcement) or to plaintiffs (private enforcement). In light of these debates, the central hypothesis tested using a meta-analysis approach is that markets penalize listed firms for engaging in intentional financial crimes.

The spillovers of intentional financial crimes are detailed in the literature which concludes that legal penalties only account for a limited part of the overall market-based consequences incurred for the public firms (Karpoff and Lott, 1993; Alexander, 1999; Karpoff et al., 2005; Murphy et al., 2009; Engelen, 2011; Haslem et al., 2017; Karpoff et al., 2017; Armour et al., 2017). In addition, markets can anticipate the news, following leaks of information over the days preceding the event (Bhagat et al., 1994; Pritchard and Ferris, 2001;

Djama, 2013; Gande and Lewis, 2009; Dyck et al., 2010; Nainar et al., 2014; Haslem et al., 2017; Armour et al., 2017; de Batz, 2020). As explained by Bhagat et al. (2002b), when information leaks before its public announcement by the regulator or the firm, the event study will understate the damages due to the fraud publication, because part of the impact of the information was already incorporated before its announcement. This supports the inclusion of some days preceding the event in the event windows.

Reactions to financial crimes can differ between regions and countries. Djankov et al. (2008) argue that commercial laws of most countries can be divided between common and code laws (see Table 1), or by geographical origins (English, French, German, Scandinavian, or socialist), which spread worldwide along history due to colonization, wars, voluntary transplantations, etc. According to La Porta et al. (2006), common laws (typically in the U.S. or the U.K.) are more favorable to stock market development: they put more emphasis on private contracting and standardized disclosure, as well as rely on private dispute resolution using market-friendly standards of liability. Secondly, legal origins influence public and private enforcements and, consequently, the outcomes of the publication of financial crimes. Enforcers and regulated entities diverge in terms of disclosure (along the procedures) and liability standards. Additionally, to date, most of the literature on the spillovers of financial crimes investigates the U.S., due to the size of the market and the higher data availability that are generated along the enforcement process. By using the largest possible scope of results, a meta-analysis can challenge whether patterns observed in the U.S. can be generalized to other regions and jurisdictions. This is even more relevant since Parsons et al. (2018) stress that market reactions to financial crimes can even differ within a given country – they compare major U.S. cities and show differences in social attitudes towards right and wrong across cities. A meta-analysis also enables to control for the level of economic and financial development. In addition, Karpoff et al. (2017) demonstrate that it can be also difficult to compare causes and effects of financial misconducts within a given country depending on the datasets used. In this respect, Shleifer (2005; p. 448) stressed that "regulation – relative to doing nothing – is a more attractive option in richer countries, where the checks on the government are stronger. In contrast, regulation is a particularly poor idea in undemocratic countries and in countries with extremely powerful executives, where the risks of abuse are the greatest." Adding granularity to our research question, a focus is put to comparisons made between common law countries (the U.S. in particular), and the rest of the world to see whether more transparency along enforcement procedures and tougher sanctions trigger stronger market reactions to the publication of financial crimes.

Different financial crimes may also trigger different market reactions. Enforcers typically split regulatory breaches between the three market abuses (1) breaches of insider dealing regulations (the use and/or divulgence of insider information for investment decisions); 2) price manipulations (a deliberate misconduct to influence securities prices and fair price formation); 3) breaches of public disclosure requirements (a failure to comply with financial reporting laws and regulations, most frequently accounting frauds), and any breach of the general financial regulations (put it differently a failure to meet with professional obligations). Part of the literature uses another split of financial crimes, depending on the parties hit: whether the regulatory breach(es) impacted related parties to the offender (investors, employees, customers, suppliers), or third parties (market participants, the public, etc.). They conclude that the reputational cost of wrongdoings against related parties is significantly higher (for the U.S.: Alexander, 1999; Karpoff et al., 2008; Murphy et al., 2009; Tibbs et al., 2011; for the U.K.: Armour et al., 2017). Echoing this split for financial crimes, accounting restatement subsequent to financial crimes will impact directly the shareholders in the sense that their shares will be worth less. Similarly, when the top management of a firm (or some of its employees) cheated on investors by sharing or using insider information, were unable to comply with their professional obligations, or manipulated others' shares, shareholders are legitimate to question the professionalism and busines ethic of the firm and its employees, justifying a reputational penalty. This supports a granular investigation of market reactions depending on pure accounting crimes, with direct financial implications, and other financial crimes, which may hint to damages to the firm's reputation.

The literature investigates market reactions to alleged and/or condemned financial crimes, along the consecutive steps of enforcement (see Figure 1). Most frequently, alleged frauds are revealed by newspaper articles, or by an official corporate or regulatory communication (see Figure 2 for a graphical illustration). Feroz et al. (1991) and Pritchard and Ferris (2001) conclude that the very first hint of financial crime triggers the most important and significant abnormal market reaction, even when compared to the sanction publication itself. Solomon and Soltes (2019; p. 1) underline the difference between "not guilty" and "innocent" for the markets: "even when no charges are ultimately brought [after SEC financial fraud investigations], firms that voluntarily disclose an investigation have significant negative returns, underperforming non-sanctioned firms that stayed silent by 12.7% for a year after the investigation begins."

Shareholders wealth can be harmed by the (alleged or sanctioned) misconduct itself (negative impact on the P&L after an accounting restatement for example) and also by the

subsequent costs, despite the fact that financial misconducts are being committed by managers. These costs of financial crimes are direct and indirect. The direct costs cover fines, compensations, and legal fees along years-long procedures (Dechow et al., 1996; Palmrose et al., 2004). According to Zeidan (2013) and Gatzert (2015), indirect costs include lower cash flows expectations (with respect to clients), and higher costs of doing business (with respect to suppliers, business partners, human resource management) and of capital (*e.g.* downgraded forecasts, risk premia, rating, higher funding costs). The cost of cumulated indirect spillovers can be called "reputational penalty", as described by Engelen and van Essen (2011). The reputational penalty can be proxied by deducting direct costs from the abnormal market reactions following the publication of the financial crime (Karpoff and Lott, 1993; Cummins et al., 2006; Karpoff et al., 2008; Armour et al., 2017). For allegations of financial crimes, listed firms can endure a pure reputational penalty. Generally, it reflects revised expectations regarding future cash flows of investors, top management, and related parties involved (Karpoff et al., 2008; Armour et al., 2017). In that sense, financial markets are an enforcement channel inducing companies to behave responsibly (Engelen, 2011). Reputational penalties complement enforcement as a tool to deter financial crimes, contrary to, for example, foreign bribery or environmental violations (Karpoff, 2012, 2020).

Further, different information channels of financial crimes may influence market reactions. The media coverage of financial crimes is typically linked with increased market reactions: the more articles, the stronger markets react (Feroz et al., 1991; Karpoff and Lot, 1993; Nourayi, 1994; Miller, 2006; Choi and Kahan, 2007; Barber and Odean, 2008; Fang and Peress, 2009; Tibbs et al., 2011; Fang et al., 2014; Peress, 2014). The business media can even be perceived by investors as a watchdog (Miller, 2006), whose credibility is supported by more independent sources of information than analysts and corporations (Kothari et al., 2009). Otherwise, enforcers or a defendant firm itself can reveal a financial crime. Still, Karpoff et al. (2017) stress that all empirical proxies of securities frauds have some shortages when compared to broader proxies based on public or regulatory datasets that merge information on all financial reporting errors, securities litigations, or enforcement procedures.[8]

All in all, this meta-analysis aims at systematically understanding the impact of the market-imposed sanctions on stock returns of public companies following the publication of intentional financial crimes. Contrary to financial fines which can be observed (if not anonymized), the abnormal returns represent potential legal and extra-legal (or reputational)

[8] For example, newspaper articles reporting frauds might not be an optimal proxy because, for example, the Wall Street Journal typically excludes lower-profile crimes that do not attract high attention.

sanctions. Hence, abnormal returns stand for a comprehensive market assessment of the penalties for financial crimes. Publication bias is also investigated, which can distort the conclusions in the literature. We expect published studies to be of higher quality on average and to contain fewer typos and mistakes in reporting their results. Still, the inclusion of unpublished papers is unlikely to alleviate publication bias (Rusnák et al., 2013): rational authors draw their conclusions with the intention to publish, by adopting the same preferences as journals. Doucouliagos and Stanley (2013) meta-analyzed 87 meta-analyses and suggest no difference in the magnitude of publication bias between published and unpublished studies. The conclusions of the meta-analysis can contribute to a regulatory debate on how to come closer to an optimal level of regulation, to deter future crimes. The recent shift towards the "name and shame" mechanism adopted for accounting standards enforcement in the U.S., Germany, and the U.K. corresponds to evidence on negative abnormal returns as well: it implicitly assumes that investors will react negatively to published findings of erroneous accounting treatments, hence penalizing the firms and incentivizing their peers not to infringe the law.

3. Data and methodology

In this section, we describe our procedure for selecting the literature, and give an overview of the studies selected for the meta-analysis, complemented by a description of funnel plots. Then, we briefly explain the meta-analysis methodology to be conducted in this paper, based on the recommendations of Havránek et al. (2020a), and describe the explanatory variables.

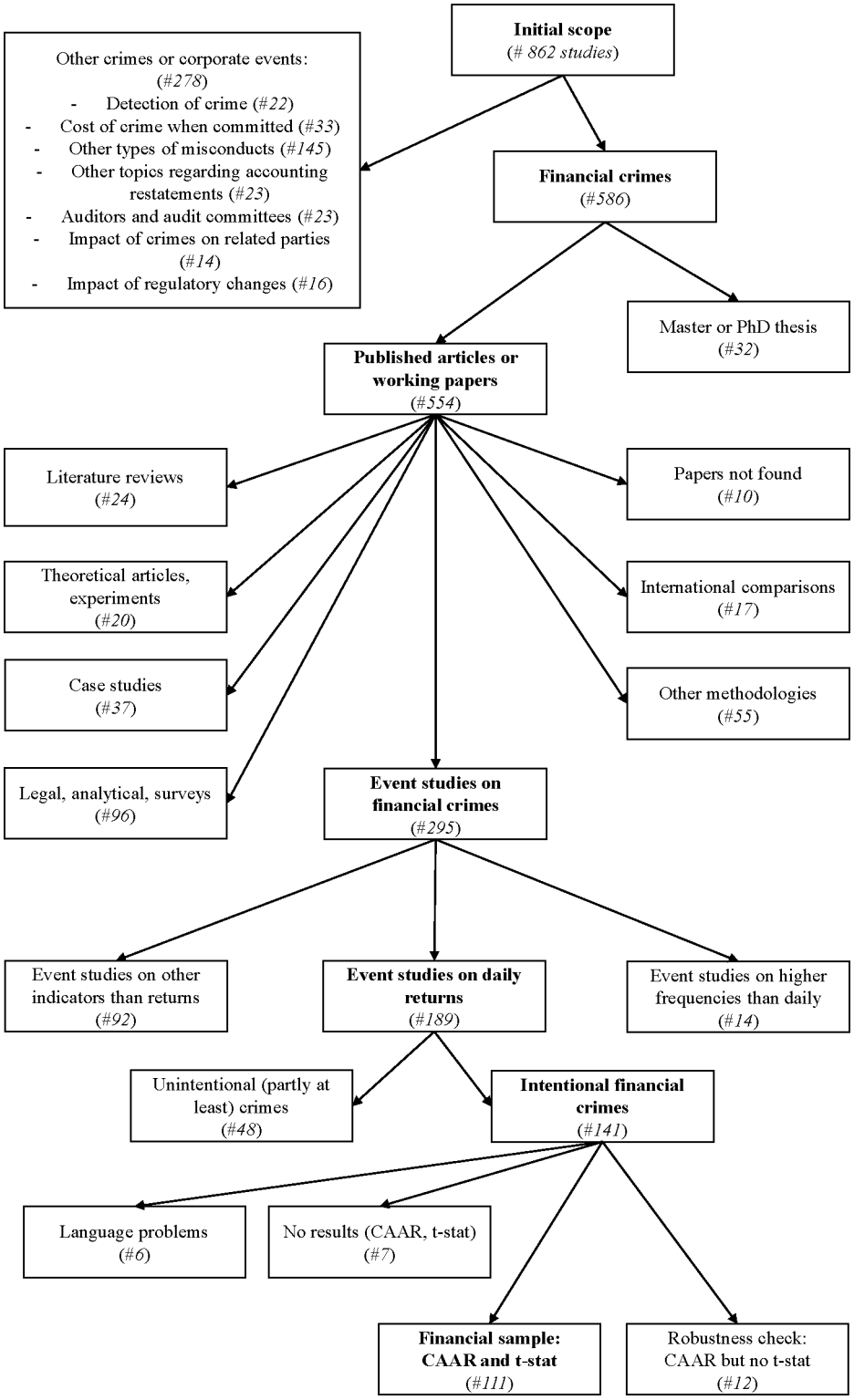
3.1 Selection of the data

We selected the studies chosen by a systematic keyword search that was performed in Google Scholar, which presents the advantage of going through the full text of studies and not only titles, abstracts, or keywords. The search was complemented through other major economic databases such as JSTOR, Econlit, Science Direct, RepEc (IDEAS), NBER, CEPR, and SSRN. We searched for the specific topics related to financial crime and its punishment *via* combinations consisting of relevant keywords including one of the following: *financial crime*, *regulatory breach*, *misconduct*, *fraud*, *sanction*, *penalty*, *class action*, *restatement*, or *lawsuit*, and another one from: *firms*, *financial market*, *event study*, *return*, or *abnormal*. We examined the first 500 papers returned by the searches in Google Scholar.

After this first selection of papers relevant to our study, we systematically inspected the lists of references in these studies, and their Google Scholar citations, to check if we can find usable studies not captured by our baseline search. No *a priori* filter was used concerning the

Figure 4: PRISMA Statement

The following PRISMA flow diagram shows the details of the information flow in each stage of literature search in our meta-analysis, as recommended by Moher et al. (2009) and Havránek et al. (2020). From an initial sample of 862 studies reviewed, we end up with a 111 sample of articles, to which add 12 more articles for robustness checks, for which no details were given on the statistical significance. Details of each category is available on demand. Bold titles illustrate how we ended with the final sample. This graphical illustration has its limit as many studies cumulated reasons for being excluded but, for the sake to presentation, they were allocated into one category.



Source: Authors

date or type of publication. This procedure further increased the number of potential studies. We terminated the search on May 1st, 2020 and did not add any new studies beyond that date. In total, 862 articles were reviewed and analyzed.[9]

In order to obtain our final set of literature, we followed an iterative process of selecting articles that is graphically illustrated by the PRISMA statement in Figure 4, as recommended by Havránek et al. (2020a).[10] We form our dataset from studies that strictly satisfy the following six conditions in that they must: 1) use a daily event study methodology; 2) analyze market reactions to (possibly alleged) intentional financial crimes (see Figure 3 for a graphical illustration of the scope of the sample); 3) specify the first public announcement reporting of the (possibly alleged) financial crime, whatever the source of information (newspaper, regulatory or corporate communication, see Figure 2); 4) report (Cumulative) Average Abnormal Returns ($(C)AARs$) and at least an explicit indication of statistical significance (t-statistics, p-values, z-statistic, and/or a significance level (1%, 5%, or 10%)), to calculate (or proxy) standard errors; 5) use short-term event windows. As recommended in Hubler et al. (2019), the dataset is comprised of all short-term $(C)AARs$ reported in each study. We used event windows around the event, centered on $t = 0$, ranging from 10 trading days before the financial crime until 10 trading days after it ($[-10; +10]$, *i.e.* two business weeks before and after the event); and 6) not be master or PhD theses (working papers are included).

Consequently, the most frequent reasons for excluding the selected studies were the following: 1) event studies out of our scope on (partly) unintentional financial crimes, other corporate scandals or crimes, impact of regulatory changes, impact of financial crimes when committed, over the fraud period (see Figure 2), spillovers of financial crimes on sector peers, or too specific financial crimes (case studies such as Enron or the U.S. stock option backdating scandal in 2006), 2) methodological problems,[11] 3) theoretical articles on financial crimes (models or literature reviews), and 4) experimental articles on financial misconducts.

At the end of our selection process, we formed a set of 111 studies. Out of these studies,

[9] We tried to circumvent the fact that language issues can act as a constraint on the scope of meta-analyses. We extended searches to the following languages: English, French, German, Portuguese, and Spanish. Some articles in Chinese, Japanese, and Turkish could not be included in the literature review, though appearing relevant in view of their references. Still, as stressed by Reurink (2018), the representativeness of the presented findings remains skewed heavily towards the Anglo-Saxon world.

[10] Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

[11] For example, higher-than-daily frequencies (weekly, monthly, quarterly, yearly) with usually a longer-term perspective (longer event windows), unpublished estimates of event studies or statistical significance indication, estimations of the costs of financial crimes with other methodologies than event studies (difference in difference with a sector perspective, no specification on the methodology used), and event studies on other variables than returns (volatility, volume of trades, spreads, interest rates, bonds, ratings, bank loans, systemic risk, sales, top management with equity compensation, wages, bonuses, careers, etc.).

90 were published in academic journals (81%), and the rest are working papers, colloquium proceedings, or chapters of a collective publications. For each study, the complete reference can be found in the Appendix D, and Table 2 describes their main features.

3.2 Descriptive statistics

We employ a meta-regression analysis to examine how, and to what extent, the publication of intentional financial crimes committed by listed firms impacts stock markets (*i.e.* their returns).[12]

Following Stanley and Doucouliagos (2012) and Hubler et al. (2019), we extract all short-term $AARs$ and $CAARs$ included in the 111 articles in the scope, specifying the event windows (from -10 to +10 days around the event occurring in $t=0$). We obtain a total of 439 effect estimates from 31,800 news of intentional financial crimes committed by listed firms. Including event windows preceding the events controls for market anticipations of the news, resulting from potential corporate or regulatory leaks of information. Complementarily, having 10 trading days after the event controls for the time persistency of the impact and some market inefficiencies, if the reaction is not full and immediate (Fama, 1970). The goal by using all $(C)AARs$ from the articles is to get as many estimates as possible to account for the variability found across the different studies and between estimates, without introducing potential selection bias, and to properly weight the reported findings. However, it does result in potential interdependence between studies, that must be accommodated by systematically clustering the dataset by studies. $(C)AARs$ are comparable between articles as, by construction, they all use the same event study methodology (see Appendix A for methodological details). Two main methodological differences between (and within for the first one) studies are 1) the length of the event windows, and 2) the model used to estimate abnormal returns, resulting from an authors' *ad hoc* decision. Contrary to the model used (83% of the articles using a market model), event windows vary significantly across studies (see Appendix B, Table A.1). The studies under review and the reported estimates have average event windows of 36 and 4 days respectively, with standard deviations of 83 and 4 days. In fact, there is no standardized way of presenting the results, even though the event day ($t=0$) is at least included in the reported event windows. Consequently, we normalized all $CAARs$ by the length of their respective event windows. We created the following variable to capture the effect of the crime publication: Average Abnormal

[12] From the reviewed articles, unintentional financial crimes are mostly accounting restatements subsequent to changes in accounting standards or in consolidation perimeters. When unintentional accounting restatements were not excluded from the scope, the articles on accounting frauds were excluded from the sample.

Table 2: The Meta Dataset

Table 2 describes the main features of the studies included in the meta-analysis. Financial crimes are sorted into three categories: pure accounting frauds, regulatory securities frauds (excluding accounting frauds) and all regulatory securities frauds (including accounting frauds). The country codes are the following, by alphabetical order: AU-Australia, BE-Belgium, CA-Canada, CN-China, DE-Germany, ES-Spain, FR-France, JP-Japan, KR-South Korea, LU-Luxembourg, MY-Malaysia, NL-Netherlands, SW-Sweden, TH-Thailand, TR-Turkey, UK-United Kingdom, US-United States of America. The "sample size" variable is the number of financial crimes which were included in the event study to assess the size effect on returns. The variable "AAR *per* day" is the average of all abnormal returns published, whatever the event window (between -10 to +10 days around the event day), divided by the number of days in the event window. The average AAR *per* day is weighted by the number of estimates *per* study. The variable "Stat. signif." is a dummy variable for statistically significant abnormal returns following the financial crimes. Finally, the variable "Nb. est." stands for the number of estimates included in the dataset *per* study.

