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The capital-market effects of introducing private rights of action in securities regulation: Evidence from the United Kingdom

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Abstract

Securities class actions are among the most controversial topics in the corporate and securities law literature, but despite the significance of this topic, little is known about the impact of the introduction of the actions in the legal system. This paper contributes to filling this gap by examining the capital-market effects of the adoption of private rights of action (PRAs) in the United Kingdom – a jurisdiction that provides a unique empirical setting for the analysis. The results indicate that the introduction of the rights was associated with enhanced market liquidity and value. Although this finding is most directly relevant to the cost-benefit analysis of private litigation in the United Kingdom, it also suggests that eliminating PRAs in jurisdictions that have adopted them (a reform that has been proposed especially in the United States) may lead to lower liquidity and market value.

JEL Classification: G10, G15, G18, G23, G28, K22.

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The capital-market effects of introducing private rights of action in securities regulation: Evidence from the United Kingdom

1. Introduction

Few topics in the corporate and securities law literature are as controversial as securities class actions – that is, actions in which shareholders in public firms seek to collectively obtain a compensation for damages resulting from false or misleading statements in corporate disclosures. Several commentators think that these actions are an important mechanism to protect investors in the securities market, which can in turn enhance firms' value and liquidity (see, e.g., Seligman 1994; Fox 2009; Sale and Thompson 2015). But others argue that the actions do not effectively compensate investors, are often frivolous, and do not adequately deter misbehavior (e.g., Grundfest, 1995; Alexander, 1996, p. 1503-04; Cox, 1997; Pritchard, 1999, p. 958; Siegel, 2005; Coffee, 2006, p. 1556; Helland, 2006; Klausner, Hegland, and Goforth, 2013; Rose, 2010, p. 2184; Caskey 2014).

One important limitation of this discussion, however, is that there is little empirical evidence on the effects of introducing private rights of action in the legal system – a limitation that is in large part explained by the scarcity of legal changes that permit such an analysis. The most direct evidence in this area is provided by the studies that examine the impact of the U.S. Supreme Court decision in *Morrison v. National Australia Bank Ltd.*,¹ which reduced the potential exposure of U.S.-listed foreign firms to securities litigation (see Bartlett, 2015; Lich et al., 2017). But since *Morrison reduced*, but did not *eliminate*, the risk of securities class actions, it is still unclear whether permitting the actions produces negative, positive, or insignificant economic outcomes.

This paper contributes to this debate by examining the impact of the adoption of private rights of action (“PRAs”) in the United Kingdom, a jurisdiction that provides a unique empirical setting for several reasons. First, the rights were made available to investors at different points in time in the London Stock Exchange’s (LSE) Main Market (“MM,” the primary stock market managed by LSE) and the Alternative Investment Market (“AIM,” LSE’s junior market for less liquid firms, which is generally subject to lighter regulation). This implementation feature thus provides two separate events to examine the same question, which allows for stronger inferences. Second, the adoption of PRAs in MM also involved two distinct events because the

¹ 561 U.S. 247, 130 S. Ct. 2869, 177 L. Ed. 2d 535 (2010).

rights were initially available only to investors that *purchased* securities and suffered a loss as a result of misstatements in *periodic financial reports*, but a few years later, the rights were made available to investors who *purchased, sold, or held* securities in the issuer and that experienced damages as a result of misstatements in *periodic or non-periodic disclosures*, or as a result of *delays in the disclosure* of material information. This enhancement of the rights, therefore, provides still another opportunity to examine their impact. And third, the United Kingdom is one of the largest financial markets in the world, which implies that examining this jurisdiction is especially relevant not only because it provides a special empirical setting, but also because of the economic significance that market has on its own.

This paper focuses on the impact of PRAs on market liquidity and firm value because PRAs may enhance the confidence of public investors in the capitals market, which may in turn increase the ease with which investors sell their shares and the price of the shares (see, e.g., Seligman 1994; Fox 2009; Sale and Thompson 2015). And, in fact, the results are consistent with that hypothesis: shortly after PRAs were implemented, the firms affected by the reforms experienced a significant increase in liquidity and stock returns in relation to a control group of firms that were relatively unaffected by the reforms. This finding has important policy implications not only because it provides an assessment of the benefits of private rights of action in the United Kingdom in particular, but also because it provides suggestive evidence on the potential consequences of eliminating or significantly curbing PRAs in jurisdictions that have considered doing so – including, notably, the United States (e.g., Pritchard, 1999; Rose, 2010; Note, 2018).

It is worth noting that PRAs may also affect four additional variables: firms' production of voluntary disclosures (in the form of management guidance), the informativeness of corporate disclosures, audit fees, and the propensity of firms to replace capital investment with cash holdings. These are plausible hypotheses for two reasons. On the one hand, PRAs may incentivize managers to increase the incidence of voluntary disclosures and the informativeness of corporate disclosures as strategies to avoid lawsuits alleging that the firm did not disclose material information or that the disclosures were not timely (e.g., Skinner, 1994, 1997; Ayers and Kaplan, 1998; DeFond and Subramanyam, 1998; Francis and Krishnan, 2002; Field et al., 2005; Qiang, 2007; Fox, 2009; Li, Wasley, and Zimmerman, 2016). But on the other hand, PRAs may produce two important costs: inducing auditors to charge higher fees to compensate

the greater risk of litigation (Shu, 2000),² and incentivizing firms to replace their capital investments with cash holdings in order to create a buffer for future litigation costs – which, in turn, may reduce firm productivity (e.g., Arena and Julio, 2015).³ The results of these analyses are presented in the online appendix,⁴ which, however, shows that the data do not support any of these hypotheses.⁵

This paper is organized as follows. Section 2 provides background on the rules governing securities litigation in the United Kingdom; Section 3 discusses in more detail the hypotheses; Section 4 reviews the prior empirical literature; Section 5 describes the methodology; Section 6 presents the results; Section 7 discusses the results; and Section 8 concludes.

2. Institutional background

Following the enactment of the Transparency Directive by the European Parliament in December 2004, the United Kingdom introduced private rights of action in November 2006. The rights were introduced as Section 1270 of the Companies Act, which added Section 90A

² Although PRAs do not enable shareholders to directly sue their firm's auditors, these professionals could nonetheless be sued by the firm for breach of contractual obligations. See FSMA, Schedule A, §§7(2), 7(3). For a discussion, see also Paolini, 2015).

³ Although prior literature suggests that firms may accumulate cash to create a buffer against litigation, firms may instead turn to directors and officers (D&O) insurance, which reimburses firms, directors, and officers for expenses incurred as a result of litigation involving corporate and securities law claims. In data shown in the online appendix, I find that the incidence of D&O insurance in fact has increased significantly after PRAs were introduced in the United Kingdom, and the increase has been stronger among the treatment firms. However, I do not find that the differences between the treatment and the control firms are statistically significant. In addition, I do not find that the cash holdings of the treatment firms changed significantly more in relation to the control firms when a firm did not have D&O insurance at the time of the PRAs reforms.

⁴ I measure all these variables at the semiannual level because firms in the United Kingdom typically report their financial information with that frequency. In addition, I scale cash holdings, investment, and audit fees by total assets. The informativeness of corporate disclosures is measured as the absolute deviation of reported earnings from analysts' forecasts (that is, the "absolute forecast error" or "AFE"). If the prospect of litigation generated by PRAs prompted firms to be more accurate or informative in their corporate disclosures, then the average AFE should decline, since more informative disclosures will make it easier for analysts to process the disclosures when making earnings forecasts. I divide the absolute forecast error by the absolute value of the actual profits to adjust for differences in performance levels. To examine whether the sign of the errors had any incidence on the results, in untabulated results, I replaced the absolute error with the actual error, but the results were qualitatively similar. An alternative test could be to use other proxies for changes in disclosure practices – including, in particular, the incidence of financial restatements and going concern opinions. However, I do not use those proxies because there is no comprehensive data on financial restatements for U.K. firms in the sample period and because going concern opinions are rare according to the available data source (CapitalIQ).

⁵ It is worth noting that the difference-in-differences estimator in the regression results does become statistically significant at the 5% level in the particular case of management guidance (and only after the 2006 event) if I add at least one more year to the sample (the basic sample is one year before and after the regulatory changes). One possible interpretation of this result is that changes in guidance simply need a relatively long period to materialize, and that those changes took place exclusively among MM firms because, relative to AIM firms, MM firms are more visible and mature – so they may be more sensitive to the risk of litigation. I also performed separate analyses for good news (i.e., upward revisions of previous guidance) and bad news (i.e., downward revisions), but did not find significant effects.

to the Financial and Services Markets Act of 2000 (“FSMA”). Before this reform, Section 90 of FSMA provided for issuer liability in the primary offer context – that is, when investors suffered economic losses as a result of misstatements in an company’s securities offering prospectus.⁶ However, Section 90A expanded these rights to a significantly broader context (i.e., the secondary market), thus enabling investors to obtain a compensation for losses caused by untrue or misleading statements (or material omissions) in the company’s annual reports, half-yearly reports, or the “interim management statements” – a type of quarterly report that the United Kingdom experimented between 2007 and 2014.⁷

For liability to be triggered under FSMA 90A, the investor must have acquired, sold or held shares (1) in reliance on the publication that contains the misstatement, or (2) in circumstances in which it was reasonable for the investor to rely on that information. In addition, a company is liable only if the directors knew that the statement was false or misleading, were reckless as to whether it was false or misleading, or knew that an omission was material (see also Jones Day, 2007). Under FSMA 90A, only the company is liable to the shareholders, but the directors may be liable to the company (FSMA 90A(5)) and the shareholders may sue the directors derivatively on behalf of the company (Part 11 of the Companies Act).

Private rights of action in the United Kingdom are similar to the rights implied by U.S. courts under Section 10(b) of the Securities Exchange Act of 1934 and Rule 10b-5.⁸ In addition, like in the United States, actions for securities law violations in the United Kingdom (formally

⁶ Liability for inaccurate statements in an offering prospectus dates back to the nineteenth century. This form of liability was initially developed by the common law, but it was subsequently adopted by statute in the Directors’ Liability Act of 1890 and, later, by FSMA 90. As Davies (2007a) notes, FSMA 90 is a wide-ranging provision. It imposes liability on “any person” responsible for the prospectus; it does not require intent to mislead (negligence is enough to trigger liability); and it does not require investor reliance on the misstatement (it simply requires an economic loss as a result of the misleading statement or omission).

⁷ Before FSMA 90A, the United Kingdom had a very limited private cause of action in the secondary market. Specifically, in *Caparo Industries plc v Dickman* [1990] 1 All E R 568, HL, the House of Lords held that the auditors of a company could be liable if the auditors provided inaccurate financial reports to a third party in the knowledge that the third party would use the reports for a specific transaction. In other words, although the auditors were not generally liable to investors, they could be liable to a specific party and for a specific transaction. The standard illustration was a situation in which auditors provided inaccurate financial statements to the buyer of a controlling stake in the corresponding company and the auditors knew that the buyer intended to use the information to estimate the price of the controlling stake. *Galoo v. Bright Grahame Murray*, [1994] 2 BCLC 492, CA. This doctrine, however, has not been exclusively applied to auditors – directors and investment bankers also have been targeted by it. See *Morgan Crucible Co plc v Hill Samuel Bank & Co Ltd* [1991] Ch 295, CA. For a discussion of *Caparo* and subsequent case law, see Davies (2007a).

⁸ In Rule 10b-5 actions, the plaintiff must prove six basic elements: (1) a material misrepresentation or omission by the defendant; (2) scienter; (3) a connection between the misrepresentation or omission and the purchase or sale of a security; (4) reliance on the misrepresentation or omission; (5) economic loss; and (6) loss causation (see, e.g., *Dura Pharmaceuticals, Inc. v Broudo*, 544 U.S. 336, 341–42 (2005)).”

known as “collective actions”) are typically brought as multi-claimant suits – so they are often referred to as “class actions” as well. However, there are three main differences between the U.S. and U.K. causes of action.⁹ First, in the United States, lawsuits under Section 10(b) and Rule 10b-5 operate under an “opt-out” system, in which all the shareholders that held securities and experienced losses as a result of the alleged violations are bound by the outcome of the action if they do not opt out of the lawsuit (Federal Rules of Civil Procedure 23(c)(3)). In contrast, in the United Kingdom, actions under FSMA 90A operate under an “opt-in” system, in which each shareholder must expressly opt into the action to be part of it (see, e.g., Clifford Chance, 2013, p. 20).

