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ABSTRACT

Among the myriad changes to have impacted the regulation of financial markets in recent years, one of the most significant yet least recognized is the growing role of technology in the regulatory process where it is used to detect emerging problems in the marketplace and guide the enforcement process. Current applications range from surveillance technologies, to datamining and risk profiling tools, to data visualization and graphing programs. Using the term ‘regulatory technologies,’ this paper examines in detail two such technologies and assesses not only their benefits and limitations, but also their more subtle role in shaping the very criteria through which financial transactions and market actors are represented, framed, and assessed for their regulatory merit. To the extent that this process hinges on the ability to make distinctions on the grounds of risk, typicality, and appropriateness, these technologies play a critical role in shaping the boundaries of enforcement and thus the scope and depth of the regulatory vision. This is revealed to have significant implications for our understanding of the place of technology in regulation and for the types of questions that must be addressed in discussions of financial governance.
INTRODUCTION

In their bid to flush out financial misconduct and protect the integrity of the markets, regulatory agencies of various stripes and colours are increasingly turning to technological solutions. Spurred by advancements in computing power, speed, and storage capacity, and new analytical capabilities such as searchable databases, computational intelligence, and data visualization tools, regulators are now able to probe much further into the depths of the market accumulating intelligence, identifying trends, and generating sophisticated renderings of potentially troublesome transactions. The specific applications of these technologies are extensive and include monitoring the Internet for changes in market sentiment, surveying the flow of buy and sell orders for signs of insider or manipulative trading, and probing the social network of market participants for evidence of connections bearing on the legality of trading activity. Indeed, these developments reflect very real changes in the markets themselves which have morphed from open outcry pits to primarily electronic transactions (Zaloom, 2003; 2006) executed at break-neck speeds often in the absence of human intermediation. The result is a greater visibility of market transactions that should translate into increased opportunities for regulatory oversight.

And yet, despite these developments and their seeming promise, very little attention has been paid to the specific role of technology in the regulatory process. This is true even outside of the more specialized literature on financial or securities regulation as technology tends to be reduced to a more narrowly conceived informational capacity and thus one of the many arrows in the regulatory quiver, rather than an aspect of regulation that is deserving of study in its own right. Informed by the results of a multi-year study of securities regulation, this paper seeks to remedy this oversight through an extended analysis of ‘regulatory technologies’ and their place
within, and their influence on, the practice of regulation. Eschewing the view of technology as a mere input inserted into the regulatory process, attention is devoted to the specific parameters and logics that inform these technologies, their unique embeddedness within organizational contexts and legal processes, and their invocation not only as analytical tools but also as opportunities for signaling the rationality of regulation to both internal and external audiences.

While dedicated to assessing the limitations of these technologies and the various ways in which they may or may not fall short of their stated aims, the analysis does not end here but seeks to push beyond this standard evaluative pose to focus on the more subtle role of these same technologies in perpetuating a very particular view of market ‘misconduct’ and, in so doing, performing a series of distinctions, lines, and borders that are themselves constitutive of the markets and integral to their ongoing performance as seemingly well-ordered financial spaces. Here the analysis draws from recent contributions to the social studies of finance, an emerging tradition which examines how market technologies and devices do not simply reflect or facilitate market activity but rather actively constitute the markets themselves (de Goede 2005; Knorr Cetina and Preda 2005; MacKenzie et al. 2007; Preda 2009). Working within this analytical vein, it is not only the promises or failures of regulatory technologies that are significant, but also their role in encoding particular assumptions, manners of visualization, and modes of rationalization into the regulatory process. Ultimately then, the question is how technology shapes the field, scope, and logics of regulatory engagement producing particular forms of disorder to the exclusion of others all the while constituting ‘the market’ itself in the process.

This analysis unfolds through three core sections. The first section offers a more fulsome account of exactly what is meant by the term ‘regulatory technologies,’ its relevance to the contemporary context of financial markets and securities regulation, and the various influences
which have driven the ever greater importation of techno-logics into the regulatory process. It then examines in detail two specific regulatory technologies that have assumed a prominent role in the daily practice of securities enforcement: (1) real-time market surveillance; and (2) datamining and risk profiling. This is followed by a discussion of agency worksheets and scorecards, calculative devices that fall outside of the formal definition of regulatory technologies and yet exert a critical influence on their organizational and legal embeddedness. Having identified their assumptions, tendencies, and practical limitations, the second section turns to the unintended consequences and less obvious side-effects of these respective technologies including their role in signaling rather than necessarily enhancing agency competencies and, even more critically, reproducing more narrowly cast and at the same time heavily moralized conceptions of trouble, risk, and disorder. The paper then concludes with a discussion of the implications of the analysis for future research including the need to extend the conversation around regulatory technologies to other areas of financial regulation such as auditing whose technological attributes are similarly overlooked and underappreciated.

‘REGULATORY TECHNOLOGIES’ AND FINANCIAL MARKETS

Recently, much has been made of the proliferation of technologically mediated forms of surveillance and their role in deepening societal interventions into the lives and life chances of myriad individuals. While the bulk of this attention has been devoted to the control of individual bodies and identities as they move through social and geographical space, and thus the use of technologies such as video surveillance and biometric scanning (e.g. Lyon 2001; 2007; Haggerty and Ericson 2006; Amoore and de Goede 2008; Hier 2010), similar developments are evident in domains such as money laundering and terrorist financing where computerized datamining programs and risk profiling tools have been enlisted to track the flow of illicit funds as part of the
financial front of the “War on Terror” (Levi and Wall 2004; Amoore and de Goede 2005; de Goede 2008; Razavy and Haggerty 2009). Applications also abound in the corporate world where sophisticated forensic auditing programs, data mining applications, and risk profiling tools are used by private agencies to identify risks and weed out vulnerabilities on behalf of well-heeled corporate clients (Williams 2005).

Largely overlooked within these accounts is the growing use of technology in the regulatory sphere, particularly in the context of financial markets whose electronic embodiments make them ideally suited to this kind of technological reconnaissance. Specific examples of the technologies available to regulators include artificial intelligence programs designed to scan the Internet for rumours and changes in public sentiment, profiling tools used to identify risky players or products, and sophisticated computer surveillance programs monitoring the ebb and flow of trading for unexplained changes in price and volume, the potential footprints of insider and/or manipulative trading. And yet, despite these applications, the place of technology in the regulatory process has not been subject to any kind of serious inquiry with these technologies either scanted entirely or mentioned only in passing (e.g. Shapiro 1984; Reichman 1993). Indeed, Black (2001) is among the few to have explicitly recognized this gap, “The role of technology in regulating is not yet part of the mainstream regulatory literature. . . . it is something that needs to be explored more systematically in the study of any regulatory system” (138).

As an attempt to remedy this oversight and engage in a more sustained discussion of the role of technology in regulation, it is first necessary to provide a clearer definition of exactly what is meant by the chosen term ‘regulatory technologies.’ Applied to the specific context of financial regulation and securities enforcement, this refers to a host of computerized applications, assessment tools, and evaluative metrics through which market data, transactions, and identities
are gathered, sorted, and subjected to various forms of analytical assessment, this for the express purpose of detecting market problems as they emerge and develop. These technologies consist of the computing platforms and infrastructures used to collect and store data in electronic form, the mathematical algorithms which parse this data based on specific rules and established thresholds, and the strategies for rendering this data in visual form for the benefit of their human operators. As noted by Pryke (2010) in his analysis of the visualization software used by traders, a key feature of these regulatory technologies is thus not only the collection or capture of financial data but also its transformation into “knowledge about the markets” (435), a task that is both ‘significatory’ and ‘interventionary’ in nature.