Author(s)	Pub. year	Publication outlet	Financial crimes	Countries	Sample period		Sample size	AAR/day	Stat. signif.	Nb. est.
Abdulmanova, Ferris, Jayaraman, Kothari	2019	WP	Regulatory securities frauds	US	2004	2013	462	-0.7%	yes	2
Aggarwal, Hu, Yang	2015	Journal of Portfolio Management	Regulatory securities frauds (incl. accounting frauds)	CN	2001	2011	750	-0.6%	yes/no	5
Agrawal, Chadha	2005	Journal of Law and Economics	Accounting frauds	US	2000	2001	119	-2.0%	yes/no	2
Agrawal, Cooper	2017	Quarterly Journal of Finance	Accounting frauds	US	1997	2002	419	-2.1%	yes	3
Akhigbe, Kudla, Madura	2005	Applied Financial Economics	Accounting frauds	US	1991	2001	77	-3.1%	yes	1
Amoah	2013	Advances in Public Interest Accounting	Regulatory securities frauds	US	1996	2006	301	-7.7%	yes	2
Amoah, Tang	2010	Advances in Accounting	Accounting frauds	US	1997	2002	143	-1.8%	yes/no	2
Andersen, Gilbert, Tourani-Rad	2013	JASSA	Regulatory securities frauds	AU	2004	2012	18	-1.1%	yes	7
Anderson, Yohn	2002	WP	Accounting frauds	US	1997	1999	4	-2.2%	yes	1
Armour, Mayer, Polo	2017	Journal of Financial and Quantitative Analysis	Regulatory securities frauds	UK	2001	2011	40	-0.8%	yes	3
Arnold, Engelen	2007	Management & Marketing	Regulatory securities frauds (incl. accounting frauds)	BE, NL	1994	2003	57	-1.0%	yes/no	4
Baker, Edelman, Powell	1999	Business and Professional Ethics Journal	Regulatory securities frauds	US	1991	1996	14	-0.3%	yes/no	7
Barabanov, Ozocak, Turtle, Walker	2008	Financial Management	Regulatory securities frauds	US	1996	2003	623	-1.6%	yes	1
Bardos, Golec, Harding	2013	Journal of Financial Research	Accounting frauds	US	1997	2002	166	-10.3%	yes	1
Bardos, Mishra	2014	Applied Financial Economics	Accounting frauds	US	1997	2002	24	-5.5%	yes	2
Barniv, Cao	2009	Journal of Accounting and Public Policy	Accounting frauds	US	1995	2003	61	-6.8%	yes	1
Bauer, Braun	2010	Financial Analytical Journal	Regulatory securities frauds (incl. accounting frauds)	US	1996	2007	648	-1.1%	yes	20
Beasley, Carcello, Hermanson, Neal	2010	COSO	Accounting frauds	US	1998	2007	213	-4.1%	yes/no	6
Beneish	1999	The Accounting Review	Accounting frauds	US	1987	1993	50	-4.2%	yes	3

Author(s)	Pub. year	Publication outlet	Financial crimes	Countries	Sample period		Sample size	AAR/day	Stat. signif.	Nb. est.
Bhagat, Bizjak, Coles	1998	Financial Management	Regulatory securities frauds	US	1981	1983	46	-1.4%	yes	1
Billings, Klein, Zur	2012	WP	Regulatory securities frauds (incl. accounting frauds)	US	1996	2008	408	-0.3%	yes	3
Bohn, Choi	1996	University of Pennsylvania Law Review	Regulatory securities frauds	US	1975	1986	103	-1.2%	yes	2
Bonini, Boraschi	2010	Journal of Business Ethics	Regulatory securities frauds (incl. accounting frauds)	US	1996	2005	686	-2.1%	yes	7
Bowen, Call, Rajgopal	2010	The Accounting Review	Regulatory securities frauds (incl. accounting frauds)	US	1989	1996	78	-0.6%	yes	1
Bradley, Cline, Lian	2014	Journal of Corporate Finance	Regulatory securities frauds (incl. accounting frauds)	US	1996	2011	1530	-0.6%	yes	1
Brous, Leggett	1996	Journal of Financial Research	Regulatory securities frauds (incl. accounting frauds)	US	1989	1991	62	-1.0%	yes/no	2
Burns, Khedia	2006	Journal of Financial Economics	Accounting frauds	US	1997	2001	215	-2.0%	yes	4
Callen, Livnat, Segal	2006	Journal of Investing	Accounting frauds	US	1986	2001	385	-2.8%	yes	1
Chava, Cheng, Huang, Lobo	2010	International Journal of Law and Management	Regulatory securities frauds	US	1995	2004	85	-3.1%	yes	1
Chen, Firth, Gao, Rui	2005	Journal of Accounting and Public Policy	Regulatory securities frauds	CN	1999	2003	169	-0.2%	yes/no	10
Choi, Karpoff, Lou, Martin	2019	WP	Regulatory securities frauds (incl. accounting frauds)	US	1978	2015	942	-14.9%	yes	1
Choi, Pritchard	2016	Journal of Legal Studies	Regulatory securities frauds	US	2004	2007	231	-6.5%	yes	3
Christensen, Paik, Williams	2010	Journal of Forensic & Investigative Accounting	Regulatory securities frauds (incl. accounting frauds)	US	2001	2003	151	-2.1%	yes/no	6
Cook, Grove	2009	Journal of Forensic & Investigative Accounting	Regulatory securities frauds (incl. accounting frauds)	US	1984	2005	88	-4.3%	yes	9
Correia, Klausner	2012	WP	Accounting frauds	US	2000	2011	683	-5.0%	yes	2
Cox, Weirich	2002	Managerial Auditing Journal	Accounting frauds	US	1992	1999	27	-4.2%	yes	3
Davidson, Worrell, Lee	1994	Journal of Business Ethics	Accounting frauds	US	1965	1990	34	-0.6%	yes/no	12
Davis, Taghipour, Walker	2017	Managerial Finance	Regulatory securities frauds	US	1996	2013	2153	0.4%	yes	2
de Batz	2020	European Journal of Law and Economics	Regulatory securities frauds (incl. accounting frauds)	FR	2004	2016	52	-0.3%	yes/no	8
Dechow, Sloane, Sweeney	1996	Contemporary Accounting Research	Accounting frauds	US	1982	1992	78	-8.8%	yes	1
Deng, Willis, Xu	2014	Journal of Financial and Quantitative Analysis	Regulatory securities frauds (incl. accounting frauds)	US	1996	2006	156	-1.7%	yes	6
Desai, Hogan, Wilkins	2006	The Accounting Review	Accounting frauds	US	1997	1998	146	-3.7%	yes	1
Djama	2013	Revue Française de Gestion	Accounting frauds	FR	1995	2008	36	-0.9%	yes/no	3
Du	2017	Journal of Business Finance & Accounting	Accounting frauds	US	2001	2011	17	-2.3%	yes	2
Engelen	2009	WP	Regulatory securities frauds	BE, DE, FR, LU, NL, UK	1995	2005	83	-0.8%	yes/no	12

Author(s)	Pub. year	Publication outlet	Financial crimes	Countries	Sample period		Sample size	AAR/day	Stat. signif.	Nb. est.
Engelen	2011	Book chapter	Regulatory securities frauds	BE, DE, FR, LU, NL, UK	1995	2005	101	-1.0%	yes/no	4
Engelen	2012	CESifo Economic Studies	Regulatory securities frauds	US	1993	2008	122	-0.8%	yes/no	2
Ervigit	2019	Journal of Financial Crime	Accounting frauds	TR	2005	2015	160	-0.1%	yes/no	4
Ewelt-Knauer, Knauer, Lachmann	2015	Journal of Business Economics	Regulatory securities frauds	DE	1998	2014	126	-2.3%	yes	2
Feroz, Park, Pastena	1991	Journal of accounting research	Accounting frauds	US	1982	1989	58	-2.6%	yes/no	11
Ferris, Jandik, Lawless, Makhija	2007	Journal of Financial and Quantitative Analysis	Regulatory securities frauds	US	1982	1999	194	-0.6%	yes	1
Fich, Shivdasani	2007	Journal of Financial Economics	Regulatory securities frauds	US	1998	2002	200	-3.5%	yes	4
Firth, Rui, Wu	2009	Journal of Accounting and Public Policy	Regulatory securities frauds	CN	1999	2005	61	-0.7%	yes/no	10
Firth, Rui, Wu	2011	Journal of Corporate Finance	Accounting frauds	CN	2000	2005	267	-0.1%	yes/no	8
Firth, Wong, Xin, Yick	2016	Journal of Business Ethics	Regulatory securities frauds (incl. accounting frauds)	CN	2003	2010	75	-0.2%	yes	2
Flore, Degryse, Kolaric, Schiereck	2018	WP	Regulatory securities frauds (incl. accounting frauds)	DE, ES, FR, NL, SW, UK, US	2005	2015	251	0.1%	yes/no	5
Gande, Lewis	2009	Journal of Financial and Quantitative Analysis	Regulatory securities frauds	US	1996	2003	605	-1.3%	yes/no	6
Geretv, Lehn	1997	Managerial and Decision Economics	Accounting frauds	US	1981	1987	37	-1.0%	yes	1
Goldman, Peyer, Stefanescu	2012	Financial Management	Accounting frauds	US	1976	2010	444	-8.9%	yes	5
Griffin, Grundfest, Perino	2004	Abacus	Regulatory securities frauds	US	1990	2002	2133	-1.8%	yes/no	4
Griffin, Sun	2016	Accounting and Finance Research	Regulatory securities frauds	US	2001	2007	80	-0.8%	yes/no	4
Haslem, Hutton, Hoffmann Smith	2017	Financial Management	Regulatory securities frauds	US	1995	2006	594	-0.8%	yes	6
Hirschey, Palmrose, Scholz	2005	WP	Accounting frauds	US	1995	1999	405	-7.3%	yes	1
Humphery-Jenner	2012	Journal of Financial Intermediation	Regulatory securities frauds	US	1996	2007	416	-1.1%	yes	5
Iqbal, Shetty, Wang	2007	Journal of Financial Research	Regulatory securities frauds	US	1996	2003	298	-5.2%	yes	8
Johnson, Ryan, Tian	2003	WP	Accounting frauds	US	1992	2005	87	-4.9%	yes	1
Jordan, Peek, Rosengren	2000	Journal of Financial Intermediation	Regulatory securities frauds (incl. accounting frauds)	US	1989	1994	35	-1.7%	yes	1
Karpoff, Koester, Lee, Martin	2017	The Accounting Review	Accounting frauds	US	1978	2011	1052	-15.2%	yes	1
Karpoff, Lee, Martin	2008	Journal of financial and quantitative analysis	Accounting frauds	US	1978	2002	371	-11.2%	yes	6
Karpoff, Lott	1993	Journal of Law and Economics	Accounting frauds	US	1978	1987	4	-1.3%	yes/no	5
Kellogg	1984	Journal of Accounting and Economics	Accounting frauds	US	1967	1979	26	-3.0%	yes/no	2
Kirat, Rezaee	2019	Applied Economics	Regulatory securities frauds (incl. accounting frauds)	FR	2004	2017	54	-0.5%	yes	2

Author(s)	Pub. year	Publication outlet	Financial crimes	Countries	Sample period		Sample size	AAR/day	Stat. signif.	Nb. est.
Klock	2015	Journal of Business & Securities Law	Regulatory securities frauds (incl. accounting frauds)	US	1996	2012	714	-1.0%	yes	3
Kouwenberg, Phunnarungsi	2013	Pacific-Basin Finance Journal	Regulatory securities frauds (incl. accounting frauds)	TH	2003	2010	111	-0.7%	yes/no	4
Kravet, Shevlin	2010	Review of Accounting Studies	Accounting frauds	US	1997	2001	299	-0.8%	yes	1
Kryzanowski, Zhang	2013	Journal of Multinational Financial Management	Accounting frauds	CA	1997	2006	210	-1.9%	yes	4
Kwan, Kwan	2011	International Review of Business Research Papers	Regulatory securities frauds	MY	2005	2009	41	-0.4%	yes/no	3
Lei, Law	2019	WP	Regulatory securities frauds (incl. accounting frauds)	CN	1999	2015	1188	-0.1%	yes/no	7
Liebman, Milhaupt	2008	Columbia Law Review	Regulatory securities frauds	CN	2001	2006	68	-0.7%	yes/no	8
Lieser, Kolaric	2016	WP	Regulatory securities frauds (incl. accounting frauds)	US	1996	2014	1377	-1.3%	yes/no	15
Loh, Rathinasamy	2003	Review of Pacific Basin Financial Markets and Policies	Regulatory securities frauds (incl. accounting frauds)	US	1996	1998	290	-0.5%	yes	2
Marciukaityte, Szewczyk, Uzun, Varma	2006	Financial Analysts Journal	Regulatory securities frauds (incl. accounting frauds)	US	1978	2001	28	-3.9%	yes	1
Marciukaityte, Szewczyk, Varma	2009	Financial Analysts Journal	Accounting frauds	US	1997	2002	187	-3.3%	yes	1
McDowell	2005	WP	Accounting frauds	US	1998	2003	174	-2.1%	yes	1
Muradoglu, Clark Huskey	2008	WP	Regulatory securities frauds (incl. accounting frauds)	US	1995	2004	296	-0.6%	yes/no	12
Nainar, Rai, Tartaroglu	2014	International Journal of Disclosure and Governance	Regulatory securities frauds	US	1999	2007	77	-1.0%	yes/no	5
Nelson, Gillev, Trombley	2009	Securities Litigation Journal	Regulatory securities frauds	US	2002	2007	58	-2.6%	yes	1
Nouravi	1994	Journal of Accounting and Public Policy	Regulatory securities frauds (incl. accounting frauds)	US	1977	1984	82	-0.2%	yes	4
Owers, Lin, Rogers	2002	International Business and Economics Research Journal	Accounting frauds	US	1994	1997	13	-3.8%	yes	4
Ozbas	2008	WP	Accounting frauds	US	1999	2003	75	-2.5%	yes/no	4
Ozeki	2019	Securities Analysts Journal	Accounting frauds	JP	2005	2016	218	-9.1%	yes/no	2
Pereira, Malafronte, Sorwar, Nurullah	2019	Journal of Financial Services Research	Regulatory securities frauds (incl. accounting frauds)	US	2004	2015	1387	-6.4%	yes/no	5
Persons	1997	Journal of Business Research	Regulatory securities frauds	US	1972	1993	95	-0.4%	yes	3
Plumlee, Yohn	2008	WP	Accounting frauds	US	2003	2006	1303	-0.3%	yes	1
Pritchard, Ferris	2001	WP	Regulatory securities frauds	US	1995	1999	89	-3.1%	yes/no	3
Romano	1991	Journal of Law, Economics, and Organization	Regulatory securities frauds	US	1970	1987	66	-0.8%	yes/no	6
Scholz	2008	US Department of Treasury	Accounting frauds	US	1997	2006	264	-6.5%	yes	1
Slovin, Sushka, Polonchek	1999	Journal of Financial Economics	Regulatory securities frauds (incl. accounting frauds)	US	1975	1992	61	-1.8%	yes	2

Author(s)	Pub. year	Publication outlet	Financial crimes	Countries	Sample period		Sample size	AAR/day	Stat. signif.	Nb. est.
Song, Han	2017	Journal of Business Ethics	Regulatory securities frauds (incl. accounting frauds)	KR	2001	2010	220	-0.7%	yes	3
Sun, Zhang	2006	WP	Regulatory securities frauds	CN	1990	2002	144	-0.5%	yes	1
Takmaz, Keles	2017	Journal of Business Research Turk	Regulatory securities frauds	TR	2007	2016	72	-0.2%	yes/no	4
Tanimura, Okamoto	2013	Asian Economic Journal	Accounting frauds	JP	2000	2008	39	-3.1%	yes	1
Tay, Puah, Brahmana, Abdul Malek	2016	Journal of Financial Crime	Regulatory securities frauds (incl. accounting frauds)	MY	1996	2013	17	0.0%	no	2
Wang, Ashton, Jaafar	2019	The British Accounting Review	Accounting frauds	CN	2007	2016	433	-0.1%	yes/no	7
Wang, Wu	2011	China Journal of Accounting Research	Accounting frauds	CN	1999	2005	67	-0.1%	yes/no	5
Wu	2002	WP	Accounting frauds	US	1977	2000	932	-7.7%	yes	1
Wu, Zhang	2014	China Journal of Accounting Studies	Regulatory securities frauds	CN	2002	2011	157	-2.3%	yes	5
Xu, Xu	2020	International Review of Law and Economics	Regulatory securities frauds (incl. accounting frauds)	CN	2014	2018	107	-0.5%	yes/no	6
Yu, Zhang, Zheng	2015	Financial Management	Accounting frauds	CN	1999	2011	195	-0.6%	yes	2
Zeidan	2013	Journal of Business Ethics	Regulatory securities frauds	US	1990	2009	163	-0.4%	yes/no	4
Zhu, Hu	2010	WP	Accounting frauds	CN	2006	2008	88	-0.9%	yes/no	7
Overall	**2009**				**1994**	**2004**	**293**	**-1.9%***		**4**

Source: Authors

Return *per* Day ($AARD$), equal to $CAAR$ divided by the length of the event window or to AAR, for one day event windows.[13] $AARDs$ were winsorized at the 1% level, to ensure that the presence of outliers does not result from mistakes in the original articles.

Event studies typically use hypothesis tests to see if abnormal returns around the event day are statistically significant. Conventionally, the null hypothesis is that $(C)AARs$ equal zero. To test the statistical significance of the abnormal returns, the great majority of studies in the sample use Student's t-test (and to a lesser extent z-statistics and p-values), most frequently with little (or no) information on how the test was run. In some cases, the results of non-parametric tests are also included. The parametric t-tests (or statistical significance levels) are provided by the primary studies themselves, under the assumption that the underlying source population is normally distributed. This assumption is never discussed in the literature, as most samples are larger than 30 (293 on average, with a standard deviation of 410). By construction, our sample includes at least a level of significance (1%, 5% or 10%). As done by Frooman (1997), when the t-statistics were not published, conservative t-statistics (or a worst-case scenario) were obtained as follows: 1) the statistical significance levels were converted into conservative levels of significance;[14] 2) the z-statistics were directly changed into t-statistics, on the assumption that as sample size increases, the Student's t distribution approaches the normal distribution (Marascuilo and Serlin, 1988); and 3) the p-values were converted into t-statistics by using a t-table and the appropriate degrees of freedom. Finally, three studies (Desai et ai. (2006), Nelson et al. (2009), and Goldman et al. (2012)), standing for 7 estimates, mentioned explicitly that the abnormal returns are significant, without including t-statistics or the statistical significance. We made the conservative hypothesis that the statistical significance level was 10% for each. (Conservative) Standard errors were calculated from the conservative t-statistics and the $AARDs$, when they were not included in the study.[15] Standard errors were also winsorized at the 1% level.

Additionally, typical dimensions of research that are routinely coded in meta-analysis (Stanley and Doucouliagos, 2012) were included, complemented by specific dimensions to our sample, subsequent to the types of events investigated and the estimation methodology. All in all, four sets of variables are included in the dataset. Detailed definitions of the variables and

[13] The $(C)AARDs$ could not be standardized by their standard deviations (Frooman, 1997) as only few event studies report them. Similarly to our $AARDs$, Veld et al. (2018) normalized the reported $CAARs$ by dividing them by the number of days in the event window and included dummy variables for observations with different event windows.

[14] 10% to t = -1.645; 5% to t = -1.96; 1% to t = -2.576; etc.