Second, the United Kingdom did not adopt one of the key presumptions for liability that the United States has long adopted. In the United States, actions under Rule 10b-5 require reliance on a misrepresentation by all the plaintiffs – that is, the plaintiffs must have been aware of (and traded a security based on) a specific misrepresentation. However, the Supreme Court’s decision in *Basic Inc. v. Levinson*¹⁰ created a rebuttable presumption of reliance under which an investor that trades in a corporation’s security is presumed to have relied on all the public information available at the moment of the trade.¹¹ The United Kingdom, in contrast, did not adopt this presumption. FSMA 90A does allow an action to proceed if the plaintiff shareholders bought, sold or held securities in circumstances in which it was “reasonable” for them to have

⁹ There are four additional differences besides the main differences noted in the text. First, unlike Section 90A, which imposes liability only on the issuer, Rule 10b-5 imposes liability on the issuer and the individuals who made the misstatement—including, notably, the directors. However, this difference is attenuated by the derivative right of action against directors provided by part 11 of the Companies Act (Davies, 2007a, p. 5; Ferran, 2009, pp. 344–45). Second, as mentioned earlier, after the 2010 reforms to the UK regime, even continuous shareholders could bring suit under Section 90A; in contrast, in the United States only purchasers and sellers have standing to sue (*Blue Chip Stamps v. Manor Drug Stores*, 421 U.S. 723 (1975)). Third, the UK system does not provide any exemption from liability for earnings projections; in contrast, the Private Securities Litigation Reform Act (PSLRA) in the United States does provide such a safe harbor (15 U.S.C. sec. 78u5[c]; Simmons and Simmons, 2020). And fourth, there is a difference in the state of mind required to trigger liability. In the United Kingdom, Section 90A requires at least recklessness (see Davies, 2007b, p. 32; Ferran, 2009, p. 339; Cox, et al. 2020, pp. 679–81). In the United States, various courts also have required recklessness (see *AUSA Life Insurance Co. v. Ernst & Young*, 2006 F.3d 202 (2d Cir. 2000); *SEC v. Falstaff Brewing Co.*, 629 F.2d 62, 76 (D.C. Cir. 1980); *Masel v. Villareal*, 924 F. 3d 734 (5th Cir. 2019)). However, the Second Circuit has held that the “scienter” element of the Rule 10b-5 action can be established by proving motive and opportunity to commit fraud – which could make the US action more favorable to the plaintiffs than the UK action (see *Novak v. Kasaks*, 216 F.3d 300, 307, 310 (2d Cir. 2000)).

¹⁰ 485 U.S. 224 (1988).

¹¹ The foundation of this presumption is the “fraud-on-the-market” (“FOTM”) theory, which states that the price of a security in an efficient market reflects all publicly available information, including false or misleading statements. See also *Erica P. John Fund, Inc. v. Halliburton Co.*, 563 U.S. 804, 811 (2011) (“*Halliburton I*”). Even before *Basic*, the Supreme Court created a presumption of reliance for lawsuits alleging omissions (*Affiliated Ute Citizens of Utah v. United States*, 406 U.S. 128 (1972)). However, this presumption was not used frequently (see, e.g., Fisch, 2013).

relied on the misrepresentation; but unlike the United States, the United Kingdom did not adopt a general presumption of reliance.¹²

The third major difference is the system of attorney fees. In the United States, the main component of the plaintiff's attorney's compensation is typically a contingent fee in the form of a portion of the damages recovered (Federal Rules of Civil Procedure 23). The United Kingdom, in contrast, relies less on contingent compensation. When FSMA 90A was adopted, the plaintiff's attorney would be compensated under the same system that already operated in other areas of civil litigation, which included two components. The first was the "no-win, no fee" rule, under which the plaintiff's lawyer charges a base fee plus a success fee of up to 100% of the base fee – each of which is payable only if the plaintiff wins (Courts and Legal Services Act, §58(4)(c); Conditional Fee Agreements Order (2000), Article 4¹³). And the second component was the "loser-pays" rule, under which the plaintiff's lawyer's fees were paid by the defendant, not the plaintiff, when the plaintiff won; but the plaintiff was required to pay the defendant's reasonable costs when the plaintiff lost (Costs and Practice Direction 44 (pre-April 1, 2013 version), Paragraphs 11.7 and 11.8).¹⁴ Since 2013, the United Kingdom has moved closer to the U.S. system of compensation, but even today, the United Kingdom relies less on contingency awards.¹⁵

Perhaps due to all these procedural differences, collective actions in the United Kingdom are significantly less common than class actions in the United States.¹⁶ In fact, only a few actions,

¹² Rule 23(a) of the Federal Rules of Civil Procedure provides that for an action to proceed as a class action, the action must satisfy four conditions: (i) the class (of plaintiffs) must be so numerous that joinder of all members is impracticable, (ii) there must be questions of law or fact common to the class, (iii) the claims of the representative parties must be typical of the claims of the class, and (iv) the representative parties must fairly and adequately protect the interests of the class. The presumption of reliance thus allows the plaintiffs to establish that common issues predominate individual ones. In the United Kingdom, the Civil Procedure Rules ("CPR") and Practice Directions also require the plaintiffs to show that there are "common or related issues of fact or law" to bring a collective action (CPR 19.6(4)). But unlike in the United States, reliance will have to be proved in the case of each investor (*Manning & Napier Fund, Inc & Anor v. Tesco plc* [2020] EWHC 2106 (Ch)); ([2019] EWJC 3315 (Ch)).

¹³ Currently codified as Article 3 of the Conditional Fee Agreements Order (2013).

¹⁴ See also Thomas and Jenkins (2020); Shah et al. (2020).

¹⁵ In 2013, the United Kingdom adopted two reforms. First, success fees are no longer recoverable from the defendant (Courts and Legal Services Act, §58(A)(6), as amended by the Legal Aid, Sentencing, and Punishment of Offenders Act of 2012, § 44). And second, a form of contingency fees, known as "damages-based arrangements" or "DBAs," is now available. Under this system, the plaintiff's lawyer can be paid a percentage of the damages recovered if the plaintiff is successful, but if the plaintiff loses, then no payment of fees is required. Unlike the U.S. contingency fees, however, these fees have a cap, as they cannot exceed 50% of the damages recovered (Courts and Legal Services Act, §58AA, as amended by the Legal Aid, Sentencing, and Punishment of Offenders Act of 2012, § 44 and §45).

¹⁶ See also Ferran (2009) (making a similar prediction when FSMA 90A was adopted).

have been filed in U.K. courts, and these actions are a relatively recent phenomenon.¹⁷ However, the suits that have been initiated demonstrate that the consequences of the actions can be substantial. In *Tesco*, for example, a group of institutional investors sued Tesco under FSMA 90A following the company's revelation of an overstatement of its profits guidance, which resulted in a settlement of approximately £450 million – well above the average settlement value in the United States.¹⁸

As mentioned earlier, there are also specific features of the implementation of PRAs in the United Kingdom that are relevant to this paper. In particular, the initial version of FSMA 90A provided that only firms listed on a “regulated market” (i.e., the London Stock Exchange's Main Market) could be targeted by the new PRAs, and only investors that *bought* securities and experienced damages as a result of misstatements in *periodic financial reports* could sue. However, drawing on the power that the Companies Act gave to the government to extend the new liability regime by regulation, and following a study commissioned to Professor Paul Davies to evaluate this possibility, in October 2010, the Financial Services Authority (“FSA”) implemented three important changes:¹⁹ it made available the new rights of action to the Alternative Investment Market (“AIM”); it permitted recovery of losses caused by misstatements in *non-periodic* corporate disclosures or by delays in the disclosure of information; and it allowed not only buyers, but also sellers and continuous shareholders, to sue (Financial Services and Markets Act 2000 (Liability of Issuers), Regulations 2010, Schedule A). As discussed earlier, these reforms provide additional opportunities to test the impact of PRAs, so the empirical tests in this paper exploit them.

¹⁷ *Manning & Napier Fund, Inc & Anor v. Tesco plc* [2020] EWHC 2106 (Ch) (July 31, 2020); *Various Claimants v. RSA Insurance Group plc* [2021] EWHC 570 (Ch) (March 9, 2021); *Various Claimants v. G4S plc* [2021] EWHC 524 (Ch) (March 10, 2021); *Allianz Global Investors GmbH & 76 Ors v RSA Insurance Group plc* [2021] EWHC 570 (Ch) (March 9, 2021).

¹⁸ See *Manning & Napier Fund, Inc & Anor v. Tesco plc* [2020] EWHC 2106 (Ch) (July 31, 2020). See also NERA, 2021 (documenting an average settlement value of \$44 million for non-merger securities class actions). A related consideration is that the investor base of public firms today often has a significant proportion of large institutional investors. As a result, even though adding multiple investor plaintiffs to a U.K. suit is not facilitated by the opt-out feature and the presumption of reliance that operate in the United States, a class action initiated by a single institutional investor (or a small group of them) can still represent a significant threat for the issuer – and thus act as a significant check on its behavior.

¹⁹ Until 2013, the FSA was the United Kingdom's primary financial regulator, which supervised banks, insurance companies, and the capitals markets. That year, the FSA was abolished, the Prudential Regulation Authority became responsible for the safety of financial institutions, and the Financial Conduct Authority (FCA) became responsible for the supervision of the securities market.

3. Hypotheses

Private rights of action can play two important roles in the economic system. Ex ante, the prospect of litigation may deter corporate insiders from violating the law; and ex post, if insiders actually misbehave, then PRAs provide a mechanism to compensate investors for the damages incurred (see, e.g., Seligman 1994; Fox 2009; Sale and Thompson 2015). PRAs may therefore have a positive effect on liquidity because investors may feel more confident in buying and selling securities if they know that they have a right to sue if the price is distorted by fraudulent statements and if the prospect of litigation makes those fraudulent statements less likely. And similarly, PRAs may have a positive effect on market value because investors may believe that right to sue for damages and the deterrence generated by the private cause of action outweigh the cost of meritless litigation.²⁰ This hypothesis, moreover, is bolstered by the fact that empirical evidence indicates that private litigation permits the identification of securities law violations in instances in which the government fails to identify those violations, which implies that PRAs play an important supplementary role with respect to public enforcement (Choi and Pritchard, 2016).²¹

It is important to emphasize, however, that the general functions that PRAs are supposed to serve are controversial and therefore it is not obvious that the rights will produce the positive effects described above. First, several commentators argue that PRAs do not compensate investors effectively because of a circularity problem: the damages award or the settlement is paid either by the firm or by its insurer, which implies that such payments may in some cases be just a transfer of resources from some investors to others in the same firm (e.g., Alexander, 1996, p. 1503-04; Cox, 1997; Coffee, 2006, p. 1556; Donelson and Yust, 2017).²²

²⁰ These arguments have broader implications for the allocation of resources in the economy. If investors undervalue good firms because of the possibility of corporate misbehavior, those firms might not be able to attract enough capital for investment and therefore they might underinvest (see, for example, Kahan 1992). As a result, PRAs can prevent underinvestment.

²¹ Public authorities themselves have recognized this supplementary role. In a recent speech, for example, Former Commissioner of the SEC Robert Jackson argued that “if I’ve learned one thing, it’s this: whether on the street or in the securities markets, the cops can’t do it alone. We need multiple layers of protection (...) Insiders who would cheat investors know that, if they’re caught, shareholders can sue—and they’ll have their day in court (...) My colleagues in the Division of Enforcement do invaluable work every day protecting investors. But there are limits to what they can do—especially today, when the SEC’s budget is frozen and fraudsters are finding new ways to harm investors. Our enforcement efforts are straining against the limits of the SEC’s resources.” (Jackson, 2018).