While it is certainly appropriate to distinguish these kinds of applications from other regulatory tools, this on the grounds of their uniquely technological features and their role in opening up new, electronically-mediated “spaces of governing” (Amoore and de Goede 2008: 7), it is important to recognize that they do not operate in isolation but are framed in terms of, and are grafted onto, such non-computerized devices as worksheets, scorecards, and investigation plans. These more conventional and less advanced tools, akin to the audit in terms of their status as techniques of assessment and computation (see Miller and Rose 1990; Power 1997; Miller 2001), exert a critical influence over both the design of regulatory technologies and their use in the actual production of enforcement cases, determining which forms of market trouble or disorder ultimately pass muster as valid enforcement concerns. With this in mind, a discussion of agency worksheets and scorecards is included alongside the various regulatory technologies as a means of appreciating both the necessarily fuzzy boundaries between these technologies and other analytical devices, and the ways in which these technologies are shaped by organizational, managerial, and legal logics that extend well beyond their manifestly technological features.
With this provisional definition in hand, there are two specific regulatory technologies that inform the daily practice of securities enforcement and which may be used to further flesh out this concept and its particular bearing on the regulatory process. These include: (1) surveillance and detection technologies; and (2) databases and datamining. The assessment of these technologies is informed by a multi-year study of securities regulation and enforcement in Canada. Consisting of documentary research and ninety interviews with regulators and various stakeholder groups, the study examined the relative contributions of a number of key agencies to the policing of financial markets including: (1) the police; (2) statutory securities commissions; and (3) self-regulatory organizations. While not initially concerned with the technological dimensions of this very diverse regulatory activity, it quickly became apparent that technology was indispensable, and increasingly so, to each of these agencies as it informed many of their engagements with the markets and was featured prominently in public disclosures and accounts of regulatory activity. It is this larger context, and the organizational, moral, political, and legal contours of enforcement, that informs the discussion of these regulatory technologies.

**Surveillance and Detection Technologies**

The first of the two regulatory technologies involves the use of sophisticated computer programs and complex mathematical algorithms to monitor stock prices and trading volumes in real-time, this with the objective of detecting fluctuations that depart from the designated normal range and serve as potential signposts for manipulative or improper trading. Once detected, these suspicious movements are then translated into computer-based alerts which appear on-screen for surveillance officers to review and assess. Using the data contained within these alerts, along with other sources of market information and a suite of data visualization and graphing tools, surveillance staff must determine whether these anomalies represent true indicators of trading
violations demanding a more in-depth look by specialized investigations units, or whether they
can be chalked up to such innocuous explanations as the issuance of a news release or the normal
vicissitudes of the markets. Representing what I have elsewhere referred to as financial
surveillance (Williams 2009), this very technology is central to the enforcement functions
performed by self-regulatory organizations such as IIROC, the Canadian self-regulatory
organization tasked with identifying forms of market manipulation, improper trade execution,
and front-running as per its own rules as well as detecting potential cases of insider trading on
behalf of the statutory securities commissions.

In theory, this budding surveillance capacity holds tremendous promise and represents
one of the key benefits associated with the shift to electronic trading, a move that has
dramatically increased the visibility of finance (de Goede 2005; Knorr Cetina and Preda 2005;
Sassen 2005; MacKenzie 2006; Preda 2006; 2007; Zaloom 2003; 2006; Pryke 2010) and, by
virtue of the regulatory possibilities contained in this enhanced transparency, created new
opportunities for exactly this kind of monitoring and analysis. As noted by Preda (2007),
“Technologies for recording, displaying, and memorizing price data opened up ways of
monitoring and analyzing “market behaviour” which otherwise would not have been possible”
(38). And yet, despite this promise, these surveillance technologies are not without their
limitations chief among which are the assumptions and parameters built into the programs
themselves. For example, given the logic of statistical deviation that underlies the mathematical
algorithms used in these programs, the design and production of alerts invariably hinges on the
settings for the statistical norms and the time periods according to which market activities will be
adjudged. Here surveillance staff run into a host of challenges as the ‘nature of normal’ will vary
not only across different stocks, with extremely liquid, heavily traded stocks being much more
volatile than illiquid stocks that are thinly traded, but also time periods. Considerations of time and timing are especially relevant given the thirty day time frame according to which all statistical averages are calculated and normal trading ascertained. One implication of this rather narrow window into the markets is that the surveillance system is geared towards fairly sudden and sharp bursts of abnormal activity executed over short time periods, “That [trade triggered an alert] because the stock never traded. And on the day before the news, the firm bought everything they could. So they were the biggest buyer that day, caused the price to move, the only activity of the week. And then the takeover was announced the next day” (Former RS #1: 12). In contrast, patterns that emerge gradually, over much longer time horizons, and with a more discrete arc may be missed. As noted by a former trader who is now in the business of market surveillance, “[These systems focus] on how is today different from yesterday. And they are looking for inter-day sudden bursts of activity. And they’re not looking at something which might have built up over time” (Consultant #3: 2).

These surveillance systems also rely on a limited range of market indicators, namely volume, price, trade rate, and order rate, identifiers that provide a rather superficial and overly simplified view of the market. In this respect, real-time market surveillance is rooted in a sociotechnology of simplification, a “summary form of visibility” through which “much is being turned into rather a little” (Law 2002: 28). As noted by Knorr Cetina and Bruegger (2000) in the context of the views of the market made available through electronic trading, “The markets investigated display themselves through signifiers which identify the object and render it significant. But these appresentations and representations never quite catch up with the object; in some aspects they always fail and misrepresent the thing they articulate. They generate the market in partial and inadequate ways” (8). From this it would appear that surveillance officers
are engaged in a task of monitoring, not the markets per se, but rather particular re-creations of the markets. These are mapped out according to a finite range of indicators or byproducts of financial activity with a limited view of the actual texture and significance of the transactions themselves, “market surveillance reflects a fascinating attempt by agency investigators to monitor the byproducts of activities to which they have no access, to study the faint observable outlines and inferentially reconstruct their underlying texture” (Shapiro 1984: 60). Given this somewhat limited view of the markets, the challenge facing surveillance staff is that even if abnormal activities are picked up, it may not be clear what they mean or how they are significant resulting in their abandonment as enforceable cases. Thus, in the same way that the emergence of electronic exchanges has made it more difficult for traders to read the markets, placing greater emphasis on interpretive skills and the ability to “pull meaning from interminable streams of numbers” (Pryke and du Gay 2007: 344; Knorr Cetina and Bruegger 2000; 2002; Zaloom 2003; Beunza and Stark 2004; 2005; Beunza and Muniesa 2005; Pryke 2010), surveillance staff have access to an array of informational and analytical tools, and yet face the formidable task of extracting regulatory meaning from the market movements reproduced on their screens.

Two additional influences are brought to bear on these surveillance technologies as they have been deployed in the Canadian context. The first involves the demands of the work process itself and the sheer number of alerts produced by the system. One of the frequent complaints of agency staff as well as those familiar with the surveillance function is that the system yields a large number of alerts that relate primarily to technical matters yet consumer an inordinate amount of time and energy, thus distracting them from more serious violations. There is also the influence of more narrow managerial concerns such as the need to produce an appropriate
number of alerts relative to the number of available surveillance staff, an objective that can be managed simply by adjusting the sensitivity of the alerts. As one manager explained,

The way we do it is we generate 20% more alerts than [the staff] can investigate. So we set the sensitivities. As a manager at the end of each quarter, I don’t look at how many alerts were generated. I look at how many were investigated and closed. I know how many they’re capable of investigating every day. So as long as those numbers are there, I don’t particularly care how many were generated. As long we’re investigating enough (RS #3: 7).