[15] Only for 2 studies published standard errors of $(C)AARs$, standing for 10 estimates or 2% of the sample of estimates.

their major descriptive statistics are displayed in Appendix B (Table A.1). More detailed information, or the whole dataset, is available on demand. The scope covers the respective characteristics of the data, the estimation, and the publication, complemented with some control

Table 3: Average Abnormal Returns *per* Day for Different Subsets of Data

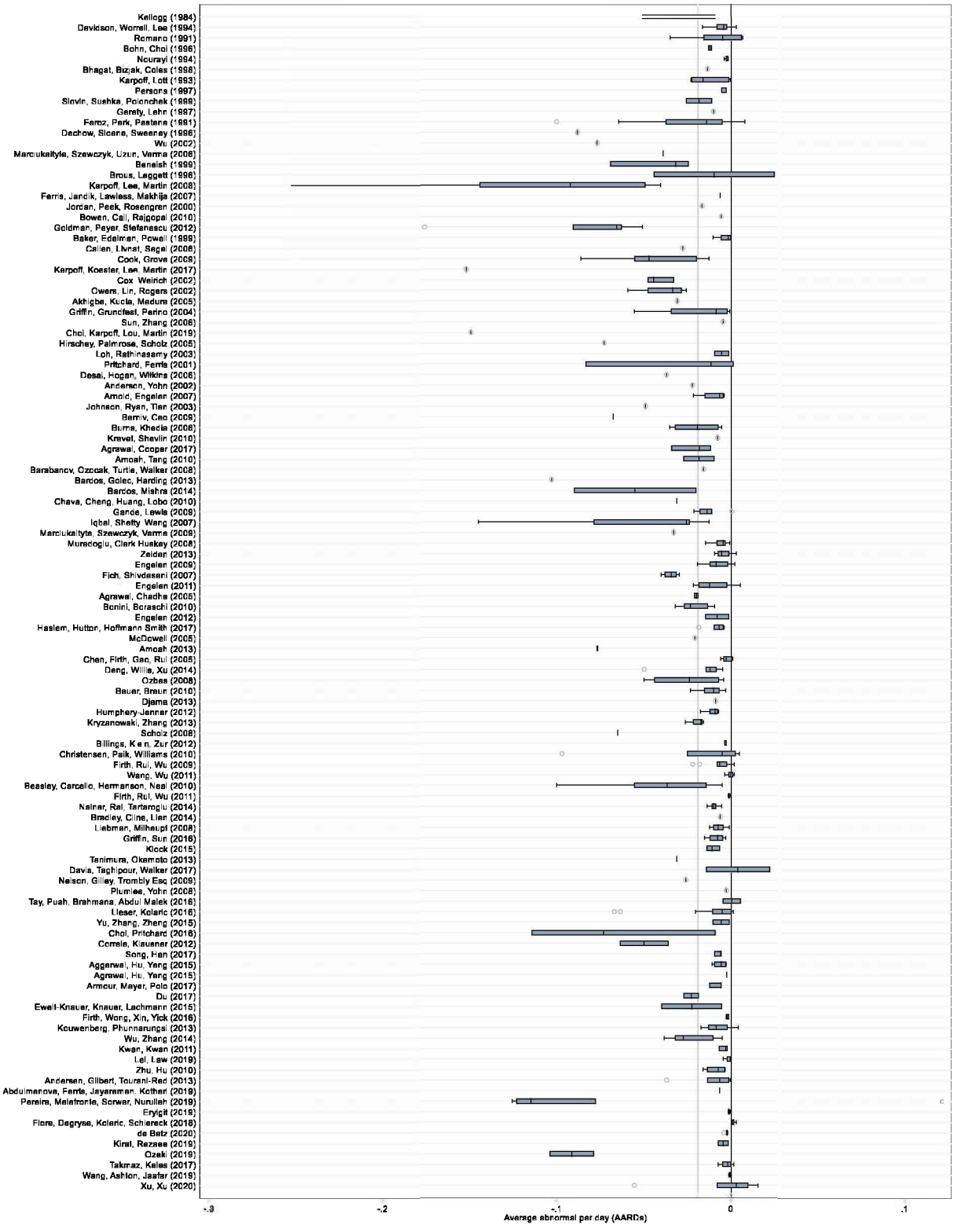
Table 3 details for the whole sample and different subsets the average abnormal returns *per* day ($AARDs$), complemented by the standard errors (SE), and a 95% confidence interval. Averages are simple averages or weighted by the inverse of the number of estimates reported *per* study. Some categories are non-mutually exclusive. The definitions of the subsets are available in appendix B (Table A.1).

	Nb. observations	Unweighted				Weighted			
		Mean	SE	95% conf. int.		Mean	SE	95% conf. int.	
1. Characteristics of the event under review:									
Event under review:									
Pure accounting frauds	142	-2.91%	0.28%	-3.47%	-2.35%	-3.75%	0.29%	-4.33%	-3.17%
Pure violations of securities laws	180	-1.36%	0.15%	-1.67%	-1.06%	-1.53%	0.16%	-1.85%	-1.22%
Violations of securities laws (including accounting frauds)	117	-1.48%	0.26%	-1.99%	-0.97%	-1.81%	0.31%	-2.43%	-1.19%
Type of procedures:									
Public enforcement	228	-1.95%	0.20%	-2.35%	-1.56%	-2.49%	0.23%	-2.94%	-2.04%
Private enforcement (private lawsuits, stock exchange procedures, and class actions)	182	-1.59%	0.18%	-1.94%	-1.24%	-2.08%	0.21%	-2.49%	-1.67%
Step of the enforcement:									
Alleged crimes (allegation in the press, initiation of regulatory procedures, investigation, class-action or lawsuit filing, etc.)	266	-2.30%	0.19%	-2.66%	-1.93%	-2.81%	0.21%	-3.23%	-2.39%
Condemned crimes (verdict of regulatory procedures, verdict of lawsuits or class-actions, accounting restatement)	173	-1.28%	0.18%	-1.63%	-0.93%	-2.09%	0.22%	-2.52%	-1.67%
Source of the news:									
Newspaper articles	175	-1.80%	0.19%	-2.18%	-1.43%	-2.12%	0.19%	-2.49%	-1.75%
Regulatory communication	301	-1.83%	0.17%	-2.16%	-1.50%	-2.52%	0.20%	-2.93%	-2.12%
Corporation communication	117	-2.00%	0.25%	-2.49%	-1.51%	-2.86%	0.26%	-3.37%	-2.34%
Geographical specificities:									
U.S. only	281	-2.55%	0.19%	-2.93%	-2.17%	-3.14%	0.21%	-3.55%	-2.73%
Common law countries	304	-2.43%	0.18%	-2.78%	-2.08%	-2.98%	0.20%	-3.36%	-2.59%
Civil law countries	135	-0.70%	0.12%	-0.93%	-0.46%	-1.02%	0.17%	-1.35%	-0.69%
2. Characteristics of the estimation:									
Event windows:									
Before the event ($t < 0$)	62	-0.86%	0.16%	-1.17%	-0.54%	-0.79%	0.17%	-1.12%	-0.45%
On the event day ($t = 0$)	82	-3.38%	0.48%	-4.34%	-2.42%	-4.41%	0.55%	-5.51%	-3.32%
Around the event day (including $t = 0$)	270	-1.83%	0.15%	-2.11%	-1.54%	-2.38%	0.16%	-2.69%	-2.07%
After the event day ($t > 0$)	25	-0.37%	0.14%	-0.65%	-0.08%	-0.36%	0.13%	-0.63%	-0.08%
Estimation model:									
Market model	353	-1.93%	0.15%	-2.23%	-1.64%	-2.26%	0.15%	-2.55%	-1.97%
Other models	86	-1.74%	0.31%	-2.35%	-1.13%	-3.80%	0.52%	-4.83%	-2.77%
Complementary estimations:									
Reputational penalty estimates	59	-0.96%	0.16%	-1.27%	-0.65%	-1.38%	0.18%	-1.74%	-1.02%
Cross-sectional regressions of $(C)AARs$	269	-2.12%	0.18%	-2.48%	-1.77%	-2.58%	0.02%	-2.93%	-0.22%
3. Publication status:									
Published papers/chapters	351	-1.98%	0.15%	-2.28%	-1.68%	-2.44%	0.17%	-2.77%	-2.11%
Unpublished papers	88	-1.56%	0.28%	-2.12%	-1.01%	-2.80%	0.40%	-3.59%	-2.01%
All estimates	**439**	**-1.90%**	**0.13%**	**-2.16%**	**-1.63%**	**-2.51%**	**0.15%**	**-2.81%**	**-2.20%**

Sources: Studies, Authors' calculations

Figure 5: Distribution of Average Abnormal Returns *per* Day Across Studies

This figure shows a box plot of the estimated average abnormal returns *per* day reported for every 111 study in the scope of this meta-analysis. Following Turkey (1977), the length of each bow represents the interquartile range (P25-P75), and the dividing line inside the box is the median value. The whiskers represent the highest and the lowest data points withing 1.5 times the range between the upper and the lower quartiles, if such estimates exist. The grey vertical line denotes the *naïve* average (-1.9%). Studies are sorted by the median year of the sampled data, in ascending order.



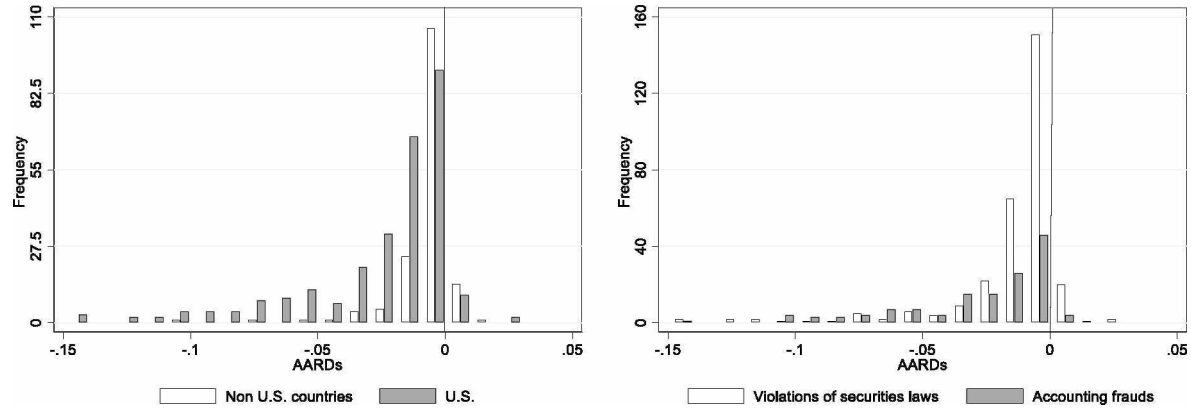
Source: Authors

variables (legal, financial, and sectorial characteristics). The articles were split into two sub-samples, echoing the hypotheses tested: depending on the jurisdictions under review, with a distinction between the U.S. and the rest of the world,[16] and on the types of financial crimes, with pure accounting frauds and violations of securities laws.

Overall, the results compiled from the sample of 111 studies vary. Figure 5 details the average abnormal returns *per* day study by study. Most frequently, studies investigating the spillovers of financial crime on returns report negative impacts (statistically significant for 73% of the sample or insignificant for 17% of the sample). Conversely, 2% are positive and significant and 8% positive and insignificant. Averages displayed in Table 3 indicate that returns abnormally contract by -1.9% *per* day after the publication of a financial crime (-2.51% when weighting by the number of estimates reported *per* study). They also hint that markets would react more to frauds committed in the U.S. and to accounting crimes (respectively -2.5% and -2.9%). Complementarily, Figure 6 displays the frequency distribution of by sub-samples depending on whether the U.S. is investigated or not, and on whether the sample is comprised solely of accounting frauds or not.

Figure 6: Frequency Distributions of *AARDs*

The figures show the histograms of the estimates of average abnormal returns *per* day reported in the individual studies, as in Bajzik et al. (2020). *AARDs* are split by geographical scope, between the U.S. and non-U.S. countries and between pure accounting frauds and other violations of securities laws. Outliers are excluded from the figures but included in all the tests.



Source: Authors' calculations

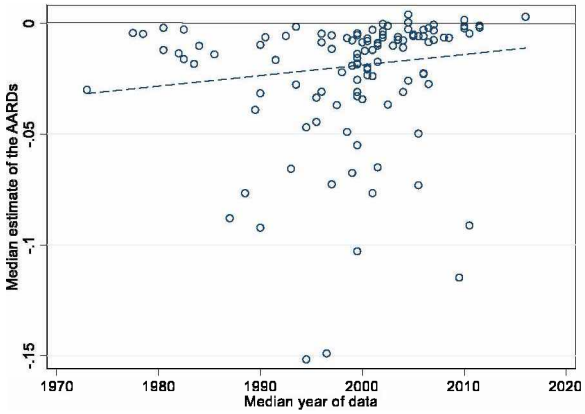
[16] Complementarily to the split by countries, one variable controls for the type of commercial laws enforced in every country in the sample (common or code). As in Leuz et al. (2003) and Liang and Renneboog (2017), we assume that the type of commercial laws is predetermined and exogenous to our analysis as the legal frameworks were set centuries ago *via* complex interactions (wars, occupations, colonization, amongst others). It is noteworthy that common law countries (and in particular the U.S.) are more transparent along enforcement or legal procedures. Therefore, they stand for a higher share of "alleged crimes" than condemned ones.

The average sample size (hence degrees of freedom) is large (293), supporting the significance of the results. The average estimation window covers the period [-153; -21] before the event and the event window the period [-17; +19]. 27% of the articles have event windows beyond the short-term window we focus on [-10; +10]. More specifically, for the reported *AARDs*, the average event window is [-1.7; +1.4]. 67% of the event studies are complemented with a cross-sectional regression and 12% by an estimation of a subsequent reputational penalty.

The events included in the articles occurred on average between 1994 and 2004 (ranging from 1965 to 2018). Figure 7 depicts graphically the chronological ordering of *AARDs* for the whole sample, plotting for every study the median *AARD* against the median year of the sample data, ranging from 1973 to 2016. The reported *AARDs* trend upwards in time (*i.e.* less negative abnormal returns, with a positive slop), indicating less responsive markets along time. Still, this apparent trend could reflect fundamental changes in market perceptions, or improvements in the data and techniques along time.

Figure 7: Chronological Ordering of *AARDs*

Figure 7 depicts graphically the chronological ordering of median *AARDs* reported in individual studies, based on the median year of the data used in the corresponding study, ranging from 1973 to 2016, as in Bajzik et al. (2020). The dashed line is the time trend.



Source: Authors

Finally, the average publication year of the article is 2009 (ranging from 1984 until 2020), most frequently in cross-disciplinary and refereed journals, and authored by 2.4 researchers. This confirms Amiram et al. (2018) observation that studies on financial misconduct belong to three perspectives: law, accounting, or finance (for our sample, by declining order of importance: finance, accounting, business, and law). A third of the latter authored more than one article out of the 111-article sample, indicating expertise in the domain of financial crimes. Articles on condemned crimes appear to be published in better journals and

to get higher attention; these features are measured, for example, by the Scopus cite score, by the RePec discounted impact factor, and by the number of Google citations.

3.3 Funnel plots and publication selection bias

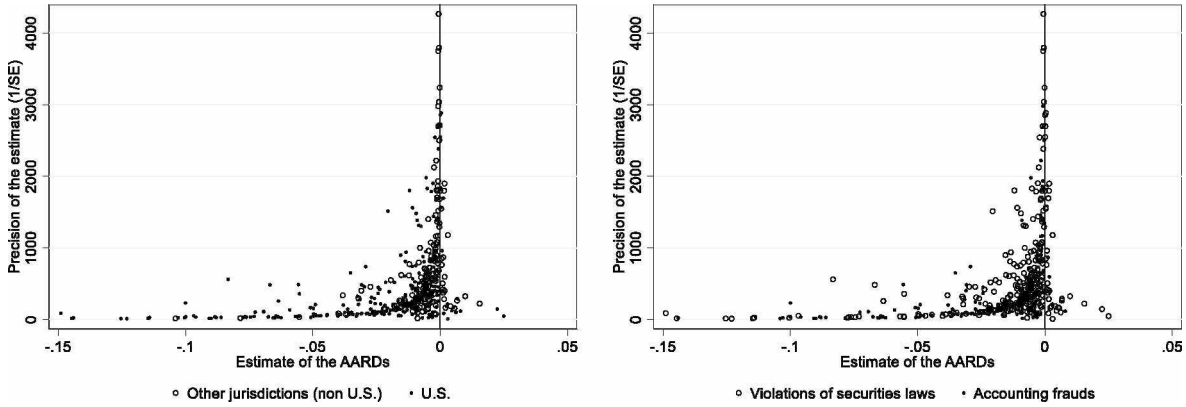
A publication selection bias means that submitted and published manuscripts (*i.e.* the combined actions of researchers, reviewers, and editors) are biased in a direction or in the strength of the study findings (Stanley, 2005). Publication bias hence distorts empirical evidence and policy recommendations (Bom and Rachinger, 2019). P-hacking, which has been receiving a lot of attention recently (amid others Brodeur et al., 2020, and Bruns and Ioannidis, 2016), can influence published results from event studies, for example by playing with the event windows to get results with the "expected" sign and significance. Funnel plots are graphical illustrations of such publication bias.

We construct funnel plots to analyze the distribution of the reported estimates of the impact of financial crimes on returns which could illustrate a potential publication selection bias (Stanley and Doucouliagos, 2010). This scatter diagram plots the size of the estimated effect ($AARDs$) on the horizontal axis against a measure of the estimate's precision on the vertical axis (the inverse of the conservative estimated standard errors of the $AARDs$). In the absence of publication selection, effect sizes reported by independent studies vary randomly and symmetrically around the "true" value of the effect (Stanley and Doucouliagos, 2012). They should form an inverted funnel, with the most precise estimates being closer to the true mean abnormal returns, and less precise estimates more dispersed. Additionally, the dispersion of effect sizes should be negatively correlated with the precision of the estimate.

Figure 8 depicts funnel plots of the $AARDs$ for the full sample of financial crimes, split depending on the jurisdiction under review (the U.S. *versus* other jurisdictions), and on the financial crimes (pure accounting frauds or violations of securities laws). The funnel graph is asymmetrical, skewed to the left (towards negative $AARDs$), in particular for the U.S. This suggests a publication selection bias, under the assumption of a "true" effect holding for the whole sample regardless of the studies' specificities. This skew could indicate a preference in the literature for reporting negative abnormal returns after the announcement of intentional financial crimes committed by listed firms. As recommended by Stanley and Doucouliagos (2012), this hypothesis of publication bias is further investigated, with a meta-regression analysis, to address heterogeneity across studies (time, countries, breaches, procedures, etc.).

Figure 8: Funnel Graphs of the Impact of Financial Crimes

The following funnel graphs scatter the estimated average abnormal returns *per* day of the publication of financial crimes ($AARDs$) against these estimates' precisions (*i.e.* the inverse of the estimated standard errors). The 439 estimates are split by geographical scope, depending on whether the study investigates the U.S. or other jurisdictions, and on whether the crimes were pure accounting frauds or violations of securities laws. The distribution is expected to be symmetrical around the true value of the estimate, in the absence of publication bias.



Source: Authors

3.4 Meta-Regression Analysis (MRA) methodology

We perform a two-step MRA, to explore the publication selection bias demonstrated by the funnel plots, and to investigate for the factors causing heterogeneity between the studies in the sample, as in Stanley and Doucouliagos (2012), Askarov and Doucouliagos (2013), and Hubler et al. (2019).

Firstly, we test the presence of a publication selection bias with the Funnel-Asymmetry Test (FAT) and proxy the true impact of the publication of financial crimes on returns with a Precision-Effect Test (PET), as recommended by Stanley (2005) and Stanley and Doucouliagos (2012). Equation (1) is estimated:

$$AARD_{i,j} = \beta_0 + \beta_1 SE_{i,j} + \varepsilon_{i,j}, \quad (1)$$

Where $AARDs$ are the average abnormal returns *per* day (*i.e.* the reported effect), $SE_{i,j}$ are the conservative standard errors of the $AARDs$, β_0 and β_1 are the parameters to be estimated, i and j denote the i^{th} estimate from the j^{th} study ($j \in [\![1; 111]\!]$), and ε are the residuals. A publication selection bias (FAT) is demonstrated by a statistically significant correlation between the reported effects and their standard errors ($\beta_1 \neq 0$), resulting in an asymmetrical funnel plot as previously described (see Figure 8). The estimates of β_0 (PET) stand for an unconditional measure of the genuine empirical effect of the publication of financial crimes on the returns of the involved listed firms, corrected for any publication selection bias (Stanley and Doucouliagos, 2012).

Secondly, the generic MRA equation (Eq. (2)), embedding the FAT-PET, is estimated to identify and quantify the factors contributing to the heterogeneity of the reported estimated *AARDs* of the sample. The null hypothesis is that the factors related to specific studies are not relevant to the reported outcomes. The following model is estimated:

$$AARD_{i,j} = \beta_0 + \beta_1 SE_{i,j} + \sum \beta_k Z_{i,k} + \varepsilon_{i,j}, \quad (2)$$

Where *AARDs* are the average abnormal returns *per* day, *SE* are the conservative standard errors of the *AARDs*, *Z* is a vector of meta-independent explanatory variables, that captures the relevant characteristics of an empirical study and explains its systematic variation from other empirical results in the literature, β_i are the meta-regression coefficient to be estimated, *i* and *j* denote the i^{th} estimate from the j^{th} study ($j \in [\![1; 111]\!]$), and ε are the meta-regression disturbance terms (Stanley and Jarrell, 2005).