²² This view is shared by several commentators (see, e.g., Langevoort, 1996, p. 651; Pritchard, 1999, p. 928; 2002, p. 884; Fisch, 1997, p. 175) and has also impacted the justification that U.S. courts have offered for PRAs. For example, when initially recognized in *Kardon v. National Gypsum Co.*, 69 F. Supp. 512, 513-14 (E.D. Pa. 1946), private rights of action were primarily seen as a mechanism to compensate defrauded investors; but approximately twenty years later, the Supreme Court adopted a deterrence-based justification, holding that private enforcement in the form of class actions “provides a necessary supplement” to the SEC’s enforcement. *J.I. Case Co. v. Borak*,

Second, PRAs may *under-deter* misbehavior because managers and controlling shareholders who commit fraud rarely contribute anything to the settlement or the damages award: the payments are generally made by the corporation, and even if individual wrongdoers are identified, those individuals do not pay anything significant due to the existence of directors and officers (D&O) liability insurance (Cox, 1997; Pritchard, 1999, p. 958; Siegel, 2005; Coffee, 2006, p. 1535-36; Black, Cheffins, and Klausner, 2006; Caskey 2014).²³

And third, the opposite argument may also be true – that is, PRAs may actually *over-deter* misbehavior, which can in turn cause firms to overinvest in precautionary measures that ultimately raise the cost of capital and reduce economic efficiency. Notably, PRAs may prompt firms to reduce their voluntary disclosures or increase the disclosure of irrelevant information as a mechanism to avoid litigation; as a result, information asymmetries may increase, not decrease, when PRAs are available – thus leading to lower liquidity and market value (see, e.g., Mahoney, 1992; Johnson, Kasznik, and Nelson, 2001; Paredes, 2003; Rose, 2010, pp. 2184-86).²⁴

Given these considerations, it is not necessarily clear that investors will perceive PRAs as a powerful or useful investor protection device. In this sense, the effect of the rights on the variables described above is something that ultimately has to be determined empirically.

377 U.S. 426, 432 (1964); *Tellabs, Inc. v. Makor Issues & Rights Ltd.*, 127 S. Ct. 2499, 2504, 2507 (2007). The circularity argument, however, also has limitations. See, for example, Cox and Thomas (2009) and Park (2009).

²³ In response to this argument, however, some commentators point out that while out-of-pocket monetary penalties may be minimal for officers and directors, litigation entails other costs such as loss of reputation, loss of time, and the stress associated with being a defendant in a lawsuit – all of which may also have a deterrent effect. See Black, Cheffins, and Klausner (2006); Klausner, Hegland, and Goforth (2010). There is also a line of commentary that suggests that the negative effect of D&O insurance on deterrence could be addressed with some reforms. These include, for example, mandating disclosure of insurance premiums, which would provide public information on a firm's governance quality (Griffith, 2006; Baker and Griffith, 2009), or mandating rotation of insurance providers, which reduces the ability of insurance companies to recoup losses caused by a claim and therefore enhances the incentives of those companies to monitor the insureds' governance practices (Verstein, 2022).

²⁴ Moreover, the problem of overdeterrence can be compounded by the fact that PRAs may generate inflexibility for the public enforcer, particularly because the presence of private litigants limits the ability of public agencies to adjust their enforcement intensity on the basis of their desired level of deterrence. See Rose (2008, p. 1316) (arguing that a monopolistic public enforcer can deal with the problem of potential overdeterrence by using discretionary non-enforcement, acting in a cooperative manner with the industry, and adjusting the size of the sanctions; but when private litigation is available, this flexibility is eliminated because plaintiffs will enforce the law “to its outermost limits” as long as such enforcement is profitable). Combining all these arguments, some commentators conclude that PRAs may both over-deter some actors (e.g., issuers, who almost always face liability for the frauds of their employees) and under-deter others (e.g., the individuals that engaged in fraud, who usually do not contribute to settlements). See Coffee (2007, p. 305).

4. Prior literature

The empirical evidence on the impact of subjecting firms to private rights of action is rather sparse and comes mainly from the studies on foreign firms' cross listing in the United States. These studies find that foreign firms that cross list on U.S. stock exchanges experience various positive outcomes, including an increase in market value and share liquidity, and to explain this result, some of these studies propose the "bonding hypothesis" – that is, the idea that the positive outcomes are caused by the fact that the cross-listing decision signals a firm's commitment to a regime of strong disclosure and enforcement, including private enforcement. Once a firm cross-lists, in fact, the firm becomes subject to several checks on the behavior of corporate insiders, including the enforcement powers of the Securities and Exchange Commission (SEC), closer scrutiny by underwriters, analysts, and stock exchanges, and the prospect of securities class actions – all of which are thought to heighten the confidence of public investors in financial markets (Stulz, 1999; Coffee, 1999; Karolyi, 2012).

The bonding hypothesis, however, has the same limitation that characterizes the cross-listing literature in general: since the cross-listing decision involves a number of changes for foreign firms on the legal dimension, it is hard to identify which specific component of the legal system has a positive impact.²⁵ To overcome this limitation, recent studies examine the impact of the U.S. Supreme Court decision in *Morrison v. National Australia Bank Ltd.*,²⁶ which reduced the potential exposure of U.S.-listed foreign firms to securities class actions.²⁷ Contrary to the predictions of the bonding hypothesis, Licht et al. (2017) find that the decision did not result in lower market value or liquidity (i.e., bid-ask spreads), or significant changes in the reporting behavior of firms; but Sikochi (2016) does find that spreads declined. In addition, consistent with Licht et al. (2017), Bartlett (2015) finds that institutional investors do not seem to value private rights of action, as investors in firms that traded simultaneously on U.S. exchanges and

²⁵ See also, for example, Leuz and Wysocki (2016, p. 577) (observing that "the sources of the cross-listing effects are still unclear"); Karolyi (2012, p. 524) (concluding that a "proper verdict" about the mechanisms behind the effects of the cross-listing decision has not yet been fully rendered).

²⁶ 561 U.S. 247, 130 S. Ct. 2869, 177 L. Ed. 2d 535 (2010).

²⁷ The court held, in particular, that going forward, foreign investors in foreign firms would not have the right to file or join an action for securities fraud in U.S. courts if the trades that generated the economic loss for the investors did not take place on U.S. markets. This doctrine reduced the litigation risks of foreign firms because the exclusion of non-U.S. trades from an action results in a smaller class of eligible plaintiffs, lower expected damage awards or settlements, and lower attorney fees.

non-U.S. venues did not relocate their trades in cross-listed issuers to the United States, nor did they relocate foreign trading to cross-listed issuers that are subject to Rule 10b-5 actions.²⁸

Although the studies on *Morrison* advance the state of the art regarding the impact of private rights of action, an important difference between those studies and this paper is that the studies on *Morrison* examine a *reduction* in the exposure of foreign firms to U.S. PRAs. In contrast, I examine *the introduction* of the rights in the legal system – and I focus on a variation of them that is not identical to the U.S. PRAs.

5. Methodology

I exploit three events to examine the impact of the adoption of private rights of action in the United Kingdom: the introduction of the rights in LSE's MM on November 8, 2006; the introduction of the rights in AIM on October 1, 2010; and the expansion of the scope of the rights in MM also on October 1, 2010 – an expansion that, as mentioned earlier, allowed collective actions to proceed for delays in the disclosure of material information and misstatements in non-periodic disclosures, and permitted recovery not only by purchasers, but also by sellers and investors that continuously held shares in the issuer. In all the analyses, I employ a difference-in-differences (“DiD”) methodology.

In the analysis of the introduction of PRAs in MM, the treatment group is the group of U.K. firms that were continuously listed on that market in the sample period and that did not have a U.S. cross-listing, and the control group is the group of MM firms with a U.S. cross-listing. I use firms with a U.S. cross-listing as a control group because those firms were already subject to PRAs under Section 10(b) of the Securities Exchange Act and therefore they should not be significantly affected by the adoption of the rights in the United Kingdom.²⁹

The analyses of the other two events follow a similar approach. In the analysis of the adoption of PRAs in AIM, the treatment group is the group of firms listed on AIM (none of which had a U.S. cross-listing in the sample period) and the control group is the group of MM firms with

²⁸ Bartlett et al. (2019) also note that *Morrison* did not change the litigation patterns against foreign issuers. In particular, the authors find that both before and after the decision, private litigation focused on issuers with a U.S. listing and substantial U.S. trading volume; and, moreover, the decision did not have a significant effect on dismissal rates, settlement amounts, or attorney's fees.

²⁹ To illustrate how U.S. securities class actions have operated in practice against cross-listed issuers from the United Kingdom, Table A2 of the Appendix provides descriptive information on these actions.

a U.S. cross-listing; and in the analysis of the expansion of the scope of PRAs in MM, the treatment and control groups are the same as in the analysis of the first event.³⁰

I perform the difference-in-differences analyses using panel regressions with time and firm fixed effects. The difference-in-differences estimator, which captures changes in the liquidity or market value of the treatment firms in relation to the control firms after each regulatory event, is represented by $Treat_i \times Post_t$, an interaction between an indicator variable for observations in the treatment group (i.e., MM or AIM firms with no U.S. cross listing) and an indicator variable for observations measured after the corresponding event (November 2006 or October 2010). The control variables include firm size (i.e., market capitalization), firm performance (i.e., EBITDA to total assets), leverage (i.e., debt to total assets), and book-to-market ratio (i.e., book value of total assets to market capitalization).³¹ In addition, as mentioned, I control for firm fixed effects, which account for unobserved time-invariant firm characteristics, and time fixed effects (at the month level), which account for overall time trends in the dependent variable.³² All the inferences are based on standard errors clustered by firm, but the results are robust to other forms of clustering, which are discussed in the sensitivity analyses.

As mentioned, this paper examines the impact of PRAs on market liquidity and value. Following Daske et al. (2008), Lang, Lins, and Maffett (2012), and Christensen, Hail, and Leuz (2016), I combine three individual proxies to form a proxy for a firm's *illiquidity*: the bid-ask spread (i.e., the difference between the price at which buyers are willing to buy and the price at which sellers are willing to sell a firm's shares);³³ price impact, defined as the Amihud (2002) illiquidity measure (i.e., daily absolute stock return divided by trading volume); and zero returns (i.e., the incidence of trading days with zero returns). I construct the proxies using daily

³⁰ It is worth mentioning that although it would be possible to use AIM companies as a control group in the analysis of the introduction of PRAs in MM, and MM firms as a control group in the analysis of the adoption of PRAs in AIM, I do not follow that approach for two reasons. On the one hand, as mentioned earlier, when PRAs were initially adopted in MM, the law simultaneously enabled the government to extend the rights to AIM companies – so those companies are not a truly unaffected benchmark. And on the other hand, when the FSA extended PRAs to AIM companies, it did so in the same regulatory instrument in which it expanded the scope of the actions in MM – so neither of the two groups can work as a benchmark for the other.

³¹ In unreported analyses, I also include CAPEX and cash holdings in the controls. I do not include them in the baseline regressions because, as discussed earlier, there are reasons to think that PRAs could affect those variables. However, including them as controls does not change the results.

³² The stand-alone $Treat_t$ and $Post_t$ variables are not included in the regression model because they are collinear with the firm and time fixed effects, respectively.

³³ More specifically, I compute the bid-ask spread as the difference between the ask price and the bid price, divided by the midpoint.

data, which I average at the monthly level to facilitate the examination of time trends. After this step, I aggregate the three proxies into a single illiquidity factor using principal component analysis and take the scores from the first component (i.e., the component with an Eigenvalue greater than 1, which explains the vast majority of the variation in liquidity) as the dependent variable.³⁴

With respect to market value, I examine the valuation effects of the introduction of PRAs by studying the adjusted cumulative returns of the treatment firms around the time of each of the reforms described above. I define the *adjusted cumulative returns* as the difference between the cumulative returns of the treatment firms minus the cumulative returns of the control group. Since the stock market reaction to regulatory changes might involve some anticipation or delay, I use two time windows to compute the returns: a “short window” of 3 days and a “long window” of 30 days before and after each event. I do not adjust the returns by any domestic stock index because the sample firms include essentially all the firms in the indices. However, in analyses shown in the online appendix, I subtracted the returns of the MSCI-Europe index from the returns of the sample firms – which produced similar results.