Another important consideration and constraint on the effectiveness of surveillance technologies involves questions of agency politicking and the regulatory division of labour. This is primarily a matter of jurisdiction. As a self-regulatory organization, the jurisdiction of IIROC is limited to the traders who participate on the exchanges for which it is the recognized regulatory service provider. Excluded from this jurisdictional ambit are the clients behind the trades and the public companies whose shares are bought and sold. Moreover, while IIROC is obliged to detect instances of insider trading, it does not have the statutory authority to pursue these cases which must be referred up the chain to the appropriate statutory securities commission. This has resulted in considerable frustration on the part of agency staff who have reported various instances where evidence of suspicious trades has been unearthed and the cases referred to the securities commissions only to disappear and never to be heard from again. When combined with fairly narrow assumptions and limited indicators, these managerial concerns and forms of inter-agency politicking further limit the effectiveness of surveillance technologies.

Databases and Data Mining

While front-line market surveillance is perhaps the most advanced of the regulatory technologies, another computerized application that is central to the work of regulatory agencies is the mining of available databases for signs of disorderly, suspicious, or risky activity. Informed by practices in the private sector where datamining, or “dataveillance” (Levi and Wall
has long been used as a critical tool for gathering information relevant to companies and
their operational risks, regulatory agencies are turning to these techniques as a means of sifting
through the massive volumes of data yielded by mandatory compliance and disclosure
requirements and seeking out market players whose practices are suspect and deserving of
further scrutiny. This is what is sometimes referred to as ‘risk profiling’ or ‘risk trend analysis.’

One of the best examples of such databases and data mining capabilities in the Canadian
context is the Complaints and Settlements Reporting System (ComSet) used by IIROC.
Established in 2002, this database consists of mandatory reports filed by member firms regarding
a range of incidents deemed relevant from a regulatory perspective. This includes: (1) written
client complaints about trading in their accounts; (2) client allegations of theft, fraud, market
manipulation, and money laundering; (3) domestic or international investigations or convictions
of a firm or registrant by a regulator or criminal authority; (4) civil suits alleging impropriety in
trading or client accounts; (5) internal investigations; and (6) denial of registration. Once these
reports are entered into the ComSet database, they are then assessed by means of a variety of
risk-based tools. One of these is the ComSet Risk Tool which uses mathematical algorithms first
to normalize ComSet reporting based on the number of events reported by firms, the types of
events and violations, the seriousness of events, and the number of registrants at each firm –
what effectively becomes the normative baseline – and then to identify firms, branches, and even
individuals trending upwards in these reports, a potential sign of an emerging or evolving
regulatory risk. Thus the objective is “not to come to a final judgment about the firm’s past
performance on an absolute basis but identify its risk trend and ranking relative to other member
firms” (IDA #5). The data harvested from the ComSet database, which is further processed and
rendered into various graphical representations and manifest signs of risk, is then fed into the
agency’s Sales Compliance Risk Model which, when combined with the Financial Compliance Risk Model, yields an overall Compliance Risk Trend Report for member firms and their employees. Both as a single indicator, and in conjunction with these other reports, ComSet data directly inform the enforcement process rationalizing the allocation of resources and directing attention to those firms and individuals with the highest relative risk scores. This is part-and-parcel of the agency’s risk-based approach to regulation which “allows IIROC to re-allocate resources to firms that have a higher than average potential to cause risk to the public, thereby enhancing the quality of regulation while minimizing unnecessary regulatory burdens on firms posing little or no risk” (www.iiroc.ca).

Despite offering a seemingly valuable “window into the industry that we didn’t have before” (IDA #2: 17), and thus insights into potential problems in the marketplace, ComSet is subject to a number of practical limitations. The most obvious of these is that the integrity of the system is entirely dependent on the willingness of firms to accurately self-report problems or misdeeds that may not otherwise come to light. This is not simply a matter of bald refusals to report as required, but the ability to take advantage of ambiguities and loopholes in the reporting requirements themselves. For example, firms may disabuse clients of the validity of their complaints and/or encourage them not to file a complaint in writing, thus avoiding two key reporting triggers. They may also game the system by playing on the distinction between complaints that are service versus non-service related, “With ComSet you’re supposed to file any internal investigation, any client complaint that is not service related and they’ve never really given a definition of what’s ‘service related.’ So I think a lot of firms just say well it’s service related we don’t have to file it” (Former RS #2: 6). These ambiguities allow for a degree of discretion that challenges the integrity of the reporting system and fuels the suspicion that dealers
“systematically under-report” incidents (Investor Advocate #2). In the words of one respondent, “often the dealers will turn a blind eye to their responsibilities, they’ll be informed in writing so that the rep is covered, but they will choose to not report to the IDA, on I guess a discretionary basis” (Lawyer #11: 1). Beyond the integrity of the reporting system itself, there is also a sensitivity within these risk profiling metrics to audit markers and signs of due diligence that privilege larger over smaller firms. That is, firms seen to have robust systems in place for managing risks and dealing with complaints are more likely to be classified as lower risk than those whose systems are less developed or less resonant with regulatory sensitivities. The result is that these kinds of risk-based assessment tools tend to be skewed towards the more marginal firms deemed to be ‘high risk’ not only on the grounds of the volume and nature of complaints, but also their status as outsiders unable to adequately signal their willingness if not necessarily their ability to comply. This further limits the effectiveness of these devices in identifying less obvious signs of risk and has the effect of tethering the regulatory process to more normatively informed judgments about firms, their activities, and the deservedness of regulatory attention.

**Worksheets and Scorecards**

With the move from data collection and analysis to the more formal stages of case assessment, the salience of these kinds of judgments around regulatory merit become even more pronounced. It is at this point that a variety of worksheets and scoring systems are used by enforcement officials to assess incoming files and determine which of the nascent signs of trouble yielded by these technologies are likely to provide the greatest return on regulatory resources. While these devices do not meet the strict definition of a regulatory technology, they nevertheless play a critical role in shaping how or whether the fodder of these technologies are converted into actionable cases. They also speak to the logics and considerations that are built
peripherally into these technologies themselves. With this in mind, it is helpful to consider these worksheets and scorecards in their own terms as a particular type of regulatory device.

All enforcement agencies assess incoming files using scorecards that consist of a series of evaluative criteria each of which are assigned a particular weighted score and are then combined to produce an overall numerical ranking for each incoming file. Typical criteria would include factors such as: (1) the nature and impact of the activities in question including the number of investors affected and the size of the losses; (2) the degree of urgency as indicated by whether the activity is ongoing, assets remain at risk, or there is a possibility that evidence will be destroyed; (3) investigative value determined by the duration of the activity, whether it involves multiple parties, its ranking according to agency priorities, the resource requirements, and whether the ‘offenders’ were previously warned or sanctioned; and (4) other considerations such as the case’s media profile. As explained by one member of the Ontario Securities Commission,

We have a weighted point system that adds the points up for the type of case. Then it’s how much harm. Over $100,000? Over $1 million. How much money is involved or how much harm has been done to the public? How many people have been hurt? What kind of activity is it? Is it conspiratorial? Is it egregious or was it just misinterpretation of the rules, nobody was really hurt so it doesn’t really matter? How many people have been involved in the activity? (OSC #8: 7).