Finally, following the strategy of Stanley and Doucouliagos (2012; p. 93 and 121), we use the coefficients of the weighted least squares MRA to "predict" the meta-average impact of the publication of intentional financial crimes on returns corrected for the publication bias (with a 95% confidence interval, despite potential omitted-variable bias). This strategy to summarize a research literature was used for example by Askarov and Doucouliagos (2013) for the impact of aid on democracy and, more recently, by Hubler et al. (2019) for the impact of rating changes on returns. These studies acknowledge that this meta-average is the best estimate of the effect of financial crimes as reported by the extant literature, under the following hypotheses: the MRA variables actually quantify the effect of misspecification bias, and some MRA variables must be chosen to predict the average effect.

3.5 Definition of the explanatory variables

We build three sets of variables to account for the genuine heterogeneity between studies and the heterogeneity introduced by primary authors' choices (see Appendix B, Table A.1), inspired by the literature review, by other meta-analysis, and by the latest guidelines (Havránek et al., 2020a). They cover the characteristics of the data, of the event study estimation, and of the publication of the study. We also included control variables.

The major features of the data build on the literature of meta-analyses (Havránek et al., 2020a). They characterize the main divergences between sampled articles, ranging from the geographical specificities (country(ies) under review, region, and legal origin) to time specificities (the average year over which crimes where analyzed, and the length of this period under review). Complementarily, they cover the types of financial crimes (pure accounting

crime or any violation of securities laws), the media of publication of the financial crime (newspaper articles, corporate or regulatory communication), and the specificities of the enforcement procedures (alleged or condemned crimes, regulatory procedures, private enforcement procedures or accounting restatements). Finally, dummy variables control for the most frequent industrial sectors under review (industry or finance).

The estimation characteristics cover the main possible divergences in event study methodology application (see Appendix A for details): whether the model used to estimate abnormal returns is a market model or not; the sample size (after excluding unintentional crimes and the confounding events in particular);[17] the length of the event window of the estimated $(C)AAR$ (1 day for AAR and 2 to 21 days for $CAAR$, given the limit put on the reported short term estimates); whether abnormal returns were also estimated for longer event windows than $[-10; +10]$; whether an estimation was done for the event day, when the financial crime is revealed (*i.e.* $AAR(0)$); whether the estimation was done around (*i.e.* $CAAR[-x; +y]$, with $t = 0$ being the event day), before or after the event, as in the meta-analysis on event studies on rating agencies' decisions by Hubler et al. (2019)).; and finally if the event study was complemented with cross-sectional regressions and/or reputational penalty estimations, to control for the quality and depth of the study.

The publication characteristics used are relevant for a meta-analysis and correspond to those highlighted by Geyer-Klingeberg et at. (2020): the number of authors of the article; if authors were named several times in the sample under review, as a way to assess the level of expertise of the authors of the article; the year and the month of publication; indicators of the quality of the article, of which whether or not the article was published in a refereed journal (and not a working paper), if the journal is referenced in Scopus, the journal Repec impact factor, and the number of citations of the article recorded in Google Scholar; and whether the article was published in a cross-disciplinary journal (which could increase the echo of the findings).

Finally, we control for exogenous variables, which are not explicitly accounted for by the authors but can be potential sources of variability in the $AARDs$. In fact, the sample covers a wide range of countries (17) with developed and emerging economies over a long time-span (1965-2018). Consequently, as *per* Hubler et al. (2019), we control for three dimensions of

[17] Contrary to Hubler et al. (2019), we did not include a dummy for the exclusion of confounding events, as it is a prerequisite to building a credible dataset for an event studies, purged from any other significant confounding event. Most frequently, the article stated that confounding events were excluded, and we assumed that this data cleaning was done seriously.

exogenous variability, mostly based on recognized development and governance indicators published by the World Bank: indicators of the level of economic development (based on the GDP or GNI); the level of financial development with the indicators of the stock market (size, liquidity, depth, number of listed firms) and of the banking sector (credit); and the economic freedom in the jurisdiction under review, with the World Bank rule of law index on the average year of the data under review and sub-indexes of the Economic Freedom indicators of the Fraser Institute, as in Hubler et al., 2019.

4. Meta-Regression Analysis results

4.1. Quantification of the publication bias and true effect of the publication of financial crimes

In order to quantify the publication bias observed in the funnel plots, FAT-PET Eq. (1) is estimated for the whole sample, and then separately for four subsamples, corresponding to whether the U.S. is under review or not, and to the type of financial crimes (pure accounting fraud or not). The hinted publication bias would be confirmed by finding a negative correlation between estimated abnormal returns and their standard errors. Additionally, the intercept between the *AARDs* and their standard errors can be interpreted as the mean *AARD* corrected for the publication bias (Stanley and Doucouliagos, 2012).

The results are presented in Table 4 for the whole sample and the four sub-samples (the U.S. or other jurisdictions; accounting frauds or violations to securities laws). To support the robustness of the results, we use three types of specifications based on the recent literature (Havránek et al., 2020a): 1) panel A uses unweighted data (simple OLS regression, OLS regression adding study-level fixed effects, to account for unobserved study-specific characteristics (such as quality, but also to some extent for the country specificities as most of the studies focus on one single country), regression using between-study variance, hierarchical Bayes, as in Bajzik et al. (2020), and instrumenting for the standard error with the number of observations reported by study, as in Havránek and Sokolova (2020))[18]; 2) panel B uses weighted OLS (by the inverse of the number of estimates reported by study, to give an equal weight to every study whatever the number of estimates, and by the precision (*i.e.* the inverse of the standard errors), to adjust for the apparent heteroskedasticity in the regression as in

[18] Estimated *AARDs* and their standard errors could potentially be jointly determined, as stressed by Havránek and Sokolova (2020). To account for this possible endogeneity, they recommend using the number of financial crimes of the event study an instrument, which is correlated with the standard errors by construction but not *a priori* with the event study methodology.

Stanley and Doucouliagos, 2017)[19]; and 3) panel C uses the latest non-linear estimation techniques. These recent techniques relax the implicit assumption made in Panels A and B that the publication bias is a linear function of standard errors. Panel C is comprised of 1) the weighted average of adequately powered estimates (Ioannidis et al., 2017), 2) the selection model by Andrews and Kasy (2019), which corrects the publication bias by estimating the probability of publication of each estimate in the literature depending on its *p*-value, depending on conventional cut-offs for the *p*-value (0.01, 0.05, and 0.10), which are associated with jumps in the distribution of reported estimates, and 3) the stem-based method (Furukawa, 2019), which focusses on the most precise estimates to minimize the tradeoff between variance and bias.[20] We cluster standard errors by study to control for the data dependence within studies (Stanley and Doucouliagos, 2012), as the dataset is comprised on average of 4 (unlikely independent) estimates *per* study.

The results displayed in Table 4 confirm the significant publication selection bias in the analyzed literature hinted by the funnel plots, towards negative estimates of $AARDs$. All sub-samples have highly statistically significant and negative coefficients for standard errors clustered by studies. Additionally, the genuine underlying empirical effect beyond the distortion due to publication selection (PET, the constant) is negative, mostly significant, but much more limited than the averaged estimates showed in Table 3 (in particular for non-linear techniques).

Panel A.1 shows the results of an OLS regression. We obtain a negative and statistically significant estimate of publication bias (column [1]). Additionally, the publication bias hits all the sub-samples analyzed, whatever the countries (columns [2] and [3]) or the financial crimes (columns [4] and [5]). The changes in the estimation methods (panels A.2 to 5, and panels B) do not affect the conclusion: the publication bias is confirmed across all estimators. The publication bias is particularly high when weighting by precision (panel B.2) or by the inverse of the number of reported estimate (panel B.1), or when adding study-level between effects (Panel A.3) or the number of observations reported by study as an instrumental variable (panel A.5, with a lower precision of the estimates), implying lower $AARDs$ effects beyond bias.

Consequently, for the whole sample, the effect beyond bias on $AARD$ (column [1]) is nearly four times lower than the simple mean of the reported $AARDs$ (-0.52% *per* day, against

[19] Beyond the advantage of giving more weight to more precise results, Havránek and Sokolova (2020) summarize the limits of weighting by the precision: in economics, and contrary to medicine, the estimation of standard errors is an important feature of the model and if the study underestimates the standard error, weighting by precision can create a bias by itself. More generally, Lewis and Linzer (2005) show that, in estimated-dependent-variable models, the weighted-least-squares usually leads to inefficient estimates and underestimated standard errors, and that OLS with robust standard errors yields better results.

[20] Complementarily, the results for the Hedges's test are detailed in Appendix C, with similar conclusions.

-1.9% on average). Over the average event window [-1.7; +1.4], returns would lose a cumulated -1.59% after the publication of financial crimes. The estimated effect beyond bias is higher for linear estimators than for non-linear estimators (respectively -0.63% and -0.24%). This indicates that markets would be much less elastic to the publication of financial crimes than initially thought. Most of the reported *AARDs* is accounted for by the publication selection bias.

Table 4: Meta-Regression Analysis of Publication Selection Bias

Table 4 details the results of the publication selection bias, based on the FAT-PET test (Eq. (1)) for the full sample (all, column 1) and 4 sub-samples (the U.S. *versus* other jurisdictions, columns 2 and 3; accounting frauds *versus* other securities law violations, columns 4 and 5). The standard errors (SE) control for the publication bias (FAT) and the intercepts (PET) for the means beyond bias. As each study reports on average 4 estimates, the data dependence is corrected for by clustering standard errors by studies. Eq. (1) is estimated with three types of estimators: 1) unweighted estimations in panel A (OLS, study-level fixed effects, study-level between effects, hierarchical Bayes, as in Bjazik et al. (2020), and using the number of observations reported by study as an instrument variable, as in Havránek and Sokolova (2020); weighted OLS estimations in panel B (by the inverse of the number of estimates reported by study and by the precision, *i.e.* the inverse of the standard errors); and non-linear estimation in panel C. The first non-parametric method was developed by Ioannidis et al. (2017). It focusses only on estimates with adequate statistical power. Complementarily, Andrews and Kasy (2019) propose a non-linear method to correct for publication bias based on the observation that the observation that the conditional publication probability (depending on the results of the study) can be non-parametrically identified and corrected for in light of the jumps in *p*-value cut-offs. Finally, the stem-based bias correction method (Furukawa, 2019) uses the studies with highest precision, which are so-called "stem" of the funnel plot to estimate a bias-corrected average effect, under the assumption that precise studies suffer less from publication bias than imprecise studies. The model is optimized over a bias-variance trade-off (as the most precise studies suffer from high variance) and the results are generally more conservative, with wide confidence intervals. Because the stem-based method uses study-level estimates (as preferred by Furukawa), we follow Gechert et al. (2020) by select median values from each study.

	All [1]		**U.S.** [2]		**Other jurisdictions** [3]		**Accounting frauds** [4]		**Violations of securities laws** [5]	
Panel A. Unweighted estimations										
1. OLS										
SE (*publication bias*)	-1.576	***	-1.544	***	-1.228	***	-1.709	***	-1.357	***
	(0.199)		(0.224)		(0.382)		(0.195)		(0.292)	
Intercept (*effect beyond bias*)	-0.62%	***	-0.95%	***	-0.24%	*	-0.84%	***	-0.58%	***
	(0.001)		(0.002)		(0.001)		(0.003)		(0.001)	
2. Study-level fixed effects										
SE (*publication bias*)	-1.215	***	-1.274	***	-0.831	***	-1.584	***	-1.092	***
	(0.115)		(0.151)		(0.138)		(0.182)		(0.155)	
Intercept (*effect beyond bias*)	-0.92%	***	-1.23%	***	-0.40%	***	-0.99%	***	-0.74%	***
	(0.001)		(0.002)		(0.001)		(0.003)		(0.001)	
3. Study-level between effects										
SE (*publication bias*)	-1.842	***	-1.834	***	-1.424	***	-1.797	***	-1.619	***
	(0.135)		(0.170)		(0.151)		(0.172)		(0.246)	
Intercept (*effect beyond bias*)	-0.67%	***	-0.95%	***	-0.23%		-0.93%	**	-0.56%	**
	(0.002)		(0.003)		(0.002)		(0.004)		(0.003)	
4. Hierarchical Bayes										
SE (*publication bias*)	-1.549	***	-1.6964	*	-1.2251	*	-1.216	***	-1.5091	***
	(0.224)		(0.291)		(0.351)		(0.360)		(0.039)	
Intercept (*effect beyond bias*)	-0.69%	***	-0.96%	***	-0.27%	***	-1.50%	***	-0.58%	***
	(0.026)		(0.041)		(0.071)		(0.062)		(0.244)	

	All [1]	U.S. [2]	Other jurisdictions [3]	Accounting frauds [4]	Violations of securities laws [5]
5. IV number of observations reported by study					
SE (*publication bias*)	-1.751 ***	-1.76 ***	-1.406 ***	-1.912 ***	-2.027 ***
	(0.373)	(0.460)	(0.423)	(0.340)	(0.635)
Intercept (*effect beyond bias*)	-0.48% **	-0.73% **	-0.17%	-0.59% *	-0.17%
	(0.002)	(0.004)	(0.001)	(0.003)	(0.003)
Panel B. Weighted OLS estimations					
1. Weighted by the inverse of the number of estimates reported by studies					
SE (*publication bias*)	-1.703 ***	-1.704 ***	-1.289 ***	-1.87 ***	-1.511 ***
	(0.187)	(0.216)	(0.352)	(0.176)	(0.303)
Intercept (*effect beyond bias*)	-0.81% ***	-1.11% ***	-0.29% *	-1.25% ***	-0.12%
	(0.002)	(0.003)	(0.002)	(0.003)	(0.001)
2. Weighted by the precision (inverse of the standard error)					
SE (*publication bias*)	-2.074 ***	-2.002 ***	-1.651 ***	-2.146 ***	-1.973 ***
	(0.171)	(0.193)	(0.273)	(0.220)	(0.240)
Intercept (*effect beyond bias*)	-0.25% ***	-0.52% ***	-0.07%	-0.31% *	-0.24% ***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Panel C. Non-linear estimations					
1. Weighted average of adequately powered (Ioannidis et al., 2017)					
Effect beyond bias	-0.15% ***	-0.26% ***	-0.07% ***	-0.13% ***	-0.15% ***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)
2. Selection model (Andrews and Kasy, 2019)					
Effect beyond bias	-0.36% ***	-0.71% ***	-0.06% ***	-0.83% ***	-0.39% ***
	(0.080)	(0.087)	(0.009)	(2.942)	(0.064)
3. Stem-based bias correction method (Furukawa, 2019)					
Effect beyond bias	-0.22%	-0.51%	0.07%	-0.16%	-0.24%
	(0.08)	(0.006)	(0.004)	(0.011)	(0.003)
Number of observations[1]	**439**	**281**	**158**	**142**	**297**

Source: Authors' estimations.

*Notes: All standard errors (but the hierarchical Bayes) are clustered by studies and are in parenthesis. [1] The available number of observations is reduced for the weighted average of adequately powered and the stem-based methods. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level. Stars for the hierarchical Bayes are presented only as an indication of the parameter's statistical importance to keep visual consistency with the rest of the table.*

Digging more into specificities of sub-samples, the following two conclusions can be drawn. The observation that the U.S. financial market would be more responsible to the publication of financial crimes than other jurisdictions is confirmed across all estimators (by four folds), with an average contraction in *AARDs* of -0.79% *per* day, against -0.17% in other jurisdictions. On average, *AARDs* contract by -0.92% for linear estimators and -0.49% for non-linear estimators, against -0.24% and -0.02% for other jurisdictions. This difference may be accounted for by structural differences between common (typically the U.S.) and code law countries in terms of disclosure, liability standards, and public enforcement. La Porta et al. (2006) conclude that common laws are more favorable to stock market development, as they emphasize more on private contracting and standardized disclosure, and rely on private dispute resolution using market-friendly standards of liability. Complementarily, the market also

appears to differentiate between financial crimes, though to a lower extent. Returns would contract abnormally by -0.75% *per* day following the publication of accounting frauds and by -0.38% for violations of securities laws. This result is not supported by non-linear estimators, with minor differences between samples. Stronger reactions to (intentional) accounting frauds can be explained by the direct P&L impacts subsequent to accounting restatements.

All in all, the results support robust evidence of publication bias in this literature and of a genuine empirical evidence in the collected estimates: markets penalize listed firms for engaging in intentional financial crimes. However, some of the apparent correlations between the estimated abnormal returns following the publication of financial crimes and their standard errors can derail from heterogeneity in the data and/or in the event study methodology, which supports further investigation with an MRA.

4.2. The effect of the publication of financial crime on firms' returns

The MRA results of the estimation of Eq. (2) for the impact of the publication of financial crimes on firms' returns are presented in Table 5. As stressed by Askarov and Doucouliagos (2013), modeling heterogeneity across studies with an MRA estimation implies an arbitrage between comprehensiveness and degrees of freedom. Hence, for the sake of clarity, and as recommended by Askarov and Doucouliagos (2013), we adopt a parsimonious specification of the MRA, with key variables from Table A.1 in Appendix B. Additionally, we use a general-to-specific methodology, whereby MRA moderator variables that are neither statistically significant nor relevant to our hypothesis or colinear to other variables are sequentially removed from the model. We use clustered data at the study level, to adjust standard errors for data dependence resulting from using multiple estimates of abnormal returns *per* study (4 on average). To check the statistical robustness of coefficients, we follow Iwasaki and Kočenda (2017) and perform an MRA using the seven estimators presented in Table 5: the cluster-robust OLS estimator, which clusters the collected estimates by study and computes robust standard errors (column [1]); the cluster-robust WLS estimators, which use as an analytical weight either the quality level of the study (number of Google Scholar citations, column [2]), the sample size (column [3]), the precision (the inverse of the squared conservative standard error, column [4]), or the inverse of the number of estimates reported *per* study (column [5]); the cluster-robust unbalanced random effects panel estimator (column [6]); and the cluster-robust study-fixed effect estimator (column [7]), that explores within-study heterogeneity. We present and compare the results for the sake of assessing robustness.

Table 5: Meta-Regression Analysis

Table 5 details the estimates the MRA based on Eq. (2), for the three sets of variables complemented with control variables. All estimations are cluster-robust (Stanley and Doucouliagos, 2012), to account for the data dependence due to having on average 4 estimates *per* study in the sample. Additionally, every column uses a specific estimation method: Ordinary Least Squares for sample (column [1]), Weighted Least Squares (columns [2] to [5]), random effects panel with Generalized Least Squares (column [6]) and fixed effects panel with least squares dummy variable (column [7]). The analytical weights used for WLS are detailed into brackets for every column: the quality level of the article, with the number of Google citations (column [2]), the sample size for every study (column [3]), the precision of the estimates, with the inverse of the squared standard error (sample [4]), and the invert of the number of estimates *per* study (sample [5]).