The sample period in the baseline regressions is one year before and after each regulatory event, but as discussed in the sensitivity analyses, I use alternative windows and obtain similar results. To avoid bias resulting from changes in the composition of the dataset, only firms that survived and had full capital-markets data during the entire sample period are included in the estimations; however, I also run all the regressions using all the firms, which yields qualitatively similar results.

The data for this project come from various sources. The capital-market variables come from Datastream; the historical information on the firms’ type of listing (i.e., MM or AIM) is from the London Stock Exchange; the information on firms’ fundamentals is from Compustat; the information on cross-listings come from the SEC, Compustat, and the J.P. Morgan ADRs database; the information on U.S. trading volume is from Compustat/CRSP Global; the information on management guidance and analysts’ forecasts is from CapitalIQ; and the

³⁴ The first component explains approximately 75% of the total variation in liquidity, which, as other commentators point out in light of similar results, is substantially above the common threshold of 50%. See Christensen, Hail, and Leuz (2016, Internet Appendix, p. 4).

information on U.S. securities class actions against U.K. issuers is from the Stanford Securities Class Actions Clearinghouse.

6. Results

Table 1 presents summary statistics. Panel A provides general descriptive information across the entire sample period and Panel B shows univariate tests. As shown in Panel B of the table, after private rights of action were introduced in LSE's Main Market, the illiquidity factor of the treatment firms declined significantly both in absolute terms and in relation to the control group. In the treatment group, the illiquidity factor declined 0.30 basis points, from -1.05 to -1.35, and this reduction was statistically significant at the 1% level. In the control group, the reduction was 0.13 points – less than half the magnitude of the reduction in the treatment group. Taking these results together, the relative change of the illiquidity factor in the treatment group after the introduction of PRAs was 0.17 points (i.e., $-0.30 - (-0.13)$). The average market capitalization of the treatment group also increased in relation to the control group, but I address more formally the valuation effects of PRAs in the analysis of the cumulative returns.

Table 1 also shows that the illiquidity factor of the treatment firms declined again after the implementation of PRAs in the Alternative Investment Market and after the expansion of the scope of the rights in the Main Market. When PRAs were implemented in AIM, the illiquidity factor declined 0.20 points, from 0.37 to 0.17; and when the FSA expanded the rights in MM, the factor declined 0.11 basis points, from -1.13 to -1.24. In contrast, the illiquidity of the control firms remained almost unchanged after the regulatory event – with a positive change of 0.03.

With respect to pre-treatment differences between the treatment group and the control group, Table 1 shows that cross-listed firms are larger and more liquid than the treatment firms across all the regulatory events, and there are other differences that appear only in some of the regulatory events. As discussed in more detail below, I mitigate all these differences not only by including controls in the regressions, but also by running estimations with a matched sample or with subsamples.

Table 2 presents the regression results on the association between the adoption of PRAs and market liquidity. As shown in the table, the difference-in-differences estimator was negative and statistically significant at the 1% level in all the models. In the case of the adoption of

PRAs in MM, the estimator was -0.13, meaning that after controlling for other variables, the liquidity of the treatment firms increased in relation to the control group by 0.131 basis points following the reform. Taking the pre-PRAs illiquidity factor of the treatment group (-1.05), this result indicates that the adjusted reduction in the treated firms' illiquidity following the adoption of PRAs was 12.5% $((-0.131/|-1.05|)\times 100 = -12.5\%)$. In the case of the introduction of PRAs in AIM and the expansion of the rights in MM, the estimated reductions in the illiquidity factor were 0.217 and 0.138 basis points, respectively.

To determine whether the reductions in the illiquidity factor described above can be plausibly attributed to the changes in the regime of PRAs, Figure 1 examines the evolution of the factor over time.³⁵ As shown in the three panels of the figure, there were no significant reductions in the illiquidity of the treatment group relative to the control group before the regulatory changes, but after each of those events, the illiquidity variable in the treatment group declined sharply in relation to the control group. In this sense, the plot indicates that the parallel trends assumption of the difference-in-differences analysis is reasonably satisfied.

Table 3 shows the adjusted cumulative returns of the treatment group around each regulatory event (that is, as mentioned before, the returns of the treatment group minus the returns of the control group). As shown, the returns were positive and statistically significant during the 3-day and 30-day windows relative to the effective date of the reforms. The increase in market value was between 1% and 2%, with stronger effects in the long-term window than in the short-term window. Figure 2, which plots the returns, indicates that the increase in market value was especially sharp in the case of the adoption of PRAs in MM, but in all the regulatory changes, the data suggests a positive association between the rights and market value.³⁶

³⁵ More specifically, Figure 1 shows the regression coefficients for the difference between the illiquidity factor of the treatment group and the illiquidity factor of the control group over a one-year period surrounding each of the PRA reforms. The bars represent the confidence intervals, the circles represent the coefficients, and the filling inside the circle indicates a relative decline in the treatment group's illiquidity factor that was statistically significant at least at the 10% level. The baseline month (for which there is no coefficient) is the first month of the sample period.

³⁶ In all the analyses, I took the effective date of the reforms. In the case of the adoption of PRAs in the Main Market, the date is November 8, 2006, when §1270 of the Companies Act (the provision that added §90A to FSMA) received "Royal Assent" (there are additional transitional provisions, but I take the earliest effective date). In the case of the 2010 reforms, the date is October 1, 2010. In untabulated analyses, however, I also examined earlier dates to compute the returns. In the case of the adoption of PRAs in MM, I examined the date of the publication of the first draft of §1270 of the Companies Act (May 24, 2006); and in the case of the 2010 reforms, I took the date on which the FSA published the reforms (April 7, 2010). The adoption and expansion of the scope of PRAs in MM were associated with long-term positive adjusted returns of 1 and 2%, respectively – and they were significant at the 1% level. In contrast, there were no gains in market value when PRAs were introduced in AIM.

Table 4 shows sensitivity analyses on the changes in liquidity documented in Table 2. Panel A shows three sets of models. In the first three models, I use a shorter period of seven months before and after each event because there are other factors outside that window that may potentially affect the results;³⁷ in the next three models, I use factor analysis instead of principal component analysis to form the illiquidity factor;³⁸ and the last three models account for industry effects by clustering the standard errors by industry instead of firm. As shown in the table, the results with all these specifications were similar to the baseline regressions. To facilitate the interpretation of the results, the online appendix also shows regressions that use each illiquidity proxy separately as the dependent variable (i.e., the bid-ask spread, the Amihud illiquidity variable, and the incidence of zero returns), and all the results were consistent with the baseline results. In addition, untabulated analyses show that the results also are consistent if I use industry fixed effects instead of firm fixed effects, or if I use only firm or industry fixed effects instead of using the entire vector of controls.

Panel B presents three sets of regressions: matched-sample regressions, simple before-versus-after regressions that examine changes in liquidity exclusively among the treated observations, and regressions with industry-by-month fixed effects. The matched sample, as mentioned earlier, seeks to mitigate the fact that there are pre-treatment differences between the treatment and control groups; the before-versus-after regressions seek to mitigate the concern that the relative decline in the illiquidity factor may be driven by a shock affecting the control group rather than the treatment group; and the industry-by-time fixed effects control for potential industry effects that vary over time. As shown in the table, the DiD estimator was negative and statistically significant in all the matched regressions and in all the regressions with industry-by-time fixed effects, and something similar happened with the “post-reform” variable in the simple before-versus-after regressions.

³⁷ Two factors in particular motivate this analysis. The first is that, as I show in a contemporaneous paper (see Restrepo, 2023), in June 2007, the London Stock Exchange significantly reduced its trading latency (i.e., the time required to execute a transaction) and increased its volume capacity (i.e., the maximum number of trades per second), and these reforms appear to be associated with greater liquidity. It is not clear that the reforms should disproportionately enhance the liquidity of firms without a dual cross-listing in the United States, but to ensure with greater confidence that this possibility does not affect the results, I truncate the sample at May 2007. The second motivation for the shorter window is that the oral argument in *Morrison* took place in March 2010. Although Licht et al. (2017) show that this decision did not have any effect on the bid-ask spread, I use only seven months around the October 2010 reforms to the PRAs regime to ensure that the decision does not affect the results.

³⁸ For a similar approach, see, for example, Christensen, Hail, and Leuz (2016).

To construct the matched sample, I matched the treatment and control firms on their capital-market characteristics (liquidity and market capitalization), industry, and balance-sheet variables (i.e., EBITDA, leverage, cash holdings, capital investment, and book-to-market value).³⁹ In the baseline matched regressions, I used only once the control firms that were matched. However, because there are more treatment firms than control firms, I also performed the estimations with replacement, and the results were qualitatively similar. I used a caliper of 0.25 times the standard deviation of the propensity score,⁴⁰ but the results are qualitatively similar if I allow for greater distance between the treatment and the control firms, if I allow for less distance (i.e., a caliper of 0.2 times the standard deviation of the propensity score), or if I impose no caliper at all. In addition, in the initial estimations, I do not impose any condition in terms of common support. However, as shown in the online appendix, a visual inspection of the distribution of the propensity scores shows that there are regions in which there is little overlap between the treatment and the control groups. Therefore, as a sensitivity analysis, I required common support – which, once again, produced qualitatively similar results.⁴¹

The industry of companies is a particularly important factor around which stock returns and liquidity are likely to cluster. In this light, I also re-ran the regressions after performing exact matching on the Fama-French industry classifications. I employed the five-sector classification, which provides the maximum number of industry clusters for which there are observations in the treatment and the control groups across all clusters. The results obtained with this procedure, which are shown in the online appendix, were similar to the baseline regressions.

³⁹ As discussed in Section 5, all the balance-sheet variables are scaled by total assets. In contrast, the capital-market variables are in levels. Using levels in the matching procedure would produce a very low number of observations that can be matched because the cross-listed firms are much larger and more liquid than the firms that are not cross-listed. I therefore scaled the market capitalization and liquidity variables by the mean values within the subsample to which a firm belongs – that is, within the treatment group or within the control group.

⁴⁰ See, e.g., Rosenbaum and Rubin 1985 (generally suggesting a caliper of this size).

⁴¹ I imposed common support by dropping the treatment observations whose propensity score was higher than the maximum or less than the minimum propensity score of the controls. Although this process does result in the elimination of some observations, as illustrated by Table OA.4, there is still significant overlap in the propensity scores of the treatment group and those of the control group. After imposing common support, approximately 90% of the treatment observations in the MM analysis and 40% of the treatment observations in the AIM analysis remained in the sample. As a result, it seems reasonable to expect a significant degree of similarity between the baseline estimations and the estimations with common support. The online appendix also shows balancing tests for the baseline matched sample. As shown there, the matching procedure did not achieve full covariate balance, especially in the comparison of AIM firms with control firms. To mitigate this deficiency, I continue to control for all the covariates in the matched regressions. In some cases, the alternative matching procedures described above were more successful than others in matching specific covariates, but none of the procedures achieved perfect covariate balance. However, the fact that all the matched regressions were qualitatively consistent mitigates the concern that differences in a particular covariate may be driving the difference-in-differences results.