In addition to these core criteria, a number of mitigating factors are also factored into case assessments such as whether another enforcement authority has primary jurisdiction, a disproportionate commitment of resources would be required, alternate remedies are available, the activity was inadvertent, or significant time has passed since the offense occurred. Once files have been scored and ranked accordingly, the decision is then made as to whether they will make it into the formal enforcement caseload as well as their place in the queue. As with ComSet, this entire enterprise is framed in terms of the merits of risk-based regulation, “what we do at the commission is establish processes and procedures and risk-based approaches and screening
mechanisms for determining which cases will be selected from the vast array of cases that could be pursued by enforcement” (OSC Dialogue 2004).

Although seemingly rooted in rational and objective determinations of harm and seriousness, one of the problems with these assessment devices is that many of the criteria are themselves quite vague referring to a multitude of factors and case attributes while providing little obvious direction as to how these criteria should actually be applied in any given situation. This sense of ambiguity was clearly evident in the comments of respondents themselves many of whom were skeptical about the merits of these risk-based metrics and alluded to the continued importance of such intangibles as ‘gut instinct’ and ‘feel for the case.’ Here it is the flexibility of the criteria and the ability to massage numerical scores in instances where an investigation is deemed necessary that renders them tolerable to enforcement staff, while nonetheless undermining their stated aims of rationalizing the assessment process,

We have a scoring system in our department, a file screening template that we use, that in my view provides us with no additional value. The template is designed in such a way that it tries to put a numerical value on a particular issue. There’s a fair degree of flexibility in the scoring scheme so you can manipulate that score a fair bit. But I dare say that we don’t need a scoring template or a scoring sheet to tell us whether or not a matter is serious or not (IDA #2: 4-5).

This echoes the observation by Black (2005) that, within the confines of risk-based regulation, “it is perfectly possible. . . for supervisors to continue to do their assessments on the bases with which they are comfortable, and then just to recast them into the new assessment forms” (172).

Beyond their ambiguity and ability to accommodate the maneuvering of enforcement staff, another consideration is that very few of the designated criteria are actually risk-based, that is, rooted in the threats posed by activities and actors. Rather, they are informed by more normative judgments regarding the deservedness of the case with considerations such as the intentionality of the conduct, the status of respondents, the credibility and degree of complicity
on the part of complainants, and opportunities for sending a ‘strong message’ figuring prominently in these more informal determinations of case worth.⁶ These notions of value, blame, and just deserts, all essential ingredients for a ‘good case,’ reveal that what actually drives the enforcement process is not the operationalization of technically derived risk metrics but the ability to construct a strong narrative grounded in moralized notions of deservedness and blameworthiness (Hawkins 2002). Operating on the margins of agency scorecards, these moral undercurrents suggest that these and other like-minded assessment tools, notwithstanding their technical pretensions, are actually rooted in normative frames which have the effect of limiting their effectiveness and yielding specific types of deserving suspects problematized more in accordance with their moral transgressions rather than their financial risks.

Returning to the strategic uses of these assessment devices, while many respondents were openly skeptical of their practical utility they did recognize their value in justifying case decisions to both internal and external constituencies as well as in rationalizing the enforcement process more generally which, it can now be argued, turns on specific criteria and the pursuit of the most objectively deserving cases rather than more nebulous and potentially objectionable considerations. These kinds of risk-based devices thus provide a kind of built-in defensibility as decisions to pursue or not pursue specific cases can be justified according to attributions of low versus high risk, yielding a “defensible basis on which [the agency] can answer its critics and explain both the actions that it took, and more importantly, the actions it did not take” (Black 2006: 25; see also Hutter 2005). In this respect, they address a key management concern, “Something had to be done to change our process where we no longer had to take in everything. We needed to kind of justify a reason for saying ‘we can’t do your file, it doesn’t meet the threshold’ or that sort of thing” (IDA #2: 4-5). In the words of a senior IDA manager,
It is our view that we needed some sort of objective standards in order to set a threshold, and one that could be varied with the resources that are available. So what we did is in our case assessment area we set up a file screening program, and the file screening program essentially scores each and every complaint based on a series of factors (IDA #5: 5).

The attractiveness of risk as an organizational and representational device delivering a unique blend of defensibility and de-politicization is nicely captured by Black (2005), “Risk-based frameworks hold out the promise that the challenges and complexities of financial supervision can be rationalized, ordered, managed, controlled. Faced with that temptation, what regulator could resist?” (179).

**FACES ON THE WALL AND LINES IN THE SAND**

While the agencies responsible for policing the markets have an ever greater array of technologies and analytical capabilities at their disposal, it would appear from the foregoing discussion that these regulatory technologies suffer from a variety of limitations that undercut their usefulness and their ability to significantly advance the regulatory cause. In the case of market surveillance, it is the assumptions and narrow parameters that underlie the designations of ‘abnormal’ versus ‘normal’ activity, the challenges associated with managing the production of alerts relative to organizational resources and mandates, and jurisdictional constraints and forms of inter-agency politicking with fellow regulators. With respect to databases and datamining, it is the conditions governing entry into the database, namely the reliance on self-reporting and the ambiguity around exactly what qualifies as a reportable incident, as well as a built-in sensitivity that privileges firms who are able to signal their status as good citizens through accepted signs of compliance and due diligence. On this count, certain firms, individuals, and practices are constituted as ‘high’ versus ‘low’ risk arguably on the grounds of their compliance with “‘auditized’ representations of business processes” rather than actual practice (Power 2009: 853).
These influences are further magnified through the feeding of the results of these technologies through scorecards and worksheets which, despite their claims to greater objectivity and incorporation of a more exacting calculative logic, continue to be driven by staff discretion coupled with highly moralized determinations of deservedness and blameworthiness, a reflection of enforcement’s roots in legal narratives and the ability to offer a compelling story.

And yet, to conclude from this discussion that regulatory technologies are simply limited in terms of their practical utility, failing to deliver on their stated promise, is to miss the point. Clearly, much of the drive towards the development and implementation of these kinds of technologies stems from their communicative value. As intimated by Black (2005) in her reference to the benefits of defensibility provided by risk-based frameworks, the open embrace of technology as part of the regulatory process must be viewed in terms of the larger move towards risk-based regulation which would appear to be less concerned with minimizing external regulatory risks and more with limiting risks to the agencies themselves (Black 2006; Hutter 2005; Rothstein et al. 2006; Power 2007; Black and Baldwin 2010). This interest in the management of ‘institutional’ versus ‘societal’ risks reflects the heightened politicization of the regulatory function and the ever greater demands for accountability and transparency within the regulatory process (Power 2007; Rothstein et al. 2006; Black 2005; 2006; Hutter 2005).

Nowhere is this more apparent than in the context of securities regulation where agencies have been placed under tremendous pressure to ramp up their enforcement efforts at the same time as they are exhorted to avoid any undue incursions on the normal course of business. It is here that the logics of risk assessment underlying these technologies have proven especially valuable in helping agencies to manage their contradictory mandates and divergent audiences and expectations (Rothstein et al. 2006; Hutter 2005), a means of “formalizing organizational
operations in order to provide bureaucratically rational ‘due diligence’ defenses in the face of increased accountability pressures” (Rothstein et al. 2006: 97). The implication here is that it is less the accuracy and more the usefulness (Millo and MacKenzie 2009) of regulatory technologies that is key as they play a critical role in the rationalization of the enforcement process and figure prominently in agency efforts to signal their efficacy to a variety of stakeholder groups. Regulatory technologies are thus part of the techniques of rationalization used by regulatory agencies to manage “assaults on their legitimacy” (Hutter 2005: 12).