Cluster robust estimator (analytical weight in brackets)	**OLS**	**WLS [quality level]**	**WLS [sample size]**	**WLS [1/SE²]**	**WLS [1/nb estimates *per* study]**	**Random effects panel GLS**	**Fixed effects panel LSDV**
	[1]	[2]	[3]	[4]	[5]	[6][a]	[7][b]
Constant	1.734***	1.207*	0.933	0.820**	0.916	1.424**	-0.088
	(2.78)	(1.67)	(0.92)	(2.50)	(1.53)	(2.31)	(-1.01)
Standard error	-1.368***	-1.747***	-1.429***	-2.473***	-1.449***	-1.348***	-1.111***
	(-8.36)	(-9.99)	(-8.61)	(-9.72)	(-8.83)	(-7.24)	(-3.43)
1. Data characteristics:							
Studies on the U.S.	-0.013**	-0.004	-0.015*	-0.005	-0.014**	-0.013**	0.006***
	(-2.59)	(-0.45)	(-1.67)	(-1.61)	(-2.35)	(-2.51)	(10.70)
Only accounting crimes	-0.007**	-0.009***	-0.003	-0.002	-0.008***	-0.006**	0.003
	(-2.35)	(-2.66)	(-0.60)	(-1.38)	(-2.63)	(-2.05)	(0.45)
Alleged crimes	-0.001***	-0.012***	-0.013***	-0.006***	-0.009***	-0.010***	-0.012***
	(-4.11)	(-3.03)	(-4.80)	(-4.05)	(-3.12)	(-4.06)	(-2.99)
Regulatory procedures	0.002	0.001	-0.004	0.000	0.000	0.001	0.001
	(0.61)	(0.14)	(-0.74)	(0.27)	(0.05)	(0.21)	(0.24)
Crimes revealed by newspaper articles	-0.001	-0.005	0.001	0.001	0.002	-0.001	-0.0172*
	(-0.23)	(-0.87)	(0.27)	(0.85)	(0.64)	(-0.41)	(-1.75)
Average year of the data in the sample[d]	-1.727***	-1.173	-0.947	-0.810**	-0.930	-1.422**	dropped
	(-2.77)	(-1.61)	(-0.92)	(-2.47)	(-1.56)	(-2.31)	
2. Estimation characteristics:							
Event window = event day	-0.016***	-0.023**	-0.011	-0.003**	-0.019***	-0.014***	-0.011**
	(-3.46)	(-2.35)	(-1.16)	(-2.38)	(-3.27)	(-3.30)	(-2.61)
Event window including the event day (but not limited to the event day)	-0.013***	-0.014**	-0.012***	-0.001*	-0.014***	-0.013***	-0.012***
	(-4.63)	(-2.32)	(-2.77)	(-1.81)	(-4.18)	(-4.80)	(-4.20)
Length of the event window of the estimate[d]	-0.001	-0.004	-0.002	-0.002**	0.001	-0.001	-0.001
	(-0.50)	(-0.87)	(-0.83)	(-2.52)	(0.20)	(-0.32)	(-0.40)
Event window before the event	0.003***	0.005***	0.002**	0.001**	0.002**	0.003***	0.003***
	(3.96)	(4.52)	(2.31)	(2.56)	(2.62)	(4.23)	(3.80)
Long-term estimates (event windows beyond -10 and +10 days)	0.003	-0.014***	0.007	0.002	0.003	0.002	dropped
	(0.90)	(-3.29)	(1.53)	(1.61)	(0.80)	(0.74)	
Sample size[d]	-0.001	-0.003**	-0.000	0.000	-0.001	-0.001	-0.003**
	(-1.42)	(-2.36)	(-0.10)	(-0.45)	(-0.74)	(-1.63)	(-2.20)
Market model used in the event study	-0.001	0.002	0.006	-0.004**	0.007	0.002	dropped
	(-0.18)	(0.49)	(1.09)	(-2.54)	(1.15)	(0.43)	
Cross-sectional regression	-0.005*	0.000	0.000	-0.001	-0.001	-0.004	0.001
	(-1.82)	(-0.08)	(-0.05)	(-0.92)	(-0.22)	(-1.34)	(0.12)
Reputational penalty estimation	0.002	0.004	-0.002	0.000	0.001	0.003	dropped
	(1.02)	(0.75)	(-0.45)	(0.31)	(0.39)	(1.18)	
3. Publication characteristics:							
Number of citations in Google Scholar[d]	-0.001***	-	-0.002*	-0.001***	-0.0002	-0.001***	0.092
	(-2.97)	-	(-1.78)	(-4.34)	(-0.66)	(-2.78)	(1.10)
Publication in a Scopus journal	0.001	0.003	0.002	0.001	-0.002	0.000	dropped
	(0.43)	(0.51)	(0.71)	(1.05)	(-0.58)	(0.15)	
Publication in a cross-disciplinary journal	0.001	-0.016	0.011	-0.004**	0.013	0.004	dropped
	(0.18)	(-1.42)	(0.78)	(-2.33)	(1.52)	(0.69)	

Cluster robust estimator (analytical weight in brackets)	OLS	WLS [quality level]	WLS [sample size]	WLS [1/SE²]	WLS [1/nb estimates *per* study]	Random effects panel GLS	Fixed effects panel LSDV
	[1]	[2]	[3]	[4]	[5]	[6][a]	[7][b]
4. Control variables:							
Wealth level (log GDP *per capita*)	-0.0001	0.0007	-0.0004	-0.0004	0.0002	-0.0003	0.0003
	(-0.24)	(0.60)	(-0.87)	(-0.73)	(0.51)	(-1.04)	(0.45)
Market liquidity[d]	0.012**	-0.003	0.0140*	0.003	0.0119**	0.0116**	dropped
	(2.58)	(-0.34)	(1.68)	(1.13)	(2.33)	(2.50)	
Rule of law	0.001	-0.002	0.004	0.001	0.002	0.001	dropped
	(0.54)	(-0.78)	(1.21)	(0.75)	(0.96)	(0.88)	
Adjusted R2	0.615	0.827	0.613	0.396	0.640	-	0.351
Number of observations	439	405	439	439	439	439	439

Source: Authors' estimations. See Table A.1 in appendix B for definitions and descriptive statistics of the meta-independent variables.

Notes:

*Figures in parentheses beneath the regression coefficients are t-statistics using cluster-robust standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Multicollinearity is controlled for with variance inflation factors.*

[a] *Breusch-Pagan test: $\chi 2 = 4.33$, $p = 0.0188$.*

[b] *Hausman test: $\chi 2 = 29.32$, $p = 0.0095$.*

[c] *The limited scope is due to the exclusion of working papers.*

[d] *Normalized variables.*

The MRA models capture the heterogeneity in the reported estimates reasonably well. They explain, on average, 57% of the variation in the dependent variable, the reported estimated *AARDs* (see the adjusted R^2 in Table 5). The meta-regression estimates are, in general, consistent across estimators. The MRA estimators detailed in Table 5 support the initial hypothesis: several variables explain the heterogeneity of the reported estimates of *AARDs* following the publication of intentional financial crimes. The appropriateness of the fixed-effect unbalanced panel estimator for MRA remains unclear.[21] As shown in the table, the coefficients are sensitive to the choice of the estimator. Hence, as in Iwasaki and Kočenda (2017), we will interpret the regression results under the assumption that the meta-independent variables that are statistically significant and have the same sign in at least four of seven models constitute statistically robust estimation results.

The constant has a positive sign for all models but one, and is statistically significant for four models. Hence, *ceteris paribus*, the constant is not conclusive regarding the impact on returns of the publication of financial crimes. The standard error variable is negative and highly statistically significant across all models, confirming the publication selection bias in the literature on financial crimes towards negative market reactions.

Complementarily, Table 5 demonstrates that several variables are important in explaining the heterogeneity of the reported estimates. Regarding the characteristics of the data,

[21] Stanley and Doucouliagos (2012) argue that random effects can be quite problematic in MRA, especially if there is publication bias. The Hausman test rejects the null hypothesis that the preferred model is random effects MRA; $\chi 2$ is 30.0 with a p-value of 0.0119.

three features must be stressed. Firstly, as stressed in the previous sections, investigating the U.S. leads to statistically significantly to more negative *AARDs*, *ceteris paribus*. Hence, being a common law country with more transparent enforcement procedures would contribute (negatively) to market reactions and to more reactive markets.[22] Secondly, pure accounting crimes (*versus* violations of securities laws) also trigger more negative abnormal market reactions. Markets would discriminate depending on the nature of the committed crimes, with significantly more negative *AARDs* for pure accounting frauds, if other research conditions were held constant. This may be accounted for by the fact that such misconducts are more easily understood by investors than price manipulations, insider trading, or breaches to regulatory obligations, and are frequently followed by direct P&L consequences from accounting restatements. Thirdly, the very first hint of financial misconduct leads to the stronger market reaction, which reflects an estimation of future sanctions. Depending on the datasets, alleged crimes encompass a wide range of situations from newspaper articles mentioning possible frauds to the announcement about early stages of regulatory enforcement or lawsuit/class action filings. In fact, the variable "alleged crime", compared to sanctioned crimes (*i.e.* verdicts), has an across-the-board negative and statistically significant coefficient. This result confirms the conclusions of past literature in that, when learning about an alleged crime, the market anticipates the subsequent cost, as in Feroz et al. (1991) and Pritchard and Ferris (2001).

Regarding less (or in-) significant characteristics of the data, the following takeaways can be considered. Surprisingly, the fact that a breach is subject to a regulatory enforcement procedure – which can point to more serious crimes, as regulators' limited means force them to focus on the worst alleged misdeeds – does not significantly influence market reactions. Contrary to the literature (Fang and Peress, 2009 and 2014; Peress, 2014), the channel through which the financial crime is revealed (newspaper articles *versus* corporate or regulatory communications) does not either account for the heterogeneity in *AARDs*. Finally, more recent financial crimes tend to impact more negatively *AARDs*, given their negative and (to some extent) significant correlation with the average year of the sampled data. The period under review is strongly positively correlated with the publication year. This invalidates the graphical historical retrospective of *AARDs* (see Figure 7), which exhibits a positive slop with time.

The estimation characteristics call for the following comments. Including the event in the event window, and in particular estimating abnormal market reactions on the day when a

[22] As a robustness check, the regressions were rerun with the variable "common law" giving extremely similar results, as the U.S. stand for 92% of the estimates for common law countries.

financial crime becomes public, is negatively and strongly significantly correlated with the size of $AARDs$. This is also confirmed by the fact that using longer event windows, before and after the event, significantly lowers the estimated $AARDs$ (*i.e.* positive coefficient). This supports the fact that markets react rapidly around a crime's publication, in line with the semi-strong efficient market hypothesis (Fama, 1970). *Ergo*, the further from the event, the lower the average cumulated impact *per* day. This is echoed by the fact that including longer event windows, beyond the [-10;+10] days, hardly influences the results. The variable controlling for event windows strictly preceding the event is negative but statistically significant only for one estimator (when the least squares are weighted by the squared precision), contrary to the anticipation by markets observed in the literature. Similarly, larger sample sizes or following the literature methodological standards – by using a market model and complementing the event study with cross-sectional regressions and reputational cost estimation – do not impact the results.

Regarding the publication characteristics, the most significant stylized fact is that more negative $AARDs$ attract more attention in literature, with the number of Google citations being negatively and statistically significantly correlated with $AARDs$. Conversely, other publication quality indicators (in particular publishing in a Scopus journal or in a cross-disciplinary journal) are not conclusive include. Contrary to the suggestion from Geyer-Klingeberg et al. (2020) that our dataset could suffer from possible between-author or between-dataset correlations, two dummy variables (research undergone by co-authors and multiple authorships within the sample) turned out insignificant and were hence excluded.

As a robustness check, we added 12 additional studies to the original sample. These studies were initially excluded from the scope despite investigating the consequences of intentional financial crimes using an event study methodology, because they either published statistical significance between samples (4 articles), or did not include any information regarding the statistical significance of the results (8 articles). We made the strong hypothesis that all commented estimates of these studies were significant at the 10% level (granting a t-statistic of 1.645 across the board to estimated $(C)AARs$). Consequently, this compounded sample covers 123 studies, with 460 $(C)AARs$ estimated from 34,550 intentional financial crimes. The sample extension did not alter our findings as all conclusions were confirmed with this larger sample.[23]

All in all, we find robust evidence of publication bias in the literature. Still, the

[23] Detailed results are not reported for the sake of brevity but are available on request.

differences between geographies where financial crimes are committed and between financial crimes are all but erased when controlling for this publication bias. The apparent correlations between estimated abnormal returns and their standard errors can be due to heterogeneity in the data or in the method, supporting the MRA analysis of the sources of heterogeneity in Table 3.

4.3.Meta-average effects: the overall reaction of stock markets to the publication of intentional financial crimes

We use the MRA coefficients tabulated in Table 5 to calculate the meta-average effect of financial crimes on stock prices (*AARDs*), as in Askarov and Doucouliagos (2013) and in Hubler et al. (2019). In fact, the meta-average constitutes the best practice estimator of the echo of intentional financial crimes on returns, as provided by the exiting literature. To do so, we assume, as Askarov and Doucouliagos (2013) and Hubler et al. (2019), that: 1) the MRA variables actually quantify the effect of misspecification bias, and 2) some MRA variables should enter into the MRA prediction, in the absence of theory on the financial crimes. Stanley and Doucouliagos (2012) recommend focusing on the results which are consistent across the multiple estimators, along with the sample FAT-PET MRAs. Hence, in line with our hypothesis, we included the most statistically and economically significant MRA coefficients to predict abnormal market reactions corrected for publication bias.

Consequently, we assume that a well specified model explaining market reactions to financial crimes should be a linear combination of the following MRA coefficients: whether the country(ies) under review is the U.S., the type of crime (accounting or securities regulations), the allegation (or condemnation of crime), the average year of the sampled data, whether the event window of the estimate is limited to the event, includes the event, or precedes the event, the length of the event window, if the event window include long-term estimates, whether a market model was used, the sample size, the echo of the article received by peers (Google citations), whether the article was published in a cross-disciplinary journal, and market liquidity of the concerned market. Then, meta-averages are constructed as a linear combination of the MRA coefficients for the four cluster-robust WLS estimators, which are the most robust estimators according to Stanley and Doucouliagos (2012). We also derive statistical significance and 95% confidence intervals. The results are reported Table 6.

The publication of intentional financial crimes corrected for the publication bias would impact abnormally negative returns for incriminated firms. Our best average estimate of daily abnormal returns, corrected from the negative publication bias, is -1.15%, with an average 95%

confidence interval of -1.81% to -0.09%. Over the average event window investigated in our sample ([-1.7;+1.4] around the event), the $AARD$ implies a $CAAR$ loss of -3.5%.

Table 6: Meta-Average Effects of Financial Crime by Sub-Samples

Table 6 details the meta-average effects of the publication of financial crimes on stock prices, as suggested by Askarov and Doucouliagos (2013), corrected for the publication bias. We assume that the MRA variables from Table 5 quantify the effect of the publication bias. Five samples are compared: the full sample, the U.S. or the rest of the world, and accounting frauds or violations to securities laws. The meta-averages are constructed using a linear combination of the MRA coefficients. The first four columns use the most statistically and economically significant MRA coefficients to assess the meta-average effect, from cluster-robust Weighted Least Squares from Table 5 (estimators [2] to [5]), as recommended by Stanley and Doucouliagos (2012). The fifth column is the average of the estimated effects across the four estimators. The last two columns are the average 95% confidence intervals using cluster-adjusted standard errors.
The following variables were chosen based on their statistical and economic significance: country (U.S. *versus* other jurisdictions), the type of crime (accounting or violations to securities laws), the allegation (or condemnation of crime), the average year of the sampled data, the use of market models, the size of the sample of crimes, the length of the event window, whether the event is included in the event window, whether the article included longer-term $(C)AARs$, whether $(C)AARs$ were estimated before the event, whether the study included cross-sectional regressions, echo received by peers (Google Scholar citations), the publication in a cross-disciplinary journal, and market liquidity of the concerned market.

	Cluster-robust WLS [quality level] [2]	**Cluster-robust WLS [sample size]** [3]	**Cluster-robust WLS [1/SE²]** [4]	**Cluster-robust WLS [1/nb estimates *per* study]** [5]	**Averages** [2 - 5]	***Average 95% confidence intervals*** [2 - 5]	
Full sample	-1.14%*	-1.28%**	-1.04%**	-1.14%***	-1.15%	*-1.81%*	*-0.09%*
	(-1.92)	*(-2.32)*	*(-2.09)*	*(-2.41)*			
Financial crimes committed in the U.S.	-1.26%*	-1.80%**	-1.52%**	-1.26%***	-1.46%	*-2.43%*	*-0.13%*
	(-1.76)	*(-2.30)*	*(-2.15)*	*(-2.69)*			
Financial crimes committed in other jurisdictions	-0.91%	-0.35%	-0.17%	-0.91%	-0.58%	*-1.23%*	*0.51%*
	(-1.34)	*(-0.71)*	*(-0.07)*	*(-0.42)*			
Accounting frauds only	-1.78%***	-1.48%***	-1.60%***	-1.78%***	-1.66%	*-2.31%*	*-0.37%*
	(-2.50)	*(-2.66)*	*(-2.64)*	*(-3.16)*			
Violations to securities laws	-0.83%	-1.18%*	-0.77%	-0.83%*	-0.90%	*-1.65%*	*0.12%*
	(-1.47)	*(-1.90)*	*(-1.56)*	*(-1.79)*			

*Source: Authors' estimations. Figures in parentheses beneath the regression coefficients are t-statistics using cluster-robust standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

Complementarily, Table 6 stresses that this correction in returns is driven by two factors: being a U.S. listed firm and committing an accounting fraud. If the latter leads – to some extent – to a stronger contraction in returns, it is interesting to note that the difference in market reactions is much higher between the U.S. and the rest of the world (-1.46% against -0.58%) than between accounting frauds and violations to securities laws (-1.66% and -0.90%). Such results are higher than the MRA estimates from Table 4 but much lower than the naïve mean

obtained by averaging the reported estimates of *AARDs* (-1.9% for the simple average and -2.5% for the weighted average, see Table 3), as they are corrected for the negative publication bias.

4.4.Comments

The funnel plots are in accord with the FAT and the MRA analyses, in that a highly significant negative publication bias exists for the market reactions to the publication of intentional financial crimes. Still, corrected for the publication bias, we find that the true effect of financial crimes on returns remains negative (-0.52% on average, ranging from -0.24% for non-linear estimations to -0.63% for linear estimations), though being much lower than the averaged estimates (-1.9 to -2.51%, see Table 3). Cumulated over the average event window of these estimates [-1.7;+1.4], returns contract abnormally by -1.59% after the publication of financial crimes. Crimes committed in the U.S. and accounting frauds – to a lesser extent – concur along the different estimations with triggering stronger market reactions.

We complemented our analysis with an estimation of meta-average effects. Markets negatively interpret the information of intentional financial crimes, leading to a -1.15% abnormal contraction in returns *per* day of the event window (or a cumulated -3.5% contraction over the average event window). Reactions are stronger for accounting crimes, and for crimes committed in the U.S. Digging into the parameters accounting for the heterogeneity in estimated abnormal returns, our results confirm the conclusions of Feroz et al. (1991) and of Pritchard and Ferris (2001): the very first hint of financial crimes (*i.e.* the allegation of financial crimes) triggers the most important and significant abnormal market reaction. This echoes the difference between "not guilty" and "innocent" for the markets stressed by Solomon and Soltes (2019). They stated that being associated to a potential crime will be sanctioned by the market, even when no charges are ultimately brought after an alleged intentional financial fraud.

Further developments and improvements in this study area are desirable to better understand and capture the true effect of financial crimes on returns of listed firms. Firstly, in the short term, the results will be possibly complemented with an enriched dataset including more qualitative control variables for countries' heterogeneity due to the legal environment and the perception to crimes, such as the trust between citizens and the confidence in governments (possibly from the World Value Survey)[24]. Complementarily, the MRA results will be enriched with multivariate meta-regression analysis to construct an implied estimate, corrected for the

[24] http://www.worldvaluessurvey.org/wvs.jsp

publication bias and potential misspecifications in the literature by employing Bayesian Model Averaging (BMA). In the absence of theoretical model accounting for market reactions to financial crimes, the BMA will challenge the hypothesis made in the MRA regarding the factors accounting for heterogeneity with an exhaustive approach. Thirdly, the robustness of the conclusions would gain from being less biased by U.S. studies (standing for 64% of the estimates). In that sense, it is worth stressing the two flowing recent trends. Research on Chinese financial crimes has been very dynamic over the last few years. Additionally, the European Securities and Markets Authority (ESMA), the European's securities markets regulator, created in 2019 a repository of published sanctions and measures imposed under MiFID II,[25] by National Competent Authorities across Europe. Still, it will take significant resources to build, clean, and exploit this subsequent dataset. Fourthly, some complementary research could enrich the understanding of some specific crimes, for example the specificities of committing accounting frauds, insider trading, or price manipulation. Still, given the limited scopes under review, this would imply comparing results from different methodologies, and not only event studies. A major limitation will be the scope and the granularity of the data publicly available. Additionally, for international comparisons, domestic specificities beyond the mere macro-financial specificities (which can be controlled for) curb the relevance of the results, for example with non-synchronized regulatory changes, specificities of enforcement procedures, a different weight given to public and private enforcement, etc. This stresses the interest of European comparison.

The takeaways of this meta-analysis for policy recommendations depend on the agenda of enforcers and regulators. The latter may intend that market participants fear being associated with alleged (and worse condemned) financial crimes or choose a lighter touch, possibly with anonymized decisions being synonymous to jurisprudence (to set example) or with confidential bilateral procedures. If enforcers intend markets to complement their actions with reputational sanctions, our results point transparency as an efficient regulatory tool. Significant negative abnormal returns follow the publication of alleged crimes committed in the U.S. and more generally in common law countries. Conversely, regulatory procedures and condemned crimes do not trigger significant abnormal reactions. Enforcers could (for example) communicate along enforcement procedures and substitute sanctions with "name and shame" strategies, at a lower cost. That way, market participants could better price financial crimes, should the enforcers' objective be that markets account for their work in terms of market supervision, and

[25] https://www.esma.europa.eu/policy-rules/mifid-ii-and-mifir

detection and sanction of financial misconducts. Conversely, if regulators reckon that the regulatory sanction is sufficient (and that markets do not have to double-sentence wrongdoers), anonymization could protect listed firms, and the decisions would still stand for an educational tool.