Moreover, as an alternative to the matched regressions, the online appendix also shows regressions by subsamples of the treatment group. As mentioned above, cross-listed firms are generally larger and more liquid than firms with no U.S. cross-listing, so I ran separately the regressions with two subsets of the treatment group. The first subset contains the treatment firms included in the FTSE-350 index or that are relatively large or liquid according to two distributional criteria: the firm had a market capitalization above the median capitalization of all the treatment observations, or the firm had an average volume traded above the median volume of the treatment observations. The second subset is a residual group of firms that do not satisfy any of these conditions.⁴² As shown in the appendix, both subsets of the treatment companies experienced a significant decline in the illiquidity factor in relation to the control group – and this result was consistent across the three regulatory events. In this sense, the association between PRAs and liquidity described in the baseline regressions appears to be a general phenomenon across the treatment observations rather than a concentrated phenomenon.⁴³

Panels C and D show analyses by subsamples of the control group. Panel C classifies the control firms on the basis of the different levels of scrutiny to which they were subject in the United States. Foreign firm typically enter the U.S. securities market through the issuance of American Depositary Receipts (“ADRs”) (that is, U.S.-traded securities that represent shares of the foreign firm), which can take one of four forms or “levels” (see, e.g., SEC, 2012; 2016): Level 1 ADRs are traded over the counter (OTC) and do not subject the issuer to periodic reporting obligations under U.S. securities laws.⁴⁴ Level 2 ADRs are listed on U.S. exchanges (usually, on the New York Stock Exchange) or quoted on NASDAQ, and in this case, the issuer

⁴² The results are qualitatively similar if I use the FTSE-100 index. Since only the composition of the treatment group changes across these specifications, the sum of the observations used in each subsample does not equal the total number of observations in the baseline estimations. For example, the sum of the observations in models 1 and 4 (that is, 170 + 140) does not equal 268 because I use 128 treatment firms in model 1 and 98 treatment firms in model 4, but I use all the control firms (42) in both models.

⁴³ To explore more fully whether there was heterogeneity in the treatment effects, I examined whether there were significant differences between the DiD estimators of the two subsamples of the treatment group – but as shown in the last column of the table, the DiD estimators were generally similar. The only exception was the third regulatory event (i.e., the expansion of the scope of PRAs in the Main Market), in which case the DiD estimator was stronger for the smaller and less liquid firms in the treatment group. One possible explanation for this result is that PRAs tend to improve more the liquidity of those firms because investors in larger companies are relatively better protected by the higher level of public scrutiny that those firms receive. I, however, do not draw strong inferences from this result, as the DiD estimators were not consistently different across all the regulatory events.

⁴⁴ These ADRs can be *sponsored* or *unsponsored*. In a *sponsored* ADR, the non-U.S. company enters into an agreement with the U.S. depositary bank to arrange for the issuance of the securities. In *unsponsored* ADRs, such an agreement with the non-U.S. company does not exist. See, e.g., SEC (2016).

must register and file annual reports with the SEC. Level 3 ADRs have the same characteristics as Level 2 ADRs, but in addition, they allow the company to raise capital in the U.S. – thus subjecting the issuer to more comprehensive registration requirements. Level 4 ADRs are restricted securities that can only be traded by large institutional investors. These investors can acquire the securities using a “private offering exemption” or the safe harbor for qualified resales provided by SEC Rule 144A, and the securities are not subject to SEC registration or reporting requirements.⁴⁵

Although Levels 1, 2 and 3 ADRs create a risk of securities class actions, Levels 2 and 3 issuers are relatively more exposed to that risk because of the periodic reporting obligations those ADRs involve;⁴⁶ as a result, using only Levels 2 and 3 issuers as the control group may yield a stronger difference-in-differences estimator. The results presented in Panel C, however, do not support this conjecture. As shown in the table, the DiD estimator was statistically significant at the 1% when I used exchange-traded firms or OTC-traded firms as the control group, and the difference between the DiD estimators was indistinguishable from zero. Although those results may be surprising, they nonetheless seem plausible for at least two reasons.

First, from a doctrinal perspective, courts have expressly indicated that issuers with ADRs listed on the OTC market are subject to U.S. securities class actions;⁴⁷ and since prior empirical evidence indicates that even a small number of lawsuits can significantly deter misconduct ex ante and prompt investors to value firms more highly (e.g., Iliev, 2014, p. 482; Gagnon and Karolyi, 2018), then the small number of cases involving OTC firms might have been enough to mute the differences in the DiD estimators.

And second, from an empirical perspective, although the incidence of class actions against foreign OTC firms is significantly lower than the incidence of actions against exchange-traded firms, suits against OTC firms still represent a real threat. To illustrate this point, the Stanford Securities Class Action Clearinghouse database reports 811 actions against foreign firms, 65

⁴⁵ See 17 CFR § 230.903 (private offering exemption) and 17 CFR § 230.501-08 (Rule 144A resales).

⁴⁶ For empirical evidence consistent with this notion, see, e.g., AIG (2021) and Table A.2 of the appendix.

⁴⁷ Courts have expressed this view on various occasions, and the doctrine covers even unsponsored ADRs. See *In re Volkswagen "Clean Diesel" Mktg., Sales Pracs., & Prod. Liab. Litig.*, No. 2672 CRB (JSC), 2017 WL 66281 (N.D. Cal. Jan. 4, 2017); *Stoyas v. Toshiba Corp.*, 191 F. Supp. 3d 1080 (C.D. Cal. 2016), rev'd, 896 F.3d 933 (9th Cir. 2018). For earlier cases, see *In re Vestas Wind Systems A/S Securities Litigation*, 3:11CV00585 (D.C. Or. 2011); *In re Roche Holdings Ltd.* 99-CV-05627 (D.C. N.J. 1999).

of which were against OTC firms; and the total number of actions against OTC firms in the database (that is, actions against US and foreign issuers) is 209. This implies that approximately 31 percent of all OTC actions were against foreign firms, and 8 percent of all foreign actions were against OTC firms. In this sense, the probability that foreign OTC issuers will be targeted by litigation is not trivial.

Panel D employs an alternative division of the control group: firms with above-the-median and below the median U.S. trading volume. These tests are motivated by reasons that are similar to the ones described in the previous paragraphs: since prior evidence indicates that the incidence of U.S. litigation against foreign cross-listed issuers is positively associated with the firms' U.S. trading volume (Bartlett et al., 2019), then it is possible that the DiD estimator is stronger when issuers with a high U.S. trading volume are used as a control group – since the introduction of U.K. PRAs might have affected to some extent the liquidity of the control firms with low U.S. trading volume. The results, however, do not support this hypothesis. As shown in the regressions, the DiD estimator was statistically significant when I used control firms with high or low U.S. trading volume, and the difference between the DiD estimators was indistinguishable from zero.

Because, like with liquidity, the baseline analysis of adjusted returns in Table 3 suggests a positive association between PRAs and market value, I also performed sensitivity analyses on that association. These analyses essentially track the robustness checks for liquidity and are presented in Table 5. Panel A of the table regresses the returns in a multivariate model, which shows that, after controlling for covariates, the treatment group experienced an increase in its cumulative returns in relation to the control group after each regulatory reform.

Panel B examines the returns using the matched sample, the raw returns of the treatment group (that is, the returns before and after the PRAs reforms, without using the control group), and regressions that include industry-by-time fixed effects. In all these tests, as in the analysis of liquidity, I focus on the long-term valuation effects of PRAs. As shown, the results in the matched sample and with industry-by-time fixed effects are similar to the baseline results; and the raw returns confirm that the treatment group experienced an increase in its market value not only in relative terms, but also in absolute terms.

Panels C and D examines the adjusted returns with the same alternative control groups used in Panels C and D of Table 4. As shown, in relation to each subset of the control group, the treatment group once again experienced positive and significant excess returns around each regulatory event.⁴⁸ Taking the results of this and the previous panels together, therefore, the valuation effects of PRAs are generally similar to the liquidity effects over all the sensitivity analyses.

An important aspect to note about the results presented in this section is that although they suggest that the adoption of PRAs was associated with positive capital-market effects, they do not identify the exact mechanism behind that association. As mentioned earlier, PRAs may enhance liquidity and market value because they provide a mechanism to compensate investors if they suffer damages as a result of corporate misstatements and/or because the prospect of litigation can deter misbehavior *ex ante*. The data available, however, do not permit to determine the relative impact of these mechanisms on the results.

7. Discussion

The fact that the introduction of private rights of action in the United Kingdom was associated with greater liquidity and market value is consistent with the prediction of a large number of studies, which view the rights as an important investor protection device that may enhance investors' confidence in the capitals market (e.g., Seligman, 1994; Stulz, 1999; Coffee, 1999; 2006; Fox 2009; Sale and Thompson 2015).⁴⁹ This result differs from Licht et al.'s (2017) finding that the reduction in the exposure of foreign firms to U.S. litigation post-*Morrison* was not associated with lower liquidity or market value. But this does not mean that the results of the two studies are inconsistent. As mentioned earlier, while Licht et al. examine the impact of the removal of private rights of action from a particular group of shareholders (i.e., foreign investors that trade exclusively on foreign exchanges), I examine a potentially more radical event – exposing public firms for the first time to such rights. In other words, *Morrison* reduced the exposure of foreign cross-listed issuers to private litigation, but it did not eliminate that

⁴⁸ The table also shows that the adjusted returns were stronger when the control group consisted of exchange-traded cross-listed firms than when it consisted of OTC firms (Models 1-7). This is in line with the hypothesis described earlier that the relative effect of the introduction of PRAs might be stronger when exchange-traded firms are used as controls because those firms were more exposed to U.S. litigation than OTC firms. However, when I replaced the kind of U.S. listing of the control firms with their level of U.S. trading volume, I did not find consistent patterns.

⁴⁹ “Even in the literature that suggests that the vast majority of investors do not need legal rights to sue (and certain other protections), private enforcement by other actors is still thought to be a central protection, especially because litigation furthers price informativeness (see, for example, Spamann 2022).”

form of litigation, which implies that the deterrent effect of private enforcement was potentially still present among foreign cross-listed firms after the decision. In addition, on a more general level, there might be unobservable differences between investors in U.K. and U.S. firms that explain why those investors react differently to the availability of private enforcement.⁵⁰

Turning to the policy implications, the results shown here are of course most directly relevant to the cost-benefit analysis of the implementation of PRAs in the particular case of the United Kingdom. One of the central concerns motivating the enactment of FSMA 90A, in fact, was the notion that a legal system that relies exclusively on public enforcement may hinder market liquidity – a view that that was especially expressed in the Davies Report, where Professor Davies emphasized that although the cross-country evidence on the association between private litigation and liquidity was not conclusive, it seemed “unwise” to concentrate all the enforcement powers in the hands of a public body (Davies, 2007a, p. 10). The results presented here suggest that this intuition was in fact correct.

This paper’s findings, however, are also potentially relevant to other jurisdictions considering the adoption or elimination of PRAs – including, notably, the United States. Although debates about the desirability of U.S. securities class actions have been active for a long time, these debates have intensified recently due to a significant rise in litigation and the concern that this rise is in large part driven by frivolous actions.⁵¹ And these trends, in turn, have triggered (or

⁵⁰ Moreover, commentators have pointed out that it might not always be clear how to apply *Morrison*’s principles to the many ways in which securities are traded in practice, and that the decision spawned new litigation strategies that expose foreign issuers to new forms of liability. For example, plaintiffs whose U.S. securities law claims would be limited under *Morrison* have sought to expand class actions by asserting foreign law claims in their complaints – a strategy that might mitigate the impact of *Morrison* and thus contribute to muting the effects of the ruling. See, e.g., Cleary Gottlieb Steen & Hamilton LLP (2020). See also *Stoyas v. Toshiba Corp.*, 424 F. Supp. 3d 829 (9th Cir. 2018); *Roofers’ Pension Fund v. Papa*, 2018 U.S. Dist. LEXIS 125885 at *72 n.24 (D. N.J. July 27, 2018); *In re VeriFone Holdings, Inc. Sec. Litig.*, 2014 WL 12646027, at *3 (N.D. Cal. Feb. 18, 2014). It is also worth noting that although previous empirical evidence from the United States suggests that securities class actions are associated with the incidence of management guidance (e.g., Johnson, Kasznik, and Nelson, 2001), audit costs (Shu, 2000), firms’ investment policy (Arena and Julio, 2015), and the quality of firms’ disclosures (Skinner, 1994; 1997; Ayers and Kaplan, 1998; DeFond and Subramanyam, 1998; Francis and Krishnan, 2002; Qiang, 2007), the fact that I do not find a meaningful association between the implementation of the actions and those variables is not necessarily inconsistent with the previous evidence. Most of the prior studies focus on changes in the variables *after a firm is targeted by class actions*, not after the actions were introduced in the legal system – which is of course a qualitatively different event.