Notwithstanding the very real benefits to be accrued from these technologies as communicative devices, it would be wrong simply to reduce them to this symbolic register. They are themselves part of the texture of the enforcement enterprise shaping, often in quite subtle ways, the criteria that inform the regulatory process and thus the types of cases and forms of market trouble bound to be picked up by agencies and pursued as valid enforcement concerns. In the words of Black (2006), “[risk-based regulation] is not simply a legitimation device that leaves underlying processes untouched; rather, it seeks to reshape those processes quite fundamentally” (21). Here an interesting connection emerges with the social studies of finance which focuses on the mechanisms, devices, and technologies through which the markets and finance are not simply represented, as a form of passive recording, but rather actively shaped and constituted on an ongoing basis. Examples include recording technologies (Preda 2006), market indices (de Goede 2005), visualization software (Pryke 2010), financial audits (Power 1997; 2004; Miller 2008), and the formulas used to determine pricing and predict risk in the derivatives market (MacKenzie 2006; 2009). These devices represent part of “the material and discursive assemblages that intervene in the construction of markets” (Muniesa et al. 2007: 2), and are thus part-and-parcel of the practical orderings and discourses that act to produce
economically relevant activity (Law 2002; Preda 2002; 2006; MacKenzie 2004; 2006; de Goede 2005; Knorr Cetina and Preda 2005; McKenzie et al. 2007). This begs the question of the extent to which regulatory technologies, and the associated algorithms, visualization tools, and databases, are themselves part of the materialities of the market, a form of “technological materiality” (Millo and MacKenzie 2009: 640) that intervenes in the enactment and framing of the markets for the purposes of regulatory consumption. Adopting this analytical lens, there are three ways in which the aforementioned regulatory technologies, in conjunction with worksheets and scorecards, may be seen to inform the materialities of enforcement and thus fundamentally (re)shape the regulatory project. These include: (1) egregious outliers and risky subjects; (2) financial frames and market boundaries; and (3) enforcement gaps and regulatory omissions.

**Egregious Outliers and Risky Subjects**

This first of these connections stems from the distinct logics and operational modalities that underlie these regulatory technologies. Despite the image of an artificial intelligence scouring the vast spaces of the markets for any and all signs of wrongdoing, these technologies are not principally or even primarily geared to the detection of problems in the marketplace, but rather the differentiation of market transactions and players based on their departures from a pre-established, standardized, and normalized baseline. The emphasis is thus on the transactions and transactors deemed problematic by virtue of their atypicality, a discriminative logic that allows for the systematic and rapid filtering of an entire population of possible events. These designations of typicality and atypicality are especially pertinent to surveillance and datamining technologies whose algorithmic logics and mathematical functions are rooted in exactly this manner of problematization identifying only those cases which exceed specified parameters based on mathematical rules such as ‗greater than‘ (>) or ‗less than‘ (<). Indeed, they are
incapable of any other form of analysis. Moreover, within these systems, it is not simply that patterns of activity depart from the norm, but the extent and degree of this departure as deviations are translated into numerical scales allowing for the further processing of deviant cases and their ranking according to computer-generated designations of priority. By virtue of this particular logic, these regulatory technologies are dedicated to the identification, or more accurately the production, of what are in essence statistical outliers with the most egregious of these cases often demanding the most urgent attention.

Moving beyond the inner logics of the technologies themselves, also noteworthy is how these statistical norms and deviations are interpreted according to, and reconciled with, notions of ‘risk.’ Resembling a post-hoc evaluative category rather than a true statistical or calculative measure, the tendency within these systems is to conceive of ‘risk’ not in terms of the activities that pose the greatest threat to the integrity of the markets, but rather those which depart most significantly from ‘the norm,’ that is the egregious outliers automatically defined as ‘high risk.’ Conversely, those activities and players located within ‘the norm’ are by implication deemed ‘low risk’ and are thus de facto removed from regulatory scrutiny simply on the grounds of their conventionality. So long as activities are consistent with or at least do not significantly depart from established practices, it is unlikely that they will be problematized or picked up through these kinds of applications, the product of a purely statistical rendering rather than any kind of informed evaluation or reasoned assessment. The result is a kind of analytical sleight of hand whereby what is in essence a statistical determination is conflated with an evaluative logic with the effect being that attributions of priority or threat tend to be directed towards the statistically anomalous, while the activities approaching and approximating the norm are effectively removed
from scrutiny. It is these very slippages around the precise meaning of ‘risk,’ and its conflation with other logics (i.e. notions of anomaly and departure), that inform risk-based regulation.

Another important consideration to emerge from the logics underlying these regulatory technologies involves the relationships and symmetries between these largely statistical determinations of anomaly and more normatively grounded considerations of ‘violation,’ ‘offense,’ and ‘transgression.’ As regulatory scholars have long recognized, the practice of enforcing legal violations is a distinctly normative enterprise geared towards forms of misconduct and types of violators that are not only atypical, but also offensive, intentional, and deemed to be in clear violation of both legal codes and established industry practices, with judgments of character, credibility, status, and blameworthiness providing much of the fodder for these assessments (Ewick 1985; Shapiro 1985; Hawkins 2002; see also Reichman 1991; Lange 2002; Power 2007). In view of these undercurrents, one of the intriguing aspects of these regulatory technologies is that, while perhaps not themselves grounded in moral considerations or normative criteria, they nevertheless tend to produce instances of misconduct and forms of violation that are amenable to, and are more easily reconcilable with, the very normative frames that guide the enforcement project. The mere fact that the practices and players selected out for scrutiny are defined first and foremost by the manner and degree of their deviation from ‘the norm’ is itself conducive to these kinds of normative determinations. Likewise, the criteria of atypicality and statistical egregiousness are more likely to apply to financial activities and actors that are exceptional or out-of-the-ordinary whether determined by the nature of the activities in question or, as is more likely the case, the status of the players involved.\textsuperscript{ix}

It is here that notions of ‘risk’ once again become significant as they are invoked not only as a descriptor or evaluative designation for the statistical outliers generated by these programs,
but also as a more normatively inspired and pejorative assessment. Determinations of ‘high’ versus ‘low’ risk depend on the atypicality and egregiousness of activities judged in accordance with the status of alleged perpetrators, their reputations with regulators, and their ability to invoke the necessary vocabularies of motive to cover for their activities, all reflections of the imputed character of the individuals involved. Ultimately, these regulatory technologies do not simply provide designations of risk on which more normatively inspired attributions can be superimposed, but they are in fact conducive to exactly this mode or logic of problematization given their grounding in notions of atypicality, aberration, and egregiousness, and their combination with more normatively inspired assessment tools. It is these intersections that fuel the production of both egregious outliers and ‘risky subjects,’ the faces of whom adorn the walls and occupy the attention of enforcement agencies.