5. Conclusion

In this paper, we use a total of 439 estimates of abnormal returns following the publication of an intentional financial crime committed by listed firms, extracted from 111 research studies. Under the semi-strong efficient market hypothesis (Fama, 1970), all publicly-available information (here the publication a financial crime) is reflected completely and in an unbiased manner in the stock price, such that it is not possible to earn economic profits on the basis of this information. We perform a meta-analysis to examine the relationship between these abnormal returns and the features of the sample of misconducts under review, of the estimations, and of the publication.

The results of the meta-analysis reveal a strongly negative publication selection bias in this literature, which is in line with the *a priori* hypothesis of efficient markets and rational investors: markets should react negatively to the publication of financial crimes. After correcting for this publication selection bias, markets on average still react negatively, with a significant -1.15% contraction in abnormal returns *per* day and a cumulated loss of -3.5% over the short-term average event window investigated. This confirms the existence of an informational effect of the publication of financial crimes.

This meta-analysis supports the efficient market hypothesis. An intentional financial crime is bad news regarding the firm, and it potentially leads to substantial costs for listed firms, a feature that justifies a negative market reaction. Additionally, several aspects contribute to materialization of the negative market reactions. The U.S., as common law countries in general, appears to be a more reactive market to news of misdeeds, with stronger negative market reactions to the news of (possibly alleged) financial crimes. Further, though to a lesser extent, markets tend to react more to accounting frauds than to general violations to securities laws. The very first hint of a misconduct typically triggers that strongest correction. Conversely, regulatory enforcement procedures do not significantly impact market reactions.

In terms of policy recommendations, our findings stress how regulatory transparency *vis-à-vis* the market is a powerful enforcement tool, should the enforcers' objective be that markets account for their actions in terms of market supervision, and of detection and sanction

of financial crimes. For example, regulators could improve their communication about enforcement procedures for their actions to be better priced by market participants.

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Appendix A: Event Study Methodology

The event studies have been long used to challenge the information content of a wide range of corporate news, called "events" (for example Dolley (1933), MacKinlay (1997), and Kothari and Warner (2008)).[26] The goal is to quantify an "abnormal" market reaction following the event, by deduction estimated "normal" market parameters from "actual" observed market parameters. A wide range of impact measure variables were used: returns (the most frequent, on which this work focuses), bid-ask spread, volatility, turnover, clients, cost of financing (interest rates) and financing mix (debt versus equity), top management turnover, analysts forecasts, etc.

The impact of each event is measured as the abnormal returns. For every "event", the abnormality of daily returns is being tested over an event window, by comparing "actual" *ex-post* returns with "normal" returns. The latter are the expected returns without conditioning on the event occurring, estimated over an estimation window preceding the event window. The abnormal returns consecutive to a given step of the procedure are taken as unbiased estimates of the total financial consequences of the event.

The finance literature has considered several models of expected returns describes the behavior of returns, to sort out, to the maximum possible extent, changes in returns caused by the "event" itself, from those caused by any other unrelated movement in prices. The event is assumed exogenous with respect to the firm. They can be classified between statistical or economic models:

A. Statistical models:

- Constant-mean-return model: $R_{i,t} = \mu_i + \varepsilon_{i,t}$, where $R_{i,t}$ is the returns in t for the stock i, μ_i is the mean return of stock i, and $\varepsilon_{i,t}$ is the disturbance term.
- Market model (or single factor market model): $R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}$, with $E(\varepsilon_{i,t}) = 0$ and $Var(\varepsilon_{i,t}) = \sigma_\varepsilon^2$, where $R_{i,t}$ and $R_{m,t}$ are the returns in t respectively on the stock i, and on the market portfolio. $\varepsilon_{i,t}$ is the zero-mean disturbance term. α_i, β_i, and σ_ε^2 are the firm-specific parameters of the model.
- Factor models: adding other factors than the market trend, for example a sector index (Sharpe, 1970).
- Market-adjusted-return model: restricted market model with $\alpha_i = 0$ and $\beta_i = 1$, when no data is available before the event for example.

B. Economic models:

- Capital Asset Pricing Model (CAPM): $R_{i,t} = R_f + \beta_i(R_{m,t} - R_f) + \varepsilon_{i,t}$, with $E(\varepsilon_{i,t}) = 0$ and $Var(\varepsilon_{i,t}) = \sigma_\varepsilon^2$, where R_f is the risk-free rate, $R_{i,t}$ and $R_{m,t}$ are the returns in t respectively on the stock i, and on the market portfolio. $\varepsilon_{i,t}$ is the zero-mean disturbance term. β_i, is the beta or systemic risk of stock i.
- Arbitrage Pricing Theory (Fama-French): $R_{i,t} = \delta_0 + \delta_{i,1}F_{1,t} + \delta_{i,2}F_{2,t} + \cdots + \delta_{i,n}F_{n,t} + \varepsilon_{i,t}$, where $F_{i,t}$, $i \in [\![1; n]\!]$, are the n factors that generate returns and $\delta_{i,y}, y \in [\![1; n]\!]$ are the factor loadings.

In the sample of this meta-analysis, by far the most frequently is the market model. It assumes a stable linear relation between the security return and the market return. It also hypotheses a jointly multivariate normal and temporally independent distribution of returns.

For a firm i, over the period τ, the abnormal returns are:

$$AR_{i,\tau} = R_{i,\tau} - E(R_{i,\tau}/X_\tau) \qquad (I)$$

$AR_{i,\tau}$, $R_{i,\tau}$, and $E(R_{i,\tau}/X_\tau)$ respectively capture abnormal, actual, and normal returns on the security i over τ, given the conditioning information X_τ for the normal performance model. Equity returns are defined as the daily log difference in value of the equity.

For every security i of sector s, the market model is in t:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}, \text{ with } E(\varepsilon_{i,t}) = 0 \text{ and } Var(\varepsilon_{i,t}) = \sigma_\varepsilon^2 \qquad (II)$$

$R_{i,t}$ and $R_{m,t}$ are the returns in t respectively on the stock i, and on the market portfolio. $\varepsilon_{i,t}$ is the zero-mean disturbance term. α_i, β_i, and σ_ε^2 are the parameters of the model.

Under general conditions, abnormal returns parameters ($\widehat{\alpha_i}$ and $\widehat{\beta_i}$) are estimated for every event using the selected model over an estimation window preceding the event with Ordinary Least Squares, as recommended

[26] Event studies have been used for decades to assess market reactions to corporate misconducts ranging from product unsafety and product recalls (air crashes, drug recalls, product automobile recalls, other product recalls, etc.) to any kind of corporate malfeasance (bribery, criminal fraud, tax evasion, illegal political contributions, criminal antitrust violations and price fixing, employee discrimination, environment accidents, environment and wildlife offenses, business ethics, breach of contracts, misleading advertising, etc.) and financial misconducts (insider trading, accounting frauds, option backdating, etc.).

by MacKinlay (1997). On every day *t* of the event window, the deviation in an individual stock's daily return (typically including reinvested dividends) from what is expected based on Eq. (II) (*i.e.* the prediction error or "abnormal" returns) is taken as an unbiased estimate of the financial effects of the "event" on the stock *i* in *t:*

$$AR_{i,t} = R_{i,t} - \widehat{\alpha_i} - \widehat{\beta_i}\, R_{m,t} \qquad (III)$$

$R_{i,t}$ is the actual returns on the security *i* in *t*, and $AR_{i,t}$ is the estimated abnormal returns for the firm *i* in *t*. $\widehat{\alpha_i}$, and $\widehat{\beta_i}$ are the estimates of α_i and β_i, from Eq. (II) over the estimation window. Abnormal returns over the event window capture the impact of the event on the value of the firm, under the assumption that the event is exogenous with respect to the given security. Abnormal returns are calculated over an event window, including the event day ($t = 0$).

The market-adjusted model merely assumes the following: $AR_{i,t} = R_{i,t} - R_{m,t}$.

The event window can start before the event to investigate for potential anticipation by the market (following leaks of information over the days preceding the event for example). Its length can challenge the persistence over time of the price effect. Under the null hypothesis H_0, the "event" has no impact on the distribution of returns (mean or variance effect). Individual parametric t-statistics are calculated for each firm's abnormal return, and for every event day.

Abnormal returns must be aggregated to draw overall inferences for the event of interest, through time and across individual firms. In fact, on a case-by-case basis, the statistical significance is difficult to detect because of the volatility in firms' stock returns. Hence, abnormal returns are then cumulated over time ($CAR_{i,[t_1;t_2]}$) and averaged across the n victims to get the Cumulative Average Abnormal Returns ($\mathrm{CAAR}_{[t_1;t_2]}$) over the period $[t_1; t_2]$, including the event (Eq. (IV)). All events are treated as a group, for which p-value on the constant of the regression for every period gives the significance of the CAR across all sanctions, with robust standard errors.

$$CAAR_{[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n} CAR_{i,[t_1;t_2]} = \frac{1}{n}\sum_{i=1}^{n}\sum_{t=t_1}^{t_2} AR_{i,t}\ . \qquad (IV)$$

Appendix B. Variable Definitions and Descriptive Statistics

Table A.1: Variable Definitions and Descriptive Statistics

Table A.1 describes most of the variables for the full sample of financial crimes. Simple means are compared with weighted means, using the inverse of the number of estimates *per* study. are calculated for the sample of articles. In fact, on average, 4 estimates are reported by study. Some categories are non-mutually exclusive.

Variables	Description	Mean	Std dev.	Weighted mean
Effect: AAR *per* day (AARD)	Average abnormal returns *per* day (of the event window), equal to the reported average abnormal returns (for one-day event windows) or to the reported cumulative average abnormal returns, estimated using a daily event study methodology, divided by the number of days in the event window.	-1.90%	2.82%	-2.51%
Standard Error	The reported standard error of the estimated abnormal returns, or estimated with the statistical significance measures.	0.81%	1.29%	1.00%
1. Data characteristics (by studies)				
Geographical scope:	1 if only one country in the scope.	0.95	0.23	0.97
	1 if the estimate's sample is the U.S. (most frequent country in the sample).	0.64	0.48	0.71
	1 if the estimate's sample is Asia (China being the 2nd most frequent country in the sample).	0.24	0.43	0.19
	1 if the estimate's sample is Europe.	0.11	0.32	0.09
	1 if the legal origin of the commercial law of a country is English common law, and zero otherwise, echoing the geographic distribution of the sample, as in Djankov et al. (2008). Commercial laws of most countries originate in one of five legal families: English (common) law, French civil law, German civil law, Scandinavian law and socialist laws, which spread worldwide along history (colonization, wars, voluntary transplantations, etc.). Consequently, countries diverge in terms of disclosure, liability standards, and public enforcement. La Porta et al. (2006) conclude that common law is more favorable to stock market development, as it emphasizes more on private contracting and standardized disclosure and relies on private dispute resolution using market-friendly standards of liability. As in Leuz et al. (2003), and Liang and Renneboog (2016), we assume that the type of commercial laws (common or code) is predetermined and exogenous to our analysis as the legal frameworks were set centuries ago via complex interactions (wars, occupations, colonization amidst others).	0.69	0.46	0.76
Period under review:	Beginning of period under review.	1995	9.85	1994
	End of period under review.	2005	7.91	2004
	Length of the period under review.	11.20	6.15	10.77
	Average year of the period under review.	2000	8.36	1999
Events types:				
Types of regulatory breaches:	1 if the scope of crimes is limited to accounting frauds.	0.32	0.47	0.47
	1 if the scope of crimes is limited to pure violations of securities laws.	0.41	0.49	0.35
	1 if the scope of crimes covers all violations of securities laws (incl. accounting frauds).	0.27	0.44	0.24
Source of the news/origin of the data under review:	1 if the crimes were revealed *via* press articles (WSJ in particular in the U.S.).	0.40	0.49	0.49
	1 if the crimes were revealed *via* regulatory communication.	0.69	0.46	0.67
	1 if the crimes were revealed *via* corporate communication.	0.27	0.44	0.30
Steps of enforcement procedure:	1 if the fraud is alleged (not condemned).[1]	0.61	0.49	0.58
	1 if the crimes were being investigated.	0.11	0.31	0.08
	1 if the crimes went through settlement.	0.04	0.19	0.03
	1 if the crimes led to an accounting restatement.	0.14	0.35	0.23
	1 if the crimes were condemned by an authority/court (verdict of regulatory procedures, verdict of lawsuits or class-actions, accounting restatement).[1]	0.41	0.49	0.45
Types of enforcement procedure:	1 if the crimes led to a regulatory procedure.	0.52	0.50	0.53
	1 if the crimes led to a stock exchange procedure.[2]	0.09	0.29	0.08
	1 if the crimes led to a class-action.[2]	0.25	0.43	0.22
	1 if the crimes led to a private lawsuit.[2]	0.10	0.31	0.10
2. Estimation characteristics (by studies if not specified)				
Model:	1 if market model used to estimate abnormal returns (not Fama-French models, CAPM or market-adjusted model).	0.80	0.40	0.84
	Final number of events in the sample (in particular excluding confounding events and events with data problems).	276	388	261
Estimation window:	Beginning of the estimation window (in days, relative to the event in t = 0).	-154	133	-153
	End of the estimation window (in days, relative to the event in t = 0).	-20	31	-21

Variables	Description	Mean	Std dev.	Weighted mean
Event window:	Beginning of the event window (in days, relative to the event in t = 0).	-15	36	-17
	End of the estimation window (in days, relative to the event in t = 0).	18	41	19
	Length of the event window (in days).	33.05	62.49	36.37
	1 if event windows beyond [-10;+10].	0.28	0.45	0.27
Estimates:	Estimated (worst case scenario) t-statistics, invert of the absolute value: t-stat when available; when the *t*s were not published, they were obtained as follow (Frooman, 1997): 1) the statistical significance levels were converted into conservative levels of significance; 2) the *z*s were directly changed into ts on the assumption that as sample size increases, the student's *t* distribution approaches the normal distribution (Marascuilo and Serlin, 1988); and 3) the p values were converted into *t*s by using a t table and the appropriate degrees of freedom. Finally, three studies Desai et al. (2006), Nelson et al. (2009), and Goldman et al. (2012)), standing for 7 estimates, stated that the abnormal returns are significant but without including t-statistics nor the statistical significance. We made the conservative hypothesis that the statistical significance level was 10% for each.	-3.30	4.83	-3.45
	1 if abnormal returns are significant.	0.75	0.43	0.82
	Number of estimates reported *per* study, to avoid unintentional weighting of articles reporting multiple estimates as recommended by Havránek and Irsova (2017). We used the raw number of estimates, as most of the articles in the sample did not include the estimate's variances.	276	388	261
	Beginning of the event window of the estimate (in days, relative to the event in t = 0).	-1.7	2.9	-1.3
	End of the estimation window of the estimate (in days, relative to the event in t = 0).	1.4	2.7	1.3
	Length of the event window of the estimate (in days).	4.1	4.4	3.6
	1 if the event window is strictly before the event date (t = 0).	0.14	0.35	0.11
	1 if the event window is limited to the event date (t = 0).	0.19	0.39	0.18
	1 if the event window is around the event date (t = 0).	0.62	0.49	0.67
	1 if the event window is strictly after the event date (t = 0).	0.06	0.23	0.04
Complementary results:	1 if additional estimates of reputational penalties.	0.13	0.34	0.12
	1 if complementary cross-sectional regression for the determinants of the stock market reaction to the event (*i.e.* between the estimated abnormal returns and the characteristics specific to the event, sample, etc.)	0.61	0.49	0.66
-				
3. <u>Publication characteristics (by studies)</u>				
Characteristics of the article:	Number of authors of the paper.	2.33	0.86	2.37
	1 if multiple authorships in the sample.	0.31	0.46	0.33
	Year of publication.	2009	7.60	2009.12
	Month of publication (1 to 12).	5.60	3.92	5.59
	1 if published in a cross-disciplinary journal. As stated in Amiram et al. (2018), studies on financial misconduct belongs to three perspectives: law, accounting, or finance. By declining order of importance: finance, accounting, business, and law.	0.91	0.28	0.87
	1 if published in a refereed journal or chapter in a book. We expect published studies to exhibit higher quality on average and to contain fewer typos and mistakes in reporting their results. Still, the inclusion of unpublished papers is unlikely to alleviate publication bias (Rusnak et al., 2013): researchers write their papers with the intention to publish. Otherwise, the article is a working paper.	0.80	0.40	0.81
Quality of the publication:	1 if published in a Scopus journal.	0.62	0.49	0.67
	Scopus Cite Score in 2018.	1.64	1.90	1.64
	Scopus Cite Score of the year of publication (2011 to 2018, otherwise 2011).	1.12	1.35	1.17
	Repec Discounted impact factor.	0.43	1.15	0.39
	Number of citations in Google Scholar (as number).	143	365	180
-				
4. <u>Control variables (on the average year of the period under review)</u>				
Economic development index:	Log of nominal current USD GDP (source: World Bank, data available from 1960 to 2018), as in Jackson and Roe (2009).	8.47	0.99	8.55
	Log of GNI *per* capita in USD (source: World Bank, data available from 1960 to 2018), as in Hubler et al. (2019) and as in Jackson and Roe (2009).	9.74	1.19	9.90
	Log of GDP *per* capita (source: World Bank, data available from 1960 to 2018), as in Djankov et al. (2008).	2.76	1.59	2.95
Financial market indicators:	Domestic market capitalization, as % of GDP (source: World Bank, data available from 1975 to 2018), as in Djankov et al. (2008) and as in Hubler et al. (2019).	94.10	41.84	97.94
	Market liquidity indicator (stocks traded, turnover ratio of domestic shares as %, source: World Bank, data available from 1975 to 2018), as in La Porta et al. (2006).	116.07	46.80	113.96
	Log of the average number of domestic listed firms to its population in millions, (source: World Bank, data available from 1975 to 2018), as in Djankov et al. (2008).	2.42	1.66	2.64

Variables	Description	Mean	Std dev.	Weighted mean
	Total value of stock traded, as % of GDP (current USD, source: World Bank, data available from 1975 to 2018).	0.84	0.87	0.90
	Domestic credit provided by financial sector (% of GDP) (source: World Bank, data available from 1960 to 2018).	101.73	31.71	97.74
Legal environment:	Rule of law mid-period under review (or previous year if not published, or 1996 if before) (source World Bank, data available from 1996 to 2018), supported by the conclusion of La Porta et al. (2006) that financial markets do not prosper when left to market forces alone.	1.10	0.83	1.21
	Regulation sub-index of the economic freedom indicator from the Fraser Institute for the mid-period under review (or the closest-available or average year when not available), with the, data available from 1970 to 2017, as in Hubler et al. (2019).[3]	7.70	1.23	7.88
	Credit market regulation sub-index of the economic freedom indicator from the Fraser Institute for the mid-period under review (or the closest-available or average year when not available), with the, data available from 1970 to 2017, as in Hubler et al. (2019).[3]	8.95	1.19	9.11
Main sectors:	1 if specified that the most frequent sector involved in financial misconducts is industry.	0.34	0.47	0.32
-	1 if specified that the most frequent sector involved in financial misconducts is finance.[4]	0.16	0.37	0.17

Sources: Studies, World Bank, Fraser Institute, Authors' calculations

[1] In some studies, no split was done between alleged and condemned financial crimes. All crimes were treated jointly. Consequently, the sum of the two variables exceeds one.

[2] Private enforcement is defined as the combination of the following types of procedures: private lawsuits, stock exchange procedures, and class actions.

[3] The Fraser economic freedom index measures the degree of economic freedom present in five major areas (with 26 components): size of government; legal system and security of property rights; sound money; freedom to trade internationally; and regulation. Each component and sub-component is placed on a scale from 0 to 10 that reflects the distribution of the underlying data.

[4] In two articles (Bauer and Braun (2010) and Ozeki (2019), financial firms were excluded from the sample.

Appendix C. Hedges's Test for Publication Bias

As a robustness check, the results on the publication bias of the literature on financial crimes are complemented with Hedges's model (1992)[27] and the augmented model by Ashenfelter et al. (1999)[28]. Hedges's model assumes that the probability of publication of estimates is determined by their statistical significance, with jumps for psychologically important *p*-value. These thresholds are typically 0.01, 0.05, and 0.1 in economics. All estimates, significant and insignificant at the conventional levels, should have the same probability of being published in the absence of publication bias. Ashenfelter et al. (1999) allowed for heterogeneity related to publication bias in the estimates of the underlying effect.