⁵¹ In 2019, for example, the number of class actions reached an all-time record, with 428 new actions filed in federal and state courts – nearly twice the average number of filings during the 1997-2018 period (Cornerstone Research, 2020, p. 1). This trend becomes even stronger if the decline in the number of public companies in the recent past is considered. Taking the 2018 year-end number of U.S. public companies (4,406), for example, approximately 9% of those companies were sued in 2019, an incidence rate that is approximately three times the average annual litigation rate over the 2005-2010 period (which was approximately 3%) (see Cornerstone Research, 2020, p. 11).

given renewed relevance) to various reform proposals to eliminate or significantly curb private rights of action.⁵² The results presented here suggest that although implementing mechanisms to prevent frivolous litigation is probably desirable, completely eliminating PRAs may result in a reduction of market liquidity and value.

It is important to emphasize, however, that any extrapolation from the results presented here to a different context, and especially to the United States, is only suggestive. Leaving aside unobserved differences across different contexts, PRAs in the United Kingdom had very specific implementation characteristics that may be related to the magnitude of the effects documented in this paper. These characteristics, as mentioned in Section 2, include mainly three: unlike the U.S. system, FSMA 90A did not adopt a presumption of reliance based on the fraud-on-the-market theory; FSMA 90A lawsuits operate under an opt-in regime, not an opt-out regime; and, when FSMA 90A was implemented, the plaintiffs' lawyers could not be compensated with contingency fees.

These characteristics may be seen as positive features – and thus value- or liquidity-enhancing. Various commentators point out that the FOTM theory may facilitate meritless suits⁵³ because it generally facilitates litigation,⁵⁴ which in turn suggests that FSMA 90A may be perceived as a provision that is less prone to frivolous suits than Rule 10b-5. And the opt-in system of litigation and the lack of contingency fees may produce similar effects: the lack of contingency fees likely reduces lawyers' incentives to initiate weak cases because of the lower expected value of their compensation, and the opt-in regime may reinforce this effect because similarly

⁵² These include: concentrating the authority to pursue civil securities-fraud enforcement in the hands of the SEC or the exchanges (Grundfest, 1994; Pritchard, 1999; Rose, 2010); imposing mandatory arbitration for securities-related disputes (e.g., Bondi, 2010; Bainbridge, 2018); capping the damages that can be recovered in class actions (Langevoort, 1996); making culpable insiders absorb the cost of their misconduct by eliminating corporate liability in cases involving a non-trading issuer (Coffee, 2006, p. 1583); replacing damages with penalties (e.g., Alexander, 1996, p. 1516-19); adopting mechanisms to align the incentives of plaintiff shareholders and attorneys (for example, by imposing restrictions on who can act as the lead plaintiff) (e.g., Coffee, 1986; Choi and Pritchard, 2018); narrowing the scope of the substantive fraud prohibitions and toughening the procedural rules; eliminating the presumption for reliance based on the FOMT theory (e.g., Pritchard, 1999, p. 928; Note, 2018); and granting the government the ability to screen which class actions may be filed and against whom (Rose, 2008).

⁵³ See, e.g., Langevoort (2009) (arguing that, after *Basic* was decided in 1988, the number of suits involving fraud-on-the-market had tripled by 1991); Pritchard (1999, p. 948) (citing evidence that total cash settlements increased by 300% between 1988 and 1992). However, some commentators present data suggesting that most securities class actions are meritorious (Donelson, Hopkins, and Yust, 2015) or that the merits typically matter at least to some degree (Griffith, 2006; Baker and Griffith, 2009).

⁵⁴ See, e.g., *Basic Inc. v. Levinson*, 485 U.S. 224, 251 (1988) (White, J., concurring in part and dissenting in part); *Halliburton Co. v. Erica P. John Fund, Inc.* (Halliburton II), 134 S. Ct. 2398, 2427 (2014) ("*Halliburton II*") (Thomas, J., concurring).

situated shareholders are not automatically included in the class of plaintiffs, which reduces the leverage of the plaintiff lawyers.

But it is also possible to make the opposite argument: since U.K. PRAs are more restrictive than their U.S. counterparts, then U.S. actions may be more strongly related with positive capital-market outcomes than the U.K. actions. The FOTM theory, in fact, is often viewed as a central protection in the U.S. system of securities litigation,⁵⁵ and comparing the incentives to litigate created by the U.K. and the U.S. systems of attorney fees is complicated by other litigation constraints in the U.S. system⁵⁶ and by the specific details of how attorney fees operate in the United Kingdom.⁵⁷ In this light, as mentioned, the policy implications of this paper for non-U.K. jurisdictions are necessarily suggestive only.

8. Conclusion

This paper exploits three alternative regulatory changes from the United Kingdom to examine the impact of introducing private rights of action for financial misstatements in the legal system. The results indicate that the adoption of the rights was positively associated with market liquidity and value. These results therefore identify an important benefit for the purposes of the cost-benefit analysis of the implementation of PRAs in the United Kingdom. However, the results also have suggestive implications for current reform proposals outside that jurisdiction (especially in the United States), as the data suggest that completely

⁵⁵ See, e.g., Fischel (1982, pp. 3-5); Fischel (1989, pp. 908, 918); Posner (1986, pp. 168-71); Macey and Miller (1990); Easterbrook and Fischel (1991).

⁵⁶ There are two notable constraints. On the one hand, plaintiff lawyers internalize part of the cost of class actions because they advance the expenses required to initiate an action – and if no recovery is obtained, they receive no fee and usually absorb the out-of-pocket expenses (see, e.g., Alexander, 1998). And on the other hand, there are institutional restrictions on the size of contingent compensation. These include: Rule 23(h) of the Federal Rules of Civil Procedure, which requires judicial approval of contingency fees; the Private Securities Litigation Reform Act of 1995 (“PSLRA”), which limited the fees to a “reasonable” percentage of the settlement or the damages award (15 U.S.C. §78u-4(a)(6)); and the existence of class representatives, who, in theory, have the incentives and the ability to monitor that the fees comply with Rule 23(h) and the PSLRA (see, e.g., Choi, Erickson, and Pritchard, 2020 (discussing empirical literature that supports this argument)). It is worth noting, however, that some commentators point out that all these constraints are imperfect in practice because judges and class representatives do not seem to be vigorous overseers of fee requests. See Baker et al., (2015); Choi, Erikson, and Pritchard (2020, pp. 438-39) (finding that extremely high awards are still granted).

⁵⁷ As mentioned earlier, even though the United Kingdom initially did not permit U.S.-style contingency fees, it did allow “success fees” of up to 100% of the base fee – which may create some incentives to litigate. In addition, the “loser-pays” system that the United Kingdom had before 2013 may have conflicting effects. On the one hand, it may increase the incentives to litigate because, if the plaintiff is successful, then he knows that the base fee and the success fee are paid by the defendant; but on the other hand, the system may have reduced the incentives to bring claims because the plaintiff knows that, if he loses, he will be liable for the defendant’s legal expenses. In this sense, comparing the U.S. and the U.K. is not equivalent to a plain comparison between a regime of contingency fees with a regime that has no contingent component at all.

eliminating private rights of action, as advocated by some commentators, may result in a reduction of liquidity and market value.

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Table 1
Summary statistics

Table 1 presents summary statistics. The *illiquidity factor* is a factor that combines three illiquidity measures: the bid-ask spread, price impact (i.e., the Amihud (2002) illiquidity measure), and zero returns. I combine these measures into a single factor using principal component analysis, as explained in more detail in the body of the paper. *Log(market cap.)* is the natural logarithm of a firm's market capitalization (the number of shares outstanding multiplied by the market price of the company). *CAPEX* is the ratio of capital expenditures to total assets. *Cash holdings* is the ratio of cash and short-term holdings to total assets. *EBITDA* is the ratio of earnings before interest, taxes, depreciation, and amortization to total assets. *Leverage* is the ratio of total debt to total assets. *Book-to-market* value is the ratio of the book value of total assets to market capitalization. The data related to the capital-market variables (i.e., stock prices and returns, bid-ask-spreads, trading volume, and shares outstanding) are from Datastream. The balance sheet variables (capital expenditures, cash holdings, debt, earnings, and total assets) are from Compustat Global. In all the analyses, the sample includes all the firms that survived and had information available on all the capital-market variables during the entire sample period (one year before and after each regulatory event). The data are measured at the monthly frequency for liquidity and market value, and at the semiannual level for the remaining variables. Panel A shows mean values over the entire sample period. In the case of MM treatment firms and control firms, I use time windows around both the 2007 and the 2010 reforms to compute the mean values (this is because MM firms were affected by both reforms). In the case of AIM firms, the sample period is one year before and after the 2010 reforms. Panel B shows univariate tests of mean differences by period and by treatment status. In that panel, Δ (T-C) means differences between the treatment and the control firms, Δ ($T_{Post}-T_{Pre}$) means differences between the post- and pre-reform periods within the treatment group, and Δ ($C_{Post}-C_{Pre}$) means differences between the pre- and post- periods within the control group. The tests of statistical significance are *t*-tests. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Summary statistics on the full sample period

Variable	MM firms					AIM firms					Cross-listed firms				
	Mean	Median	S.D.	Firms	N	Mean	Median	S.D.	Firms	N	Mean	Median	S.D.	Firms	N
Illiquidity factor	-1.19	-1.31	1.06	226	10848	0.25	0.29	0.86	118	5650	-2.62	-2.74	0.70	42	2014
Log (market cap.)	5.80	5.87	1.57	226	10848	4.16	3.74	1.83	118	5664	8.97	8.97	1.51	42	2016
CAPEX	0.04	0.03	0.05	226	1800	0.05	0.03	0.07	118	464	0.05	0.04	0.04	42	336
Cash holdings	0.12	0.07	0.13	226	1808	0.19	0.10	0.23	118	472	0.10	0.07	0.11	42	336
EBITDA	0.13	0.13	0.13	226	1808	0.00	0.07	0.30	118	472	0.14	0.14	0.08	42	336
Leverage	0.15	0.11	0.17	226	1808	0.07	0.01	0.11	118	472	0.24	0.21	0.18	42	336
Book-to-market value	2.34	1.33	4.58	226	1808	3.27	1.29	8.90	118	472	3.02	1.26	9.50	42	336

Panel B. Univariate tests of mean differences by treatment status and period

Variable	Before regulatory event			After regulatory event				
	Treatment	Control	Δ (T-C)	Treatment	Control	Δ (T-C)	Δ ($T_{Post}-T_{Pre}$)	Δ ($C_{Post}-C_{Pre}$)
Adoption of PRAs in MM								
Illiquidity factor	-1.05	-2.49	1.44***	-1.35	-2.62	1.27***	-0.30***	-0.13***
Log(market capitalization)	5.75	9.03	-3.28***	5.99	9.12	-3.13***	0.24***	0.09
CAPEX	0.05	0.05	0.00	0.05	0.05	0.00	-0.01	-0.01
Cash	0.13	0.10	0.03	0.12	0.09	0.03*	-0.11**	-0.02
EBITDA	0.13	0.15	-0.02	0.13	0.14	-0.01	0.00	-0.01
Leverage	0.16	0.23	-0.07***	0.16	0.25	-0.09***	0.00	0.02
Book-to-market value	2.04	2.67	-0.63	1.83	2.76	-0.93	-0.21	0.09
Adoption of PRAs in AIM								
Illiquidity factor	0.37	-2.70	3.07***	0.17	-2.67	2.84***	-0.20***	0.03
Log(market capitalization)	3.90	8.81	-4.90***	4.10	8.94	-4.83***	0.20***	0.13
CAPEX	0.05	0.04	0.01	0.05	0.05	0.00	0.00	0.00
Cash	0.20	0.11	0.09***	0.19	0.11	0.08***	-0.01	0.00
EBITDA	0.00	0.15	-0.15***	-0.01	0.15	-0.16***	0.00	0.00
Leverage	0.07	0.26	-0.19***	0.06	0.24	-0.18***	-0.01	-0.02
Book-to-market value	3.33	3.35	-0.02	3.21	3.29	-0.08	-0.12	-0.06
Extension of the scope of PRAs in MM								
Illiquidity factor	-1.13	-2.70	1.57***	-1.24	-2.67	1.43***	-0.11***	0.03
Log(market capitalization)	5.65	8.81	-3.16***	5.81	8.94	-3.13***	0.16***	0.13
CAPEX	0.03	0.04	-0.01**	0.04	0.05	-0.01	0.01**	0.00
Cash	0.11	0.11	0.00	0.11	0.11	0.00	-0.01	0.00
EBITDA	0.12	0.15	-0.03**	0.12	0.15	-0.03*	0.01	0.00
Leverage	0.14	0.26	-0.12***	0.14	0.24	-0.1***	0.00	-0.02
Book-to-market value	2.76	3.35	-0.59	2.74	3.29	-0.55	-0.02	-0.06