Financial Frames and Market Boundaries

By identifying signs of anomalous market activity, regulatory technologies do more than simply differentiate ‘typical’ from ‘atypical,’ and ‘low risk’ from ‘high risk,’ conceived as relative positions on a regulatory continuum. They also serve, and this points to a second performative feature of these technologies, to divide market activities in terms of mutually exclusive categories of regulatory merit and, in so doing, create or perhaps more accurately perform the very boundaries that enliven these distinctions. This notion of boundaries or borders, what Foucault (2000) terms “dividing practices” (326), once again traces back to the social studies of finance a key insight of which is that financial markets are defined not only by their component devices, metrics, and technologies, but also the boundaries or points of contrast through which they are performed, constituted, and legitimated as rational, legitimate, and well ordered spaces of exchange (Callon 1998; Callon and Muniesa 2005; Muniesa et al. 2007; Preda 2006; 2009; Miller 2008; Pryke 2010). This is an aspect of what Preda (2009) refers to as the
framing of finance which, he argues, turns on the ability to distinguish between insiders and outsiders and thus designate a “constitutive outside” (Mitchell 2002: 291) through which boundaries are drawn “between legitimate groups, together with the institution they support, on the one hand, and a tolerated “rest,” on the other” (Preda 2009: 67). A similar form of juxtaposition is cited by de Goede (2005) as having played a critical role in the legitimation of speculative activity in the early 1900s, this through its contrast with the more socially questionable practice of gambling. In this respect, the problematization of gambling established a “pattern of normalization” “which made possible. . . the emergence of speculation as a legitimate practice” (54). What is perhaps most critical about these kinds of boundary marking activities is that by the very act of constituting a questionable ‘outside,’ they serve to normalize and legitimate the activities of those on the other side of this line (de Goede 2005; Aitken, 2007; Langley 2008a; 2008b; Preda 2009).

Returning to the enforcement fold, this process of enacting boundaries is reflected in the view, widely shared amongst respondents, that the markets can be divided between the majority of market participants who have good intentions, are generally good citizens, and have an abiding interest in playing by the rules, albeit while engaging in the occasional ‘technical’ transgression, and the minority of much more questionable market players with dubious reputations and an absence of both good intentions and ties to the financial core, “You’re going to have the legitimate, honest people that you don’t have to worry about, then you’re going to have this band that is either lacking in intention or prone to looking after themselves at the expense of the law, and then you’re going to have the decidedly rotten scoundrels” (Lawyer #6: 7). In juxtaposing these two classes of market actors, respondents invoked the metaphors of “lines,” “fences,” and “perimeters,”
You have people inside the fence and outside the fence. People inside the fence want to settle and be good citizens because they want to continue to play in the sandbox. They may fight a bit but they will eventually settle the matter. The people that are doing stuff outside the fence which is often fraudulent activity will not settle (OSC #4: 10).

Echoing this sentiment, a top securities lawyer used the analogy of a football game to explain this boundary. For the players who are interested in playing the game by the rules, inadvertent breaches can be refereed and dealt with through other units or more informal actions. However, for the committed rule breakers who have no intention of playing by the rules and who “run into the stands to catch the ball and argue that the touchdown still counts,” (Lawyer #7: 2), formal enforcement action is deemed both necessary and appropriate.

While less stark and less overtly moralized, it would appear that regulatory technologies along with various assessment tools are rooted in a similar logic of categorical juxtaposition. What is produced within these various programs is not simply a scale of typicality and deviation but rather a line effectively separating that which will be subject to scrutiny for the purposes of enforcement, this by virtue of it meeting the criteria of ‘high risk,’ and that which will not, what is therefore construed as ‘normal’ or at least unproblematic from a regulatory standpoint. Even more critically is that the very act of producing these categorical distinctions is the result of an entirely automated and routinized process. Activities deemed ‘normal’ or ‘typical’ or ‘low (or no)’ and ‘high’ risk are automatically removed from suspicion, this in the absence of any kind of reflection or deliberate assessment on the part of enforcement agents themselves. Why waste valuable time and energy questioning the work product of these systems, or exploring activities that may exist beyond their perimeters, when the whole point of having them is to rationalize and streamline the enforcement process. The result of these thoroughly automated exclusions is that these boundaries are, quite unintentionally, rendered in the form of a deceptively ‘bright’ line,
the product of a purely technical and thus de-politicized process rather than somewhat arbitrary and normatively inspired acts of distinction. It is through these various dynamics of juxtaposition, framing, and normalization that these technologies help to bring into existence a particular view of both the markets and financial disorder, thereby performing the distinction that separates different classes of players and activities and constituting the markets as both regulated and distinctly regulatable social spaces.

**Enforcement Gaps and Regulatory Omissions**

The notion that systems of securities regulation and enforcement tend towards particular types of cases to the exclusion of others is a frequent refrain of critics and was featured prominently in the comments of those interviewed as part of this larger study. For example, in response to a question about regulatory gaps one respondent replied, “I would have to say yes. There’s cases where clients consult me worried, and with just cause worried, and nothing happens” (Lawyer #3: 12). In the more critical assessment of another respondent,

> What I see is that there’s this whole spectrum of issues out there and the securities commission is concentrating its resources on issues that are 99% fixed. So they’re concentrating 99% of their resources on issues that are pretty well fixed and there are big problems out there that are not being addressed and they’re just ignoring or devoting very limited resources to (Lawyer #22: 10).

A third respondent directly questioned the merits of the risk-based approach given the tendency to focus on smaller issues to the exclusion of larger problems in the marketplace,

> The $10,000, $20,000, $30,000 fines against these brokers that do discretionary trading, I think there’s bigger issues out there. But if you look at the cases you see a lot of that. So it just makes me wonder when they talk about priorities are they really doing a risk-based approach... some of the stuff they seem to be spending time on just to me is low on the totem pole (Former RS #2: 7).

When viewed in relation to the preceding discussion of egregious outliers, risky subjects, and financial boundaries, the question invariably arises as to the types of gaps and areas of omission
that emerge from these regulatory technologies. Regardless of their other applications, the main function of these technologies is to organize and narrow the regulatory field of vision, this by pre-screening and therein limiting the number and range of problems with which regulators need concern themselves. Based on the logics, assumptions, and operating procedures that are built into these technologies and which animate this screening process, it is reasonable to expect that there would be particular patterns in the types of financial activities and actors likely to be either excluded from the regulatory gaze, that is assessed but found to be ‘normal’ or ‘typical’ despite their potentially troublesome features, or not even subject to review and overlooked altogether. Indeed, the results of this research point to two different forms of omission.

The first involves activities and actors that are organized such that they fall below the thresholds needed to trigger the regulatory alarms and are thus viewed as normal, or at least are de facto normalized, by virtue of having been subject to automated review. Examples would include sophisticated forms of insider trading and market manipulation that are too subtle or dispersed to be picked up by surveillance systems or, in the context of risk profiling tools, problems with the quality of stocks or mutual funds that are invisible to the average client and are thus unlikely to trigger the types of inquiries and complaints that would appear as reportable incidents in ComSet. Moreover, these are the forms of misconduct which, even if detected, would likely score poorly on agency scorecards given their complexity, the absence of the requisite element of intent, the involvement of players of substantial reputational and symbolic capital, and the failure to satisfy the legal and in particular the narrative requirements of the enforcement process. The complexity of these cases exerts an especially strong impact on the dynamics of case assessment and prioritization as the criteria engineered into agency worksheets place greater weight not only on more blatant, atypical, or clearly egregious conduct, but also on
incidents where expenditures may be more limited, that can be processed in a relatively short period of time, and in which evidence is more readily accessible and less subject to challenge. As noted by Hawkins (2002), “The result is that enforcement is channeled into particular types of case. The complex, the costly, and the legally defensible are less likely to be prosecuted (439).

The second set of omissions is rooted less in these specific trigger points, their internal logics, and their relative sensitivities vis-à-vis different forms of (mis)conduct and more in limitations bearing on the functional capabilities and potential applications of the technologies themselves. In this first instance, questionable activities are at least vulnerable to the possibility of detection with the difficulty being where the thresholds are set, allowing some activities to be picked up while others are overlooked. The much larger problem involves areas of financial activity that simply are not amenable to review or analysis as they do not lend themselves to the forms of visibility required by these technologies or the data structures needed for them to function. As we have seen, regulatory technologies such as market surveillance and risk profiling are quite capable of assessing data that exists in electronic form and which is organized in terms of the continuous patterns required by the rules of algorithmic analysis. However, they are much less adept, to the point of being functionally ineffectual, at detecting problems in data that is not organized in this way and thus does not lend itself to this kind of formatting and analysis.