As in Havránek and Sokolova (2020)[29], we assume four intervals of *p*-values reflecting different levels of conventional statistical significance of the estimates: below 0.01, between 0.01 and 0.05, between 0.05 and 0.1, and above 0.1. For the first step, *p*-value < 0.01, we normalize ω to 1 and evaluate whether the remaining three weights differ from this value. Regarding the characteristics of the estimates, we control for the following publication characteristics, which might be related to publication bias: publication year, number of citations in Google Scholar, publication in Scopus journal, and Repec impact factor of the journal.

Table A.2 shows the estimation results for two models: 1) an unrestricted model, assuming a publication bias, and 2) a restricted model, with $\omega_2 = \omega_3 = \omega_4 = 1$, assuming no publication bias (in other words, all coefficients have the same probability of being published, their different statistical significance notwithstanding). Part A details the results of the Hedges's model without heterogeneity in the estimates of excess sensitivity (simple model). The restriction is rejected, which suggests publication bias: estimates significant at the 1% level are much more likely to get published than all other estimates (the differences among the three remaining groups are not statistically significant). Part B displays similar results when allowing for heterogeneity in the estimates of excess sensitivity that might potentially be related to publication bias.

Table A.2: Hedges's test of publication bias

	A. Simple model				B. Model controlling for publication characteristics			
	Unrestricted model		Restricted model (ω_j=1)		Unrestricted model		Restricted model (ω_j=1)	
	Coeff.	Standard error	Coeff.	Standard error	Coeff.	Standard error	Coeff.	Standard error
ω_2	-7.931	6.126			-4.534	3.754		
ω_3	-9.846	8.681			-5.173	4.890		
ω_4	-67.350	28.579			-33.157	12.993		
Publication year					-0.001	0.000	-0.001	0.000
Citations in Google Scholar					-0.008	0.002	-0.009	0.002
Scopus journal					0.012	0.007	0.025	0.006
Repec impact factor					0.000	0.003	-0.002	0.002
Constant	0.033	0.017	-0.036	0.002	0.035	0.014	0.006	0.012
σ	-0.107	0.007	-0.041	0.002	-0.037	0.002	-0.039	0.002
Log likelihood	985		1,081		1,310		1,102	
Observations	439		439		439		439	
	χ^2 (H_0: all estimates have the same probability of publication): 192.6, p-value < 0.001.				χ^2 (H_0: all estimates have the same probability of publication): 415.7, p-value < 0.001.			

Notes: Without publication bias, all estimates, whatever their statistical significance, should have the same probability of being reported. ω_1, the weight associated with the probability of publication for estimates significant at the 1% level, is set to 1. ω_2, ω_3, and ω_4 show the relative probabilities of publication for estimates respectively significant at the 5% level or at the 10% level, and insignificant. σ is the estimated measure of heterogeneity (standard deviation) of the estimates of excess sensitivity.

[27] Hedges, L. V. (1992). Meta-Analysis. *Journal of Educational Statistics*, 17(4), 279-296.

[28] Ashenfelter, O., Harmon, C., & Oosterbeek, H. (1999). A Review of Estimates of the Schooling/Earnings Relationship, With Tests for Publication Bias. *Labour Economics*, 6(4), 453-470.

[29] Havránek, T., & Sokolova, A. (2020). Do Consumers Really Follow a Rule of Thumb? Three Thousand Estimates from 144 Studies Say "Probably Not". *Review of Economic Dynamics*, 35, 97-122.

Appendix D: Studies Included in the Meta-analysis Dataset

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Beneish, M. D. (1999). Incentives and Penalties Related to Earnings Overstatements that Violate GAAP. *The Accounting Review*, 74(4), 425-457.

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Chapter 5

Replies to Opponents' Reports on Dissertation Thesis

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I wanted to thank my opponents and the members of my committee for their extremely valuable and useful comments. They greatly contributed to improve the quality of this thesis and gave me interesting leads for future research. I hope my comments provided hereafter will meet their requirements.

For the sake of simplicity, I ordered my replies alphabetically.

Once again, thank you!

1. Karel Brůna

First of all, I am extremely grateful to Karel Brůna for the interest and the quality he found in my dissertation and most interestingly for his thoughtful suggestions to improve its quality. The following comments can be made. For the sake of clarity, I first recall the comments and then reply to them.

1.1 I think it is worth noting, regarding the application of the event study methodology, that as time of the FFMA decision is considered as time zero in the time window (which is correct), there is sometimes some post-announcement communication of the regulator (and also other stakeholders and the penalized firm itself), which provides new information and might have some consequences to abnormal returns.

Generally speaking in the aftermath of enforcer's decisions, there can be post-announcement communication by different stakeholders, such as the regulator itself, the defendant(s), and/or the press. Regarding the setting analyzed in Chapter 2, the following three points have to be taken into account.

Firstly, it is only since 2019 that the Enforcement Committee of the AMF has been issuing systematically a news releases summarizing the sanction, on the day of the publication of the sanction report online. Before, the AMF was only publishing the sanction decision on its website. This change in communication towards a greater transparency is not relevant to chapters 2 and 3, as the period under review ends respectively in 2016 and 2018. Still, this higher regulatory transparency is likely to increase market reactions in the future, as well as the echo in the press. It would be interesting to investigate further the consequences of this regulatory change.

Secondly, the echo received by the press is taken into account in the model, with variables created from data extracted from Factiva. The following variables were built: a coverage media intensity of the firm before the sanction (as in Capelle-Blancard and Laguna, 2010), the media coverage of the sanction between the Enforcement Committee meeting and the publication, and after the publication of the decision, with an additional focus on top-ranked financial newspapers.

Thirdly, regarding other stakeholders and the sanctioned firm itself, it is clear that additional communication can contribute to abnormal market reactions. This may contribute to the lag in the reaction, which is demonstrated by the results. Consequently, the following comments were added in Chapter 2 and in Chapter 3 (p. 31 and p. 71 respectively):

> "It is also likely that some channels of news scaled in time after the publication, from part of the sanctioned company itself or newspaper articles, will contribute to postponed (or lagged) market abnormal reactions."
>
> "The results (Panel A in Table 4) demonstrate market failures for two reasons. Firstly, contrary to the semi-strong efficient market hypothesis (Fama, 1970), statistically significant reactions take time to materialize, with statistically significant average abnormal returns over the second week following the sanction decision. It may be accounted for the fact that some channels of news are scaled in time after the publication, from part of the sanctioned company itself or newspaper articles, hence contributing to postponed (or lagged) market abnormal reactions."

1.2 It could be discussed in more details that double penalization of victims (the penalization provided by the stock market except the regulatory body penalty) could be a consequence of a rational investor behavior (it assumes that the market consists of two categories of investors, one being fundamental value seekers and the other one focusing on short-term price movements no matter of fundamental value for whom being the victim is a pure risk that must be considered in their investment strategy and that influences their trading activities).

Regarding the double penalization of the victims (Chapter 3), Karel Brůna suggests an interesting discussion regarding the rationality of investors, taking into account their heterogeneity. He suggests a split between 1) fundamental values seekers, for who price changes are due to fundamental changes, and 2) investors focusing on short-term price movements, disregarding the fundamental value. For them,

being a victim could stand for a pure risk that will influence their investment strategies and trading activities. The second category of investors would be noise-traders, following the trends, and contrarian agents, processing the market information with different time delays. Noise traders would indeed focus on short-term price movements, no matter of the fundamental value of the firm. Hence, being a victim could stand for a pure risk on their investment strategy, implying net sales.

Jonathan M. Karpoff also hinted some additional developments regarding the reasons why victims could be penalized by rational investors. Consequently, the comments of the results of Chapter 3 were enriched (see 5.5, p. 80).

1.3 I would also recommend specifying in more details the agents involved in the process of financial misconduct investigation and to highlight a role of external auditor in that.

The following remarks can be made regarding the agents involved in the process of financial misconduct investigations and to highlight the role of external auditors.

- The enforcement procedure, as described in the timeline of AMF enforcement action in Figure 1 of Chapter 2 (p. 10) and in part 3.1 (p. 15), is undergone by two sets of teams: employees of the AMF (in charge of the market surveillance, of investigations/controls, and the qualifications of the regulatory breaches) and the Enforcement Committee members (judge and juries), who act independently from the AMF. Additional information was added to Figure 1 of Chapter 2 (p. 10) and to Figure 2 of Chapter 3 (p. 52).
- External auditors do not play any role in the enforcement procedures. They were, on some rare occasions, pursued by the AMF Enforcement Committee, or signaled the potential accounting breaches (in sanctions which were not include in the sample of these studies, as they did not hit listed firms nor victims). They also have their own regulatory authority (called H3C, www.h3c.org).

1.4 It could also be clarified if the offender of financial breaches could be published twice as well (except the loss of reputation), it means whether the offender could be penalized by the regulator and further withing private litigation or police investigation/public action (or if the regulatory decision excludes private litigation or police investigation/public action).

Regarding the legal setting in France, until late 2016 – when the *non bis in idem* principle was enforced according to EU guidelines (p. 54 of Chapter 3) – for a given regulatory breach(es), AMF administrative sanctions could be complemented by criminal prosecutions. France was even sanctioned by the European Court of Human Rights in 2019 for its late enforcement.

Unfortunately, no public information is available regarding criminal prosecutions. This is the reason why they could be integrated in the dataset. Still, the timing of the criminal procedures is unlikely to coincide with the one of the AMF procedures. This should be controlled for by the one-by-one searches on Factiva for confounding events. Complementarily, two variables control for sanctions set by other regulatory authorities, and in particular whether the predecessors of the AMF or the Competition Authority sanctioned the entity.

Additionally, in the future, it could be interesting to investigate the impact of the enforcement of this *non bis in idem* principle, as since 2016, every financial breach has either judged either by the financial prosecutor or by the AMF, after a referral process.

1.5 The author also makes differences between intended financial crimes and unintended errors but I think that it is hard to distinguish them clearly as the intended crimes could be presented as unintended errors by the firms to exclude investigation or to be less penalized in the process of investigation (as for example the change of the rules (when it brings negative consequences for the firms) makes firms to cheat on them and when it makes public, they present it as unintended error).

The split between intentional and unintentional financial crimes was done by the authors of the original studies included in the meta-analysis. It is particularly relevant for the U.S., where it is made possible by the detailed information supplied to enforcers and available on public datasets. In particular, regarding accounting restatements, it is literally stated in the dataset if the restatement is due to a change in accounting principles (GAAP) or in consolidation perimeter (*i.e.* unintentional accounting frauds). This enables circumventing the scope to intentional financial crimes due to misdeeds by the firms themselves, and not corrections due to external factors. Still, we must assume that authors of original research did the split seriously (as well as for the exclusion of confounding events for example). The footnote below (12, p. 107) was subsequently added in Chapter 4.

> "From the reviewed articles, unintentional financial crimes are mostly accounting restatements subsequent to changes in accounting standards or in consolidation perimeters. When unintentional accounting restatements were not excluded from the scope, the articles on accounting frauds were excluded from the sample."

For the case of France and of the sanctions by the AMF (as for most of international regulators), only the most serious breaches lead to sanction procedures. The rest of the misconducts are delt with bilaterally between the AMF and the regulated entity. Hence, a minor/unintentional accounting mistake (which would be qualified of "unintentional") would not be in the scope of the meta-analysis.

1.6 How would you adapt the event-study methodology to consider the effects of post-announcement communication of the regulator?

Echoing the first point raised by Karel Brůna, two methodological aspects will contribute to account for the effects of the post-announcement communication of the regulator (the publication of the decision on its website and, since 2019, the publication of a news release). On the one hand, using "medium term" event windows to assess abnormal returns beyond the few days around the event itself will contribute to measure to what extent the reaction is scaled on time (with the rising risk of confounding events). On the other hand, complementarily and in a few years, it could be interesting to split the sample by dates depending on whether the decisions were published before or after the enforcement of news release. That way, it could be possible to measure higher abnormal returns since the AMF has become more transparent and vocal regarding its enforcement decisions.

1.7 What is an optimal mix of penalization of firms and managers as individual person based on result of your analysis using data from France?

It is hard to conclude with an "optimal mix of penalization" for financial misconducts, which will depend on the objectives of the regulator. What is shown by this thesis is that regulators' voice is credible to the market. So, it can serve as a regulatory tool *per se*, by naming and shaming misconducts and wrongdoers more frequently than actually done (only 20 sanctions *per* year in France). Enforcement procedures are long (2.7 years on average in France) and expensive. Complementarily, it might be relevant to sanction more toughly the most severe regulatory breaches and to possibly target more top managers to reinforce accountability and encourage compliance with the law. That way, two aspects of Becker's (1968) model of crime will be impacted: a higher probability of being caught (named and shamed, *i.e.* leaving the market sanction firm's reputation, or sanctioned) and a higher cost of being caught (regulatory or market sanction).

2. Tomáš Havránek

First of all, I am extremely grateful to Tomáš Havránek for the interest and the quality he found in my dissertation. I also want to thank him, one more time, for his precious help regarding the meta-analysis on the effect of financial misconduct on stock returns of Chapter 4, which quality he greatly contributed to.

The major changes made to this chapter incorporate his two most urgent suggestions: improvements in the estimation of the publication bias and of the effect beyond bias (Table 4, p. 124), including up-to-date non-linear estimations, and in the definition and calculation of meta-averages (part 3.4 p. 119, and part 4.3 p. 131). Complementary changes still have to be incorporated before submitting the article to a journal. In particular, I decided not to include in my dissertation results from Bayesian and frequentist model averaging, which are still preliminary and deserve further investigation. Still, they support most of the conclusion obtained with model averaging.

The following discussions to the 10 detailed comments and suggestions made by Tomáš Havránek are presented below ordered depending on whether they are already incorporated or will be before submission. The references to the 10 comments are put into parenthesis, in bold and italic.

2.1 Changes to the dissertation

Generally speaking, the revised Chapter 4 was both shortened and lengthened, echoing the suggestions of the opponents.

On the one hand, as suggested by Tomáš Havránek, I tried to shorten and simplify the article, starting with the literature review and the subsequent set of hypotheses. The initial set of hypotheses was reduced to one hypothesis (do markets penalize listed firms for intentionally engaging in financial crimes?). The 9 former hypotheses were basically declinations of the same question. To better emphasize the main results, two sub-hypotheses are tested along the article by splitting the sample depending the geography where the crime is committed (the U.S. *versus* the rest of the world), and on the committed crimes (in that echoing the comments from Jonathan M. Karpoff), with a stronger focus on the differences between accounting frauds and other violations to securities laws. Consequently, all figures and tables depicting the results by hypotheses were removed from the revised version. In parallel, whenever possible, the revised tables and figures include this split between sub-samples, comparing the U.S. with the rest of the world, and accounting frauds with other violations to securities laws (Figure 6, p. 116; Figure 8, p. 119; Table 4, p. 124; and Table 6, p. 132). Finally, the table detailing the definitions of the variables and their main descriptive statistics were moved to the Appendix B. (***comments 1, and 5***)

The current version of the article still uses linear estimators for the MRA. Even if the models' uncertainty is huge, they include the most relevant variables based on the literature on financial crimes and on meta-analysis best practices (Havránek et al., 2020). Table 5 (p. 127) was – to some extent – simplified with a reduction by 7 in the number of explanatory variables: as suggested by Tomáš Havránek, the "length of the article", but also the fact that only one country was under review, the number of years under review, whether the firms were mostly industrial and financial, the number of authors of the study, and multiple authorship within the sample. Complementarily, the fact that the event window is limited to days before the event was added, to challenge the hypothesis observed in the literature that markets tend to anticipate the revelation of financial crimes. The multicollinearity was controlled for with variance inflation factor. (***comments 6, 7, 8, and 9***)

On the other hand, the article was enriched with additional graphical illustrations of the distribution of effects (Figure 5, p. 115, with the distribution of average abnormal returns *per* day across studies; Figure 6, p. 116, with the frequency distributions of AARDs; and Figure 7, p. 117, with the chronological ordering of median AARDs), and with additional estimates of publication bias and effects

corrected for this bias, in particular using more modern techniques (Table 4, p.124). As recommended, in order to confirm the effect beyond bias estimated with linear and quadratic techniques, the following non-linear techniques (under which the estimated impact can be more complex function of standard errors) are included or further developed: 1) the Weighted Average of Adequacy Powered (WAAP, Ioannidis et al., 2017); 2) the selection model by Andrews and Kasy (2019); and 3) the stem-based bias correction method (Furukawa, 2019). (***comment 2***) These techniques corroborate the results from simpler methods, though to a lower extent on average (see part 4.1, p. 122; and Table 4, p. 124). (***comment 3***)

In light of the comment that the assumption made that, in the absence of publication bias, there is no correlation between estimated AARDs and their standard errors, may not hold, we complemented Table 4 (p. 124) with the following estimations: 1) using the degrees of freedom (*i.e.* the number of observations reported by researchers) as an instrument variable for the standard errors (panel A.5), as in Havránek and Sokolova (2020), and 2) adding the results of the Hedges' (1992) test and the augmented model by Ashenfelter et al. (1999) in Appendix C (p. 147). (***comment 4***)

Finally, the methodology for the meta-averaged effects was further documented and developed (part 3.4 p. 119; and part 4.3 p. 131), in particular with a reference to Stanley and Doucouliagos (2012), complemented with practical applications for the impact of aid on democracy (Askarov and Doucouliagos, 2013) and for the impact of rating changes on returns, also estimated using an event study methodology (Hubler et al., 2019). (***comment 10***)

2.2 Future changes before submitting the working paper to a journal

Before submission, the article will be further shortened and simplified, in particular the introduction. A shorter version of the literature review will be relegated to the appendix.

The next steps will be to substitute parts 4.2 and 4.3 MRA with Bayesian model averaging using prior the dilution (BMA), and frequentist model averaging. (***comment 7***) To do, we will capitalize on the recent literature using similar methodologies for meta-analyses, in particular Bajzik et al. (2020), Gechert et al. (2020), and Havránek and Sokolova (2020). Consequently, Table 5 will be reshuffled and simplified. It will be complemented with additional graphical illustrations, in particular a model inclusion based on the best 5,000 models based on the posterior inclusion probabilities of BMA. (***comment 6***)

3. Jonathan M. Karpoff

First of all, I am extremely grateful to Jonathan M. Karpoff for the interest he found in my dissertation, and most importantly for his thoughtful suggestions, which helped improving its quality.

Generally speaking, the following comments relevant to all chapters of the dissertation can be made, and will be further developed hereafter comment by comment. As suggested by the Jonathan M. Karpoff, I tried to better consider both theoretical and empirical implications of the differential impacts on firms of different types of misconduct, by stressing systematically the split between accounting frauds and other violations of securities laws. This also echoes enforcers' practice. Additionally, for the dataset of the French sanctions, some variables control for who is sanctioned (firms, and/or individuals). Given the scope of the study, at least a listed firm is sanctioned in Chapter 2, whereas in Chapter 3 it can be either/or (possibly listed) firms, asset management firms, individuals.

The meta-analysis is still under revision before submission to a journal.

In order to satisfactorily account for the ideas contained in the report, I first recall the specific comments, and then reply to them. When relevant, some comments are answered jointly.

*3.1 **Chapter 2 examines several types of impact associated with financial misconduct. Financial misconduct is defined as including insider trading, price manipulation, providing false information, accounting fraud, and engaging in a breach to regulators. It is important to note that these are very different types of activities that are likely to have different types of impacts on the firm and its counterparties. Grouping them together can obscure the fact that some types of misconduct (accounting fraud, for example) have significant impacts on the firm's stakeholders (in this case, investors), whereas other types of misconduct do not (e.g., insider trading). This means that the channels by which the misconduct is disciplined and deterred will differ. For example, reputational capital is likely to be used to bond the firm's commitments to investors to report its financials honestly, as investors are directly harmed by accounting fraud. In contrast, reputational capital is unlikely to play much of a disciplining role for insider trading. This is because it is more difficult to identify important stakeholder groups with whom the firm has repeat contracting and that are likely to be harmed by an increase in the likelihood of insider trading. I suggest that the author consider the economics of misconduct for each type of misconduct that is examined empirically. Laying out the underlying economics can help guide the tests and interpret the empirical test results. Lumping all of these different types of misconduct together, in contrast, makes it difficult to draw inferences from the data.***

I fully agree with Jonathan M. Karpoff regarding the relevance of splitting misconducts depending on their subsequent spillovers for stakeholders. This is echoed by a systematic split in the two datasets I built between – at least – accounting frauds and other violations to securities laws (Chapter 4). Chapters 2 and 3 stick to the more granular European and French FMA classification of sanctioned financial misconducts,[1] one of the three market abuses being the accounting frauds (breach to public information obligation, in the sense that the firm communicated to the market false financial information, hence the French FMA opened an investigation on the firm's financial information). On average, 1.3 breaches were sanctioned by the French FMA (Chapter 2).