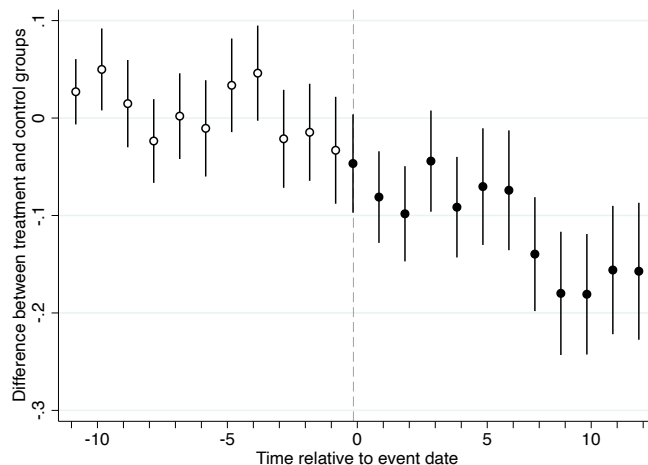
Table 2
Regressions on the effects of PRAs on firm liquidity

Table 2 presents regression results on the effect of PRAs on firm liquidity – measured by the *illiquidity factor* described in the body of the paper and the appendix. The sample firms and periods of analysis are defined in the body of the paper. The control variables include market capitalization, firm performance (EBITDA), leverage, and book-to-market value. MM_{NCL} and AIM_{NCL} , the treatment variables, mean MM and AIM firms with no U.S. cross-listing, respectively. The *Post* variables are indicator variables for each of the 2006 and 2010 reforms. The *t*-statistics are in parentheses and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

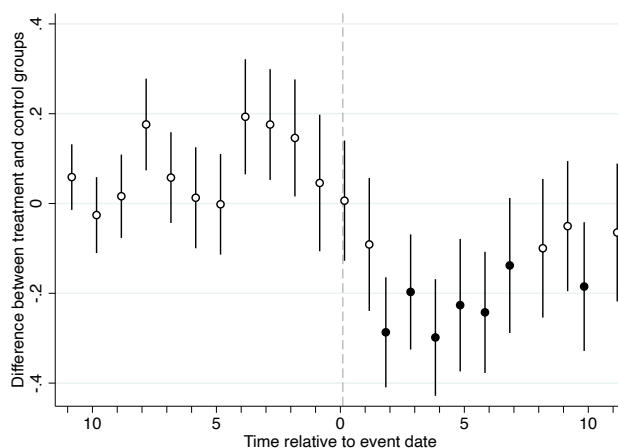
Regulatory event	Adoption in MM	Adoption in AIM	Extension in MM
Model	(1)	(2)	(3)
$MM_{NCL} \times Post_{Nov.2006}$	-0.131*** (-6.16)		
$AIM_{NCL} \times Post_{Oct.2010}$		-0.217*** (-7.08)	
$MM_{NCL} \times Post_{Oct.2010}$			-0.138*** (-6.63)
R-squared	0.674	0.635	0.708
Firms	268	160	268
N	6432	3838	6430

Figure 1
Illiquidity of the treatment firms in relation to the control firms around the adoption and expansion of PRAs

Panel A. Illiquidity around the adoption of PRAs in MM



Panel B. Illiquidity around the adoption of PRAs in AIM



Panel C. Illiquidity around the expansion of the scope of PRAs in MM

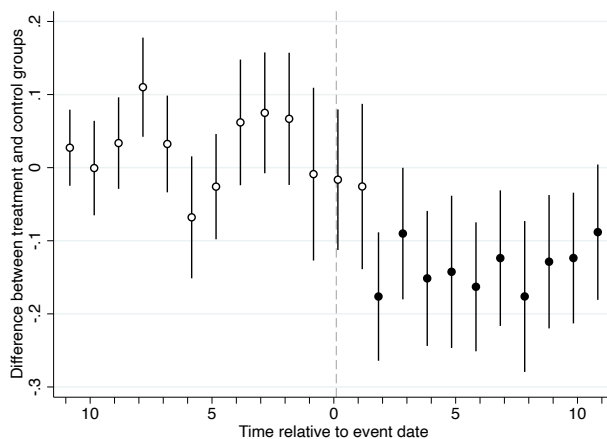


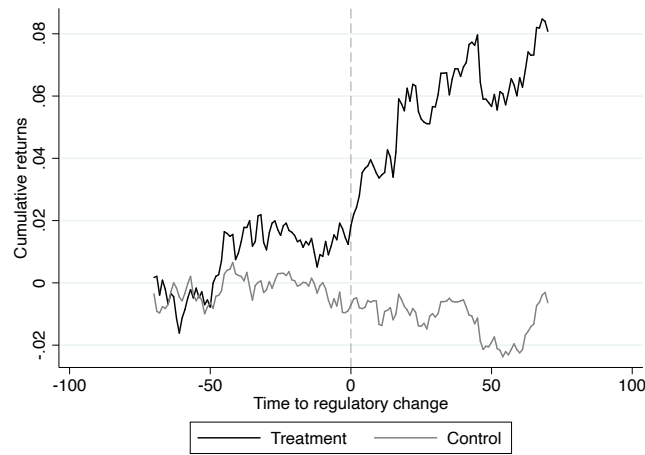
Table 3
Adjusted cumulative returns around the adoption and expansion of PRAs

The table shows the adjusted cumulative returns of the treatment group around each of the PRA events. I define the adjusted returns as the difference between the cumulative returns of the treatment group minus the cumulative returns of the control group. The (-3,+3) range denotes a time window of three days around each regulatory event, and the (-30,+30) range denotes a window of thirty days. The data to compute the returns come from Datastream.

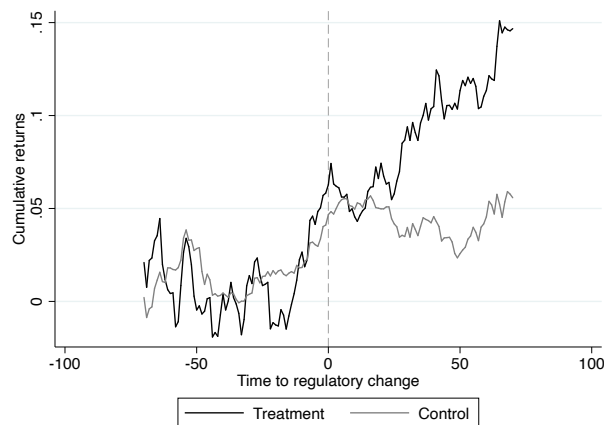
Event	Coefficient	t-statistic
Adjusted cumulative returns (-3,+3)		
Adoption of PRAs in MM	0.006***	2.86
Adoption of PRAs in AIM	0.007**	2.19
Expansion of the scope of PRAs in MM	0.016***	8.91
Adjusted cumulative returns (-30,+30)		
Adoption of PRAs in MM	0.013***	8.06
Adoption of PRAs in AIM	0.018***	6.64
Expansion of the scope of PRAs in MM	0.019***	10.89

Figure 2.
Cumulative returns of the treatment and control firms around the adoption of PRAs

Panel A. Returns around the adoption of PRAs in MM



Panel B. Returns around the adoption of PRAs in AIM



Panel C. Returns around the expansion of the scope of PRAs in MM

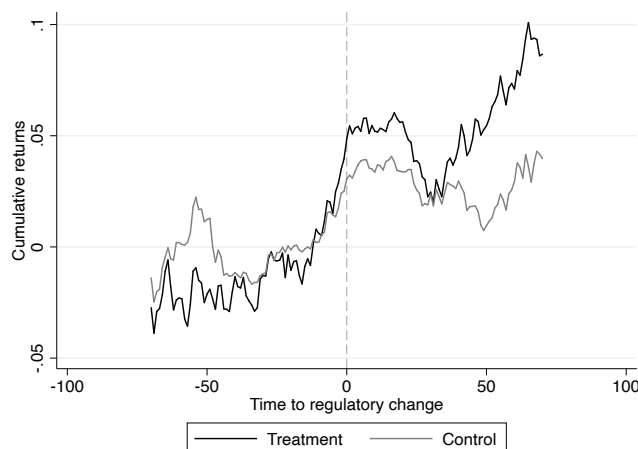


Table 4
Sensitivity analyses on the liquidity effects of PRAs

The table presents sensitivity analyses on the association between PRAs and liquidity. Panel A shows three types of analyses: Models 1-3 use a reduced sample period of seven months around each regulatory event; Models 4-7 use factor analysis instead of principal component analysis to compute the illiquidity factor; and Models 7-9 use standard errors clustered by industry rather than firm. Panel B reports regression results based on a matched sample (Models 1-3), before-and-after regressions for the treatment group exclusively (Models 4-6), and models with industry-by-time fixed effects. Panels C and D shows regressions using subsets of the control group, as well as the p -values associated with differences in the DiD estimators between the subsets. The t -statistics are in parentheses and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Alternative sample period, computation of the illiquidity factor, and clustering of the standard errors

Sensitivity analysis	Reduced sample period			Illiquidity from factor analysis			Clustering by industry		
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$MM_{NCL} \times Post_{Nov.2006}$	-0.103*** (-4.77)			-0.094*** (-5.94)			-0.131*** (-8.34)		
$AIM_{NCL} \times Post_{Oct.2010}$		-0.263*** (-9.87)			-0.132*** (-6.97)			-0.217*** (-8.04)	
$MM_{NCL} \times Post_{Oct.2010}$			-0.124*** (-6.36)			-0.091*** (-6.34)			-0.138*** (-6.72)
Time window	Reduced	Reduced	Reduced	Full	Full	Full	Full	Full	Full
PCA or factor analysis	PCA	PCA	PCA	FA	FA	FA	PCA	PCA	PCA
SE clustering	Firm	Firm	Firm	Firm	Firm	Firm	Industry	Industry	Industry
R-squared	0.640	0.424	0.627	0.658	0.639	0.701	0.674	0.635	0.708
Firms	268	160	268	268	160	268	268	160	268
N	3752	2238	3750	6432	3838	6430	6432	3838	6430

Panel B. Matched sample regressions, before-and-after regressions, and regressions with industry-by-time fixed effects

Sensitivity analysis	Matched sample			Before-and-after analysis			Industry-by-time fixed effects		
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$MM_{NCL} \times Post_{Nov.2006}$	-0.141*** (-6.01)						-0.104*** (-4.49)		
$AIM_{NCL} \times Post_{Oct.2010}$		-0.207*** (-6.09)						-0.234*** (-6.59)	
$MM_{NCL} \times Post_{Oct.2010}$			-0.128*** (-6.05)						-0.135*** (-5.59)
$Post_{Nov.2006} MM_{NCL} = 1$				-0.221*** (-9.52)					
$Post_{Oct.2010} AIM_{NCL} = 1$					-0.151*** (-5.08)				
$Post_{Oct.2010} MM_{NCL} = 1$						-0.055*** (-2.80)			
R-squared	0.693	0.479	0.729	0.605	0.131	0.639	0.668	0.592	0.691
Firms	255	132	255	226	118	226	268	160	268
N	6120	3168	6118	5424	2832	5424	6432	3838	6430