Perhaps the best example of this are the accounting-based offenses associated with the likes of Enron and WorldCom. One of the key challenges with these types of cases is detection. Admittedly, this is next to impossible where overt financial misrepresentation is involved and there are thus few discernible clues to the illegal conduct lingering beneath the surface. However, in many of the cases unearthed during the early 2000s, the problems were embedded in financial statements themselves but were not picked up. Here the functional limits of available regulatory
technologies are quite clear as accounting statements do not exist (at least to regulators) in the electronic form required for more intensive datamining. Moreover, the ability to review these statements for signs of impropriety often depends on a sense of intuition and critical judgment that is irreconcilable with the statistical language of aberration and atypicality. It remains to be seen whether such technologies might be developed in the future but at this point their application to accounting offenses, certainly from a regulatory perspective, remains limited.xi

Even if detected, accounting cases are notoriously complex lacking clear forms of wrongdoing and clearly imputed motives, and involving areas of legal ambiguity and professional judgment that create significant reputational risks for regulators themselves, “Any of those financial statement ones seem to be quite problematic. . . I was involved in the [Company X] file and what they did there way just shocking and appalling. They just didn’t roll up their sleeves and actually do an effective investigation” (Accountant #2: 3). Perhaps this accounts for the lack of urgency on the part of regulators to develop and/or adopt technologies for these types of cases. The result of these challenges of detection and enforcement is that, even if they are discovered, these cases quickly drop in the list of risk-based prioritiesxii with agency concerns around the management of their own risks looming large in the background of these assessments and, as predicted by Power (2007), often trumping more serious societal concerns.

From this discussion of outliers, boundaries, and gaps, it would appear that what is most critical about the technologies available to regulators, and informs their existence as technological materialities rather than merely symbolic devices, is the production of a particular vision of the markets or the “construction of a broader field of financial visibility” (Thrift 2002: 203). The nature, scope, and parameters of this vision reflect the challenges of monitoring markets that are dispersed in time and space and are revealed only through moments of formal
execution, along with the assumptions, logics, and operational capabilities of the technologies themselves. This is bound to be a somewhat artificial enterprise as it relies on a limited range of indicators and data points, and an equally narrow set of mathematical operations which subject accumulated data to the only form of analysis possible: the detection of movements that depart from normalized baselines with the most urgent flags raised by the greatest and most egregious of departures. Granted, these technologies create a form or version of the markets that is distinctly regulatable, or auditable (Power 1995), and thus amenable to systematic and computer powered analysis. However, this auditability comes with a price as what is being analyzed is not the markets themselves but rather a replica lacking crucial details and nuances. The essential point is that these technologies do not simply rely on an artificial rendering of the markets; rather, they in fact require this degree of artificiality in order to function. The resulting practice of harvesting anomalies from a limited data universe is thus very different from the advertised pursuit of serious problems in the markets, many of which are bound to lack the epistemic features, informational coordinates, and manners of visibility required and likely to be detected by these programs. The problem with this computer-mediated rendering of raw data into actionable financial intelligence is thus what gets lost in translation. As some problems are more readily detectable through these regulatory technologies, others that are more complex, difficult, and resistant to this manner or mode of analysis are bound to be overlooked.

And yet, it is not simply the parameters and fault lines of the technologies themselves that constrain the regulatory process, but also the fact that they are embedded within a particular set of organizational, legal, and normative influences. This includes the managerial imperatives and resource restrictions which limit the amount of time and effort that can be devoted to analyzing the data yielded by these technologies, as well as the challenges and distractions associated with
having to sift through the vast byproducts of this process including large numbers of false positives and less serious technical breaches. The tethering of these technologies to specific jurisdictional boundaries also limits their range of motion confining them to designated markets and market players. Given the need to translate detected ‘anomalies’ into regulatory ‘offenses,’ the normative and moral undertones of the enforcement process is another major source of influence. This is especially true as one moves from detection to assessment as the latter is necessarily framed in terms of notions of merit and the obligation to select only those cases that satisfy the legal and narrative demands of the regulatory process, hence the focus on the most morally egregious activities and actors. This is another point where tensions emerge between the stated objective of identifying troublesome conduct regardless of its nature and the assertion from the following respondent that, “The real objective of the regulatory framework is the fringe people, the market manipulators, the poker dealers, the people who cheat little old ladies out of their savings, who take companies and engage in fraudulent activity, those people need to be prosecuted” (Lawyer #12: 9). It is these normative commitments, the often unstated subtext of ‘successful cases,’ that underlie the explicitly technical features of regulatory technologies and account for their gravitation towards ‘the usual’ faces on the wall and lines in the sand.

CONCLUSION

Confronted by continuously evolving markets and the ever greater speed and scale of transactions, regulators are engaged in a perennial struggle to keep up, or rather, to not fall too far behind. As part of this quest, regulatory technologies offer a ray of hope expanding the analytical capabilities of regulators and their ability to parlay available market transparencies into actionable intelligence. And yet, it would seem that the contributions of these technologies, as a matter of practice, are much more modest limited as they are by their own internal logics
and the nature of their organizational and legal embeddedness. The result of these various influences is the narrowing of the field of engagement and the production of a limited view of the markets. This is a view organized according to a logic of normalized distinguishability and coded in terms of the boundaries between transactions and actors thus divided and distinguished.

It is in this respect that regulatory technologies may be seen to contribute to the framing of finance itself (Preda 2009). Informed by the metaphor of looking through an outside window and witnessing events unfolding on the inside without actually being able to enter, these technologies provide a degree of access to the markets while at the same time limiting the extent and meaningfulness of this engagement. They thus represent observational devices, a kind of regulatory window into the markets that is significant both as a sign of regulatability on which the legitimacy of regulators and the markets may be staked, and an indication of the boundaries that invariably separate finance from the ‘outside’ world, the paradox of a financial visibility that is increasingly clear yet exceedingly remote. Taking this one step further, these technologies do more than simply create a rendering of the markets suitable for regulatory consumption; they are also constitutive of the markets themselves. As per the Hawthorne effect, market players are no doubt aware of the parameters and limits of these regulatory technologies and adjust their practices accordingly, thus altering market activities and potentially exacerbating existing financial risks (see Black 2006). And yet, these strategies, choices, and dynamics rarely come to light, subsumed as they are under the smooth surface of algorithms and technological outputs and framed in terms of the sound principles of technocratic inquiry and disinterested deliberation, a further manifestation of the de-politicization of finance (de Goede 2005).

There are a number of implications that follow from this analysis. First, the critiques and limitations of regulatory technologies offered in this paper should not be interpreted as evidence
that nothing works or that no more can be done. Indeed, while regulators are invariably distanced from the markets and must rely on the reconstituted footprints or outlines of market activity, there are certainly opportunities for expanding the applications and capabilities of regulatory technologies. These might include: (1) adopting more sophisticated software programs and data visualization tools allowing for greater insights into the markets and their movements; (2) developing more finely turned algorithms and expanding the time periods according to which departures in trading volume and rate can be referenced, thus increasing the odds of identifying anomalies or manipulations that might have built up over time; (3) establishing inter-market surveillance capabilities through, for example, the integration of equities, derivatives, and commodities markets into a single platform; and (4) improving access to information and trading data from other exchanges. Of course, the viability of these kinds of moves is not simply a technical but also a political matter. They may open up new forms of market trouble that agencies may be ill-equipped, unable, or unwilling to handle, thus creating a new threat to their institutional legitimacy. There are also significant barriers to the kind of integration required by these moves as the regulatory world remains very much divided by jurisdiction and agencies are bound to be hostile to the proposed weakening of traditional designations of scope and authority. Nevertheless, there are ways of enhancing the uses and applications of these regulatory technologies that deserve further study.