The dataset of 52 sanctions analyzed in Chapter 2 is comprised of 27 breaches to public information obligation (accounting frauds) and of 5 breaches to information obligation *vis-à-vis* the French FMA (4 of which also involved breaches to public information obligation). For that reason, and to for the sake of simplification, I grouped the two sub-categories into "breaches to information obligation". It is interesting to note that the average cash fine for the 27 sanctions for breaches to public

[1] Insider trading, price manipulation, and dissemination of false information are called "market abuses" under the European Market Abuse Directive (MAD 2003/6/EC) and Market Abuse Regulation (MAR 596/2014). Failures to comply with professional obligations can also be sanctioned.

information obligation does not significantly differ from the total average (respectively 909,000 and 860,000 euros). To clarify this point, I added a following comment "⁰"to Table 2 of Chapter 2 (p. 22):

> "Breaches of public disclosure requirements are comprised of breaches to public information obligation (*i.e.* accounting frauds), 52% of the sample, and/or breaches to information obligation vis-à-vis the AMF (10% of the sample). Only one sanction involved a mere breach breaches to information obligation vis-à-vis the AMF".

A former (longer) version of the article (de Batz, 2018) included the following Table 1, with the results of the event study split by regulatory breaches. Still, the limited sizes of the subsamples question the robustness of the results. This is the reason why I followed the literature in aggregating breaches depending on the party which was hit. The current version of the article includes comments (p. 33) on the estimations of abnormal returns split between related (insider trading, dissemination of false information, and breaches to one's professional obligations) and third parties (price manipulation). Insider trading is included in the related party category as the past trades based on the use of insider information did impact the valuation of the firm, at the expense of related parties, and the revelation of the breach will dampen the assessment of the professionalism and business ethic of the management of the firm. Table 1 demonstrates that the sanctions of breaches impacting related parties hit harder returns, in line with past literature. Echoing the previous paragraph, I added the results for "pure accounting crimes" (*i.e.* excluding the sanction for a breach to regulatory information obligation). The results are robust. This split by breaches supports the comments of Jonathan M. Karpoff in the sense that accounting frauds are one of the breaches triggering the strongest abnormal returns. Market reactions to sanctions of insider trading are very similar.

Table 1: Split by Regulatory Breaches of Cumulative Average Abnormal Returns Following the Publication of the Sanctions of the Listed Companies

Table 4 reports the cumulative average abnormal returns ($CAAR_t$) , as defined in Eq. (2), up to a specified day *t* in event time for the four kinds of regulatory breaches sanctioned by the AMF. Event time is days relative to the step of the sanction procedure being analyzed and *t = 0* is the event itself. Abnormal returns are computed given the augmented market model parameters, which are estimated with OLS through the period [-120;-11] in event time. The sample is composed of the 52 companies which were sanctioned guilty by the AMF from 2004 to 2016 and were daily quoted all through the enforcement procedure.

	Sample		Insider trading		Information		Pure accounting frauds		Professional obligations		Price manipulation	
t	$CAAR_t$	*t-stat*	$CAAR_t$	*t-stat*	$CAAR_t$	*t-stat*	$CAAR_t$	*t-stat*	$CAAR_t$	*t-stat*	$CAAR_t$	*t-stat*
-1	-0.5%***	*-2.7*	-0.7%**	*-2.5*	-0.7%**	*-2.6*	-0.7%**	*-2.7*	-0.4%	*-1.2*	0.1%	*0.1*
0	-0.8%***	*-3.0*	-1.0%**	*-2.9*	-1.1%***	*-2.8*	-1.2%***	*-2.8*	-0.8%*	*-1.8*	-0.5%	*-0.5*
1	-0.7%*	*-2.0*	-1.0%	*-1.7*	-0.6%	*-1.2*	-0.6%	*-1.2*	-1.0%*	*-1.9*	-0.1%	*-0.1*
2	-0.9%*	*-1.5*	-1.6%	*-1.5*	-1.2%	*-1.7*	-1.3%*	*-1.8*	-0.8%	*-1.2*	-0.7%	*-0.7*
3	-1.1%*	*-1.8*	-2.0%	*-1.7*	-1.2%	*-1.3*	-1.4%	*-1.4*	-1.2%	*-1.5*	-1.3%	*-0.8*
4	-0.9%	*-2.2*	-1.3%	*-0.9*	-1.1%	*-1.1*	-1.2%	*-1.2*	-0.8%	*-1.2*	1.1%	*1.3*
5	-1.1%*	*-1.8*	-2.3%	*-1.7*	-1.7%*	*-1.8*	-1.8%*	*-1.9*	-0.8%	*-1.1*	-1.9%	*-1.2*
6	-1.3%**	*-1.2*	-2.7%*	*-2.1*	-2.3%**	*-2.8*	-2.4%***	*-2.9*	-0.9%	*-0.9*	-4.0%	*-2.1*
Sample size		**52**		**16**		**28**		**27**		**20**		**5**

*Sources: AMF, Thomson Reuters, Authors' calculations *** p<0.01, ** p<0.05, * p<0.1*

Another key aspect of the French FMA enforcement process is which type of procedure (control or investigation) led to the sanction. In fact, controls are part of the daily life of regulated entities (here listed firms), which can lead to a sanction if a serious breach to professional obligations is characterized. Conversely, investigations are triggered by serious hints of breaches detected for example by the AMF, typically by the market surveillance with abnormal developments in prices, volatilities, or traded volumes. The cross-sectional regressions demonstrated that this dimension is particularly relevant to account for the abnormal returns, rather than the split by breaches (Table 6, p. 39).

Finally, in light of Jonathan M. Karpoff's suggestion to consider the economics of misconduct for each type of misconduct in the sample, the following two major changes were made to Chapter 2:

1) the paragraph below was added to the literature review (p. 14):

> "Studies can specifically investigate the spillovers of a subset of financial crimes, most frequently accounting frauds or insider trading. This is particularly the case in the U.S. where more data is available (larger market, long history of sanction, culture more prone to legal procedures, etc.). This is supported by economic and financial implications of the revelation of such crimes (see appendix A for details). Still, in other jurisdictions, the approach is more generally focused on the enforcer, for example the sanctions made by a given entity (as in this study the French AMF or the British FCA)."

2) the Table 2 was added as an appendix of Chapter 2 (Appendix A, page 48), echoing and complementing Table 1 (p. 17) and the comments p. 33.

Table 2: Abnormal Market Reactions by Regulatory Breaches

Table 2 defines and details the economics of every type of breaches sanctioned by the AMF. They are sorted by declining cumulative average abnormal returns following the publication of the sanction decision. Finally, the fourth columns displays the results of the event study estimation for each sub-sample, with the cumulative average abnormal returns (CAAR) over the event window [-1;+6] around the publication of the sanction, where the event take place in t=0.

Breaches	Definition	Impact of the breach publication on investors/signal sent	CAAR[-1;+6]
Insider trading (Sample size: 16)	Divulgation and/or use of insider information, in the sense of precise, unknown to the public and likely to be used by a reasonable investor as part of the basis for an investment decision	- Professionalism and ethic of top management and employees => reputational penalty to the firm - Possible fine to pay - Impact of the insider trade on the returns of the firm when committed (against related parties) - No direct impact on the firm's financials	-2.7%*
Dissemination of false information (o.w. accounting frauds) (Sample size: 28)	Failure to comply with financial reporting laws and regulations, implying obligations on periodic and ongoing disclosure to provide the public with accurate, precise and fairly presented information	- Professionalism (and ethic) of top management and employees => reputational penalty to the firm - Possible fine to pay - Publication of accounting restatement (possibly long before the sanction) impacting negatively the value of the firm (at the expense of related parties)	-2.3%**
Failure to meet one's professional obligation (Sample size: 20)	Breaches of the Monetary and Financial Code and the AMF General Regulation, covering regulated professions, as applicable to investment services providers[2], collective saving products and market infrastructures.	- Professionalism of top management and employees => reputational penalty to the firm - Possible fine to pay - Direct impact on the firm's financials: remediation costs to reach higher standards, potential competitive disadvantage, etc. (at the expense of related parties)	-0.9%
Price manipulation (Sample size: 5)	Deliberate misconduct aimed at influencing securities prices and a fair price formation, potentially misleading or attempting to mislead the public or ensuring a dominant position on the market, leading to unfair transactions	- Professionalism and ethic of top management and employees => reputational penalty to the firm - Possible fine to pay - Breach committed at the expense of third parties (manipulated stocks) - No direct impact on the firm's financials	-4.0%

*Sources: AMF, Thomson Reuters, Authors' calculations ** $p<0.05$, * $p<0.1$*

[2] Investment services providers are investment firms and credit institutions that have been licensed by the AMF or the *Autorité de Contrôle Prudentiel et de Résolution* (ACPR). Their main activity is to transmit and process stock market orders.

3.2 Chapter 2 reports that the average stock price reaction to news that a company had been sanctioned by the FMA is negative. But the loss in market value is, on average, smaller than the direct financial penalties imposed by regulators. Thus, by Karpoff and Lott's (1993) residual method, there is an implied reputational gain, not a loss.

The paper tries to make sense of this result by conjecturing that regulatory penalties are too low, that that it "questions… the credibility of the Regulator" (p. 4). There are, however, alternative possibilities. Perhaps there is prior information leakage about the misconduct that, despite the author's efforts, are not picked up. Research from the U.S., for example, shows that most of the information and price reactions to news of misconduct occurs on days that precede any regulatory investigation or sanctions.

Another possibility is that the conduct that is sanctioned is not very costly. This would explain both the small regulatory penalties and the small reputational losses. Here, it could be useful to focus on differences between different types of misconduct, as discussed in comment 1.

3.3 The theoretical relation between regulatory and reputational penalties is complex, and raises questions about some of the inferences made in Chapter 2. As Karpoff and Lott (1993) discuss, legal penalties and market penalties (i.e., reputational losses) are substitutes. An increase in legal penalties decreases firms' reliance on reputational capital to bond their commitments to act or report honestly. To illustrate this comparative static result, consider a hypothetical situation in which regulatory penalties are non-existent. Zero regulatory penalties would not, in most markets, lead to rampant fraud, because firms would rely mostly on reputational capital and the threat of lost reputation to guarantee their commitments. Likewise, if we consider an opposite extreme in which regulatory penalties are extremely high, we would observe an equilibrium in which firms would not make investments in reputational capital; the high legal penalties would crowd out firms' reliance on reputation to provide quality assurance to their stakeholders.

So a finding of no reputational loss does not necessarily imply that the regulatory penalties are too small – one of the inferences made in the paper. To the contrary, a low reputational loss could result if regulatory penalties are very large.

First of all, as stressed during the pre-defense, the former version of Table 5 (p. 35) assessing the average stock losses/gains suffered from a unit error. Accordingly, the table was updated. This was an opportunity to enrich the analysis and add granularity to the results. On average, firms endure millions of euros of losses in market capitalization after the publication of a sanction, implying a reputational cost. Still, as stressed in the chapter, these averaged results must be interpreted with great prudence given high standard deviations, consecutive to the heterogeneity in market capitalizations. Additional results (Figures 4 and 5, p. 36 and 37) show that smaller firms endure a large reputational penalty for being sanctioned, while large firms (above 1bn EUR in market capitalization, *i.e.* the Euronext threshold for largest firms) would "gain" from being sanctioned.

As described by Jonathan M. Karpoff, the market reaction is comprised of two substitutable parts: the cash fine (and, if relevant, to total subsequent costs), and the reputational penalty. Hence, if fines are limited, and if sanctions are credible to the market, a large reputational penalty should compensate for the low fine in light of the serious breach signaled by the regulator. I tried to better allude to this comment in the literature review of Chapter 4.

The French results are quite different when using a split by size of firms. On the one hand, large firms, which receive comparatively lower cash fines for several financial misconducts and are also the most prone to recidivism, do not endure reputational penalties: the market does not care about sanctions of big firms, echoing the AMF's reputation for leniency. On the other hand, and conversely, smaller firms endure proportionally higher financial fines and reputational penalties, in the aftermath of the sanction. Hence, the results for France go against the theory developed in Karpoff and Lott (1993): fines set by the AMF and market penalties (*i.e.*, reputational losses) go in the same direction and are not substitutes. Higher legal penalties increase firms' reliance on reputational capital to bond their commitments to act or report honestly for smaller firms, while conversely, for larger firms, the market neglects misconducts, assorted with limited legal penalties. How to account for such a gap? Possibly the AMF would gain in sanctioning more severely larger firms and their top management (as done in the

U.S. for example), and possibly rely more on market sanctions for smaller firms, typically by naming and shaming misconducts.

I fully agree that there can be some leakages on the day(s) preceding a regulatory announcement of the sanction, as observed in the literature in the U.S. and the U.K. for example.[3] This is the reason why I started the event window before the event day (10 trading days) and why I did sanction-by-sanction searches on Factiva of the echo of the sanction in the news between the hearing of the Enforcement Committee and the publication of the sanction (a 50-day lag on average). Still, there could have been leakages unnoticed by the press for example or before the event window on which I focused based on the literature. Consequently, I added the following remark in the revised version of the chapter (p. 36):

> "It could also be explained by prior information leakage about the misconduct which would have been priced in even before the start of the event window, as it happens frequently in Anglo-Saxon countries."

Regarding the possible explanation that "the conduct that is sanctioned [by the AMF] is not very costly", I do not have data to support or contradict this hypothesis. Still, the following three remarks would please against:

1) only the most severe regulatory breaches are sanctioned by the AMF Enforcement Committee. The volume of sanctions is very low (20 on average since 2004). There is no reason to believe that French listed firms would do better than other jurisdictions in terms of financial crimes (and costs) when focusing on the worst cases;

2) the great majority of cases brought to the Enforcement Committee are sanctioned. This supports an efficient upstreaming screening by the AMF between less serious breaches, which are dealt with bilaterally and confidentially between the AMF and the regulated entity, and the most serious breaches, ending sanctioned;

3) the great majority of AMF decisions are confirmed in appeal courts (sometimes several times); which supports also the severity – and hence potentially the cost – of the past breaches.

Finally, one limitation of this chapter is the small (though exhaustive) sample size (52 sanctions). Consequently, the significance of results using sub-samples is very dubious. It would be very interesting to re-estimate the models which a larger sample within a few years, all the more that a recently enforced regulatory change led to a massive anonymization of the dataset of older sanctions (5 years after publication). The historical dataset constructed for this dissertation is hence more valuable.

*3.4 **Chapter 3 examines the share price reactions of firms that were victims of misconduct when the FMA announces that the perpetrator was sanctioned. The main finding is that the victims experience a share price decline. The author interprets this as evidence that "Victims are … shamed by the market, despite being avenged by the regulator," and that this is a type of "market failure as victims are not properly differentiated from wrongdoers" (quotes from the introduction and p. 45).***
This is an interesting result that begs for additional investigation. It seems unlikely that investors benefit from "shaming the victim." Rather, it is likely that news about the misconduct conveys negative information about the victimized firm. The news could be that the victim's internal controls are not as effective as investors previously believed, or that the cost of controlling misconduct is higher than investors' expectations that previously were priced in the firm's shares. An analogous situation is a data security breach. Firms that experience a data security breach clearly are victims of a crime. But they also frequently experience significant share price declines. Part of the share price decline appears to be due to investors' revisions about the quality of the

[3] Conversely, there should not be any leak over the first two steps of enforcement procedures, which are by law confidential. The only parties which could use insider information are AMF employees involved in the procedure for the ignition of the procedure and then also the parties when they are notified of an ongoing investigation.

firm's data security. Similarly, news of the misconduct is likely to convey relevant information about the victim firm's costs and operations.
To examine these issues, it would be helpful to partition the results by the type of misconduct. Take price manipulation. News that traders were able to manipulate a company's share price could reveal that the market for the firm's shares is not as deep and liquid as previously believed. The share price decline could reflect a decrease in liquidity. Or, news of a penalty for insider trading could reveal that the company's data security is poorer than previously thought, or that the internal governance is ineffective. In general, it is hasty to conclude that any spillover effect on the "victimized" firm reflects some underlying behavioral effect on valuation. It is worth trying to understand how news of the misconduct can affect investors' perceptions about firm fundamentals.

3.5 I am not sure I understand the argument that the data reported in this part of the thesis indicates that markets are informationally inefficient. If we are to believe that there is not much information leakage about the misconduct before the FMA's sanctions, then we should expect an adjustment in the victim firm's share price when news comes out about the misconduct event.

The idea that sanctioning the victim could result from a rational behavior of investors also echoes a comment by another opponent (Karel Brůna, 1.2). The main subsequent adjustments made to Chapter 3 are summarized hereafter, echoed in the summary (Chapter 1), abstract, introduction, and conclusion.

I fully agree with this comment that two facts could account for the victims being penalized by abnormal returns: either they are assimilated with their past executioner, or the sanction also reveals some weaknesses of theirs to the market (which possibly enabled the breach(es) to be committed). Whatever the reason, a market correction in returns reflects a readjustment of market participants compared to past expectations. From a regulatory perspective, what should be the takeaways? I guess that, even if the first alternative supposedly or just slightly contributes to the estimated negative abnormal returns (which would reveal informationally inefficient markets), a regulator will be willing to avoid unintended spillovers on the victims (which could also damage its reputation as a fair regulator if revealed), and rather resort to off-the-record bilateral communication with the past victims to improve their internal processes and to avoid other breaches committed at their expense.

As relevantly suggested, the results of the event studies split by breaches were annexed to the chapter (Appendix A, p. 88) and discussed in the comments of the results (5.5, p. 81). They demonstrate that price manipulation and insider trading, to some extent, trigger stronger abnormal losses for the victims. This echoes the results of the cross-sectional regression (Table 7, p. 77). In fact, insider trading appears to contribute significantly negatively to the estimated abnormal returns, all other things kept equal.

Finally, I would like to stress that I added a paragraph detailing into more details how a listed firm can be the "victim" of others' misconducts, based on 4 typical sanctions involving victims (p. 57).

3.6 Chapter 4 conducts a meta-analysis of 111 studies that were published between 1978 and 2020. The author concludes that news of financial misconduct is associated with share price declines, although there is a publication bias toward results of large share price losses. After adjusting for this bias, the author concludes that the loss in share values is smaller than that reported by many papers.
Once again, there is an aggregation issue to consider. Some types of misconduct are likely to have larger regulatory penalties or larger reputational penalties than other types, implying different share value losses. E.g., financial fraud is associated with very large losses, and insider trading violations less so. Many of the studies included in the meta-analysis also suffer from severe measurement problems because they do not capture the most relevant dates on which news of the misconduct is revealed to investors. For example, many measure stock price reactions to lawsuit filings, restatements, or regulatory actions – all of which typically occur after the initial revelation of misconduct.
Overall, I am skeptical of the conclusion drawn from the meta-analysis, that the average share value losses associated with news of financial reporting misconduct are much smaller than

reported in published papers. If anything, the bias could go the other way when the misconduct is defined as financial misreporting, misrepresentation, or fraud. This is because many of the papers in this literature report abnormal share price reactions around days that come some time after the initial public revelation of the misconduct.

The following amendments were made to the Chapter 4, as well as in the journal article based on this chapter (which is still work under progress).

The revised Chapter 4 emphasizes more the three main divergences in the results in terms of abnormal reactions to the publication of a financial crimes: 1) whether the crime is committed in the U.S. or not (and the results hold for common law countries); 2) whether the crime is a pure accounting crime or, more generally, a violation to securities laws; and 3) whether the crime is alleged or sanctioned (which tries to circumvent the comparison problem between dates of lawsuit filings, restatements, or regulatory actions). Complementarily, variables control for the different types of procedures analyzed in every research. These last two sets of variables (allegation or sanction, types of procedure) should contribute to control for the fact that many studies do not capture the most relevant dates on which news of the misconduct is revealed to investors.

The specific characteristics of the event windows used in every study are also controlled for. On the one hand, the estimated effects (all the reported (C)AAR over the event window [-10;+10]) are divided by the number of days in the event window to be comparable. On the other hand, the dataset includes several parameters of the event windows (Appendix B, p. 144): 1) the length of the event window (number of days), dummy variables if the event window 1) is limited to the event day, 2) is strictly before the event, or 3) is around the event, and 4) if the event window of the study exceeds the [-10;+10] days, for which the estimates are compiled in the dataset.

As advised by another opponent (Tomáš Havránek), the results of publication bias and the estimated effect beyond bias were robustness-checked with additional linear and non-linear methodologies (Table 4, p. 124). The results and the magnitudes were confirmed.

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