Second, from a research perspective, more studies are needed on the role of technology in the regulatory process in the context of financial markets and beyond. Such research must take regulatory technologies seriously as a force in their own right, opening up these ‘black boxes’ and recognizing that regulation is constituted not only in terms of organizational and legal forms, but also a wide range of technologies, devices, and material practices that extend well beyond
these institutional casings. Specific questions to be addressed by future studies might include: (1) the extent to which technologies in other regulatory contexts produce a similar narrowing of the field of engagement; (2) the role of automation, routinization, and standardization, as the specifically ‘technical’ aspects of these programs, in facilitating this narrowing particularly through the production of automated exclusions which restrict the field of vision and potentially exacerbate financial and regulatory risks; (3) the diversity of regulatory technologies and the similarities and differences across applications; and (4) the question of what is to be gained, that is, whether these technologies are simply bound to provide a different way of visualizing and framing regulatory activities, or if they are indeed capable of detecting forms of misconduct that would have otherwise been overlooked. Regardless of the specific course of inquiry, more attention must be paid to the costs and limitations associated with the growing investment in, and reliance, on technological solutions to regulatory problems.

Third, given the questions of auditability and calculability that underlie these and other like-minded regulatory technologies, future studies would benefit from a greater dialogue between the social studies of finance and the critical accounting literature which continue to exist in what Vollmer et al. (2009) describe as a “state of comparative neglect” (620). This would include a recognition of their common interest in dilemmas of calculation and auditability as well as the constitutive role of devices, programs, and assessment techniques in performing finance, the markets, and other areas of economic activity. There is also a common theoretical kinship as evidenced in connections to Actor Network Theory and Foucauldian/governmentality scholarship, a lineage that might be mined productively in future work.

Finally, the study of regulatory technologies points to a larger dilemma that continues to confound regulation more generally and which deserves to be explored in future research. This
involves what may be described as a failure to ‘problematize the norm.’ As revealed through this paper, one of the consequences of relying on algorithmically inspired technologies is a tendency to focus only on those activities that are construed as atypical or abnormal to the exclusion of most others. This inclination, bolstered by the logics, format constraints, and modes of problematization that inform the larger enforcement process, is equally evident in securities regulation in general and increasingly so as, for example, creative accounting and dubious financial products are bound to be condoned so long as they remain standard industry practices. Set alongside this valorization of the norm, and the continuing emphasis on egregiousness as a marker of regulatory interest and energy, is the progressive narrowing of what are considered to be legally sanctionable practices. This narrowing is perhaps most evident in attributions of ‘fraud’ which tend to be reserved for only the most extreme, and extremely nefarious, cases thus limiting the ability to mobilize regulatory and especially criminal law in response to financial misconduct and fueling what Snider (2000) has described as the de-criminalization of corporate crime. The need to problematize and politicize ‘the norm’ is thus an important consideration for future research on regulatory technologies and an essential lens for evaluating their relative merits in this and other regulatory contexts.
This is evident in the rapid growth of algorithmic or ‘black box’ trading in which buy and sell orders are placed by preprogrammed supercomputers responding to miniscule changes or trends in share price. These forms of trading, which account for approximately 70% of daily trading volume (Basen 2010), raise fundamental questions regarding the availability of information and the ability of more sophisticated investors to profit from informational asymmetries that are largely artifacts of computing speed.

Securities enforcement, as distinguished from securities regulation, refers to the practice of detecting and taking action against alleged breaches of securities laws, a function performed by formally designated units within larger regulatory agencies. While technology permeates the entire regulatory process, including the compliance function, enforcement provides a unique window into the role of regulatory technologies in responding to more serious threats to the market integrity and transparency.

While there is a clear link here to the concept of ‘financial surveillance’ (Williams 2009), the term ‘regulatory technologies’ is intended to have a much broader meaning encompassing not only surveillance technologies but also applications rooted in database management and data visualization.

During the final stages of this research, two of the most active self-regulatory organizations, Market Regulation Services Inc. (RS) and the Investment Dealers Association (IDA), merged to form a single SRO, the Investment Industry Regulatory Organization of Canada (IIROC). Since this transpired without significant changes to the ways that these technologies are used or their associated limitations, the conclusions yielded by this research are entirely generalizable to the new entity. Whenever possible, discussions of these technologies are framed in terms of the newly merged entity, with the exception being interview citations which refer to the position of respondents in the original agencies constituted as they were at the time of the interviews.

While the Sales Compliance Risk Model focus explicitly on questions of regulatory compliance, the Financial Compliance Risk Model is oriented to the financial health and viability of member firms including questions of solvency and proper fiscal management.

Despite the seemingly technical language in which risk-based metrics are couched, when asked about what would qualify as a high risk activity, the following respondent cited an entirely conventional form of misconduct, “High risk matters? Where we have an illegal distribution being done by a multiplicity of brokers through some sort of a syndication. Basically a fraudulent pump and dump scheme for example, where the broker’s facilitating the pump and dumps” (IDA #5: 7).

While work on the calculative devices of accounting and auditing is not formally associated with the social studies of finance, proceeding instead under the banner of “critical accounting,” there are a number of interesting parallels including the notion that the audit does not simply reflect the financial condition of companies but rather engages in a process of making up and constituting that which is then reviewed and audited, what Power (1997) refers to as “making
things auditable” (87). A similar notion of performativity is evident in the work of Miller (2001) who argues that, “As one of the preeminent means of quantification in certain Western societies, accounting accords a specific type of visibility to events and processes, and in so doing helps transform them” (393).

For example, the alerts produced by IIROC are coded as green, yellow, or red representing progressively higher degrees of priority.

For example, forms of insider trading sufficient to produce noticeable and otherwise unexplained shifts in the markets are more likely attributable to a relatively unsophisticated trading strategy executed by a more peripheral player unschooled in the tactics of concealing ‘inside’ trades or, if not the trades themselves, then at least their own identity and hand in the transactions. This fuels the tendency on the part of regulatory agencies to pursue cases involving more marginal players and more egregious forms of misconduct.

This was a key issue in the Bernie Madoff case as, despite repeated warnings, SEC staff were hesitant to believe that such a well-respected member of the financial establishment could be implicated in a major Ponzi scheme, a perception reaffirmed by his skilled presentation of self during subsequent interviews (see Markopolos 2010).

It should be noted that while computerized forensic auditing tools (e.g. Sherlock) are increasingly available to accounting firms and may be even used as an aspect of regular audits, many of these are more geared towards detecting misappropriation by employees further down the organizational ranks rather than more systemic problems in either the accounting systems or statements of the firms themselves. Here the limitations of computerized auditing tools are closely bound up with the shortcomings of audits themselves.

The exception of course is where companies have failed and these failures have been made public, thus forcing the regulators’ hand and demanding some form of response.

The recent moves towards the consolidation of a number of major exchanges (e.g. the TSX and the London Stock Exchange) could be viewed as a positive development in this regard allowing for the integration of not only financial offerings and trading, but also market surveillance. However, the regulatory implications of these moves remain to be sorted out and worked through, while the simultaneous growth of the ‘off board’ or the ‘over-the-counter’ market may serve to undermine even the most robust of these regulatory gains.
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