Panel C. Regressions using subsamples of the control group: firms traded on U.S. exchanges versus firms traded on the OTC market

Model	Control firms traded on U.S. exchanges			Control firms traded on the OTC market			Difference in coefficients (<i>p</i> -value)
	(1)	(2)	(3)	(4)	(5)	(6)	
$MM_{NCL} \times Post_{Nov.2006}$	-0.135*** (-4.61)			-0.131*** (-5.62)			0.44
$AIM_{NCL} \times Post_{Oct.2010}$		-0.215*** (-6.55)			-0.218*** (-6.73)		0.96
$MM_{NCL} \times Post_{Oct.2010}$			-0.139*** (-5.44)			-0.137*** (-5.81)	0.62
R-squared	0.656	0.515	0.675	0.648	0.529	0.687	
Treatment & control firms	226-16	118-16	226-16	226-26	118-26	226-26	
Firms	242	134	242	252	144	252	
N	5808	3215	5807	6048	3455	6047	

Panel D. Regressions using subsamples of the control group: firms traded on U.S. exchanges versus firms traded on the OTC market

	Control firms with above-the-median U.S. trading volume			Control firms with below-the-median U.S. trading volume			Difference in coefficients (<i>p</i> -value)
	(1)	(2)	(3)	(4)	(5)	(6)	
$MM_{NCL} \times Post_{Nov.2006}$	-0.167*** (-6.23)			-0.101*** (-4.47)			0.15
$AIM_{NCL} \times Post_{Oct.2010}$		-0.214*** (-6.57)			-0.219*** (-6.71)		0.93
$MM_{NCL} \times Post_{Oct.2010}$			-0.134*** (-5.62)			-0.141*** (-5.70)	0.75
R-squared	0.641	0.530	0.682	0.665	0.513	0.681	
Treatment & control firms	226-19	118-19	226-19	226-23	118-23	226-23	
Firms	245	137	245	249	141	249	
N	5880	3287	5879	5976	3383	5975	

Table 5
Sensitivity analyses on the valuation effects of PRAs

The table presents sensitivity analyses on the cumulative returns of the treatment firms in relation to the returns of the control group around the PRA reforms. In all the tables, the cumulative returns of the sample firms are the dependent variable and thus the adjusted returns are given by the coefficients of the treatment group variables. Panel A estimates the adjusted returns using a multivariate framework, which relies on the same controls used in Table 2. Panels B through D show the results of the same sensitivity analyses shown in Panels B through D of Table 4 for the illiquidity factor. These panels focus on the long-term valuation effects of PRAs. The *t*-statistics are in parentheses and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Multivariate estimation of the adjusted returns

Sensitivity analysis	Cumulative returns (-3,+3)			Cumulative returns (-30,+30)		
Model	(1)	(2)	(3)	(4)	(5)	(6)
<i>MM_{NCL(2006)}</i>	0.016*** (4.92)			0.052*** (21.04)		
<i>AIM_{NCL}</i>		0.012** (2.20)			0.049*** (7.07)	
<i>MM_{NCL(2010)}</i>			0.007*** (2.74)			0.032*** (10.96)
R-squared	0.032	0.007	0.066	0.040	0.027	0.036
Firms	268	160	268	268	160	268
N	1876	1120	1876	16348	9760	16348

Panel B. Matched-sample regressions, before-and-after regressions, and regressions with industry-by-time fixed effects

Sensitivity analysis	Matched sample			Before-and-after analysis			Industry-by-time fixed effects		
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$MM_{NCL} \times Post_{Nov.2006}$	0.065*** (23.47)						0.045*** (19.27)		
$AIM_{NCL} \times Post_{Oct.2010}$		0.060*** (6.86)						0.054*** (7.53)	
$MM_{NCL} \times Post_{Oct.2010}$			0.031*** (9.90)						0.036*** (12.47)
$Post_{Nov.2006} MM_{NCL} = 1$				0.051*** (30.83)					
$Post_{Oct.2010} AIM_{NCL} = 1$					0.072*** (17.22)				
$Post_{Oct.2010} MM_{NCL} = 1$						0.072*** (38.89)			
R-squared	0.046	0.024	0.034	0.102	0.064	0.135	0.140	0.092	0.193
Firms	255	132	255	226	118	226	268	160	268
N	15555	8052	15555	13786	7198	13786	16348	9760	16348

Panel C. Regressions using subsamples of the control group: firms traded on U.S. exchanges versus firms traded on the OTC market

Model	Control firms traded on U.S. exchanges			Control firms traded on the OTC market			Difference in coefficients (<i>p</i> -value)
	(1)	(2)	(3)	(4)	(5)	(6)	
<i>MM_{NCL(2006)}</i>	0.065*** (19.95)			0.045*** (17.24)			0.00
<i>AIM_{NCL}</i>		0.086*** (9.18)			0.040*** (5.66)		0.00
<i>MM_{NCL(2010)}</i>			0.040*** (10.34)			0.028*** (8.93)	0.00
R-squared	0.035	0.023	0.036	0.044	0.024	0.040	
Treatment & control firms	226-16	118-16	226-16	226-26	118-26	226-26	
Firms	242	134	242	252	144	252	
N	14762	8174	14762	15372	8784	15372	

Panel D. Regressions using subsamples of the control group: firms traded on U.S. exchanges versus firms traded on the OTC market

Model	Control firms with above-the-median U.S. trading volume			Control firms with below-the-median U.S. trading volume			Difference in coefficients (<i>p</i> -value)
	(1)	(2)	(3)	(4)	(5)	(6)	
<i>MM_{NCL(2006)}</i>	0.071*** (20.85)			0.041*** (16.09)			0.00
<i>AIM_{NCL}</i>		0.049*** (6.05)			0.063*** (8.08)		0.00
<i>MM_{NCL(2010)}</i>			0.032*** (7.74)			0.032*** (11.60)	0.90
R-squared	0.046	0.024	0.036	0.033	0.021	0.039	
Treatment & control firms	226-19	118-19	226-19	226-23	118-23	226-23	
Firms	245	137	245	249	141	249	
N	14945	8357	14945	15189	8601	15189	

Appendix

Table A1. Variable definitions

Variable	Definition
Adjusted cumulative returns	Cumulative returns of the treatment firms in relation to the control firms around each regulatory event. <i>Source</i> : Datastream.
AIM_{NCL}	Indicator variable that takes the value of 1 for firms listed on the London Stock Exchange's Alternative Investment Market (AIM) and 0 otherwise. The subscript <i>NCL</i> means "no cross-listing." <i>Source</i> : London Stock Exchange. The cross-listing data come from Compustat, the SEC, and the J.P. Morgan ADRs database.
<i>Amihud illiquidity measure</i>	Daily absolute stock return divided by trading volume. <i>Source</i> : Computed using Datastream data.
<i>Audit fee</i>	Audit fees to total assets. <i>Source</i> : Compustat Global.
<i>Bid-ask spread</i>	Difference between the ask price and the bid price, divided by the midpoint of the two values. The bid and ask prices are based on daily price data and the spread is then averaged at the month level. <i>Source</i> : Datastream.
<i>Book-to-market</i>	The ratio of the book value of total assets to market capitalization. <i>Source</i> : Computed using Compustat Global and Datastream data.
<i>CAPEX</i>	Capital expenditures to total assets. <i>Source</i> : Compustat Global.
<i>Cash</i>	Cash and short-term investments to total assets. <i>Source</i> : Compustat Global.
<i>EBITDA</i>	The ratio of earnings before interest, taxes, depreciation, and amortization to total assets. <i>Source</i> : Compustat Global.
<i>Forecast error</i>	Absolute deviation of the forecast error scaled by the reported profits. <i>Source</i> : Capital IQ.
<i>Guidance</i>	Incidence of management guidance reports issued by a firm in the corresponding semester. <i>Source</i> : Capital IQ.
<i>Illiquidity factor</i>	Illiquidity factor obtained from principal component analysis. The underlying variables to compute the factor include: the bid-ask spread, the Ahimud (2002) illiquidity factor, and the incidence of zero returns in a given month. <i>Source</i> : computed using Datastream data.
<i>Leverage</i>	The ratio of total debt to total assets. <i>Source</i> : Compustat Global.
MM_{NCL}	Indicator variable that takes the value of 1 for firms listed on the London Stock Exchange's Main Market (MM) and 0 otherwise. The subscript <i>NCL</i> means "no cross-listing." <i>Source</i> : London Stock Exchange. Cross-listing data come from Compustat, the SEC, and the J.P. Morgan ADRs database.
<i>Market capitalization</i>	Monthly average stock price multiplied by number of shares outstanding. <i>Source</i> : Datastream.
$Post_{(November\ 2006)}$	Indicator variable that takes the value of 1 for observations after November 2006 and 0 otherwise.
$Post_{(October\ 2010)}$	Indicator variable that takes the value of 1 for observations after October 2010 and 0 otherwise.
$Post_{PRAs} Treat = 1$	Indicator variable for observations after each of the reforms to PRAs, conditional on a firm belonging to the treatment group (i.e., AIM or MM with no U.S. cross-listing).
<i>Zero returns</i>	Incidence of zero returns for a given firm and a given month. <i>Source</i> : Datastream.

Table A.2. U.S. securities class actions against U.K. companies

The table reports all the securities class actions that have been filed against U.K. issuers in U.S. courts between 1996 and 2021. The table only includes actions that involved Rule 10b-5 claims (there are additional actions under Section 11 of the Securities Act for misstatements in a registration statement). The data come from the Stanford Securities Class Actions Clearinghouse.

Date filed	Issuer	Sector	Circuit	Issuer's market	Status
3/24/97	Insignia Solutions PLC	Technology	9th	NASDAQ	Settled
12/3/98	Micro Focus Group, PLC : American Depositary Shares	Technology	2nd	NASDAQ	Settled
7/2/99	Smallworldwide plc	Technology	10th	NASDAQ	Settled
9/6/00	Independent Energy Holdings, PLC	Utilities	2nd	NASDAQ	Settled
7/9/01	Marconi, PLC. : American Deposit Receipts (ADR's)	Capital Goods	3rd	NASDAQ	Settled
11/7/01	Bookham Technology PLC	Technology	2nd	NASDAQ	Settled
9/18/02	Vodafone Group PLC	Services	2nd	New York SE	Settled
12/26/02	Cable and Wireless plc : American Depositary Receipts (ADRs)	Services	4th	New York SE	Settled
4/9/03	Imperial Chemical Industries PLC : American Depositary Shares	Basic Materials	2nd	New York SE	Settled
8/12/04	CP Ships Limited	Transportation	9th	New York SE	Settled
1/27/05	AstraZeneca PLC	Healthcare	1st	New York SE	Dismissed
4/12/05	GlaxoSmithKline plc	Healthcare	2nd	New York SE	Dismissed
3/31/06	Sea Containers, Ltd.	Transportation	2nd	New York SE	Dismissed
6/11/07	GlaxoSmithKline PLC	Healthcare	2nd	New York SE	Dismissed
11/9/07	Vodafone Group, PLC	Technology	2nd	New York SE	Dismissed
11/15/07	BP P.L.C.	Energy	9th	New York SE	Dismissed
7/17/09	Willis of Colorado Inc. : Willis Group Holdings Ltd.	Financial	11th	New York SE	Dismissed
5/21/10	BP, PLC	Energy	5th	New York SE	Settled
11/23/11	Lloyds Banking Group, PLC	Financial	2nd	New York SE	Dismissed
7/10/12	Barclays PLC : American Depositary Receipts	Financial	2nd	New York SE	Settled
7/28/14	Barclays PLC : American Depositary Shares	Financial	2nd	New York SE	Settled
10/23/14	Tesco PLC : American Depositary Shares	Services	2nd	OTC-BB	Settled
9/11/15	Fiat Chrysler Automobiles N.V.	Consumer Cyclical	2nd	New York SE	Settled
11/13/15	Eros International PLC	Services	2nd	New York SE	Dismissed
1/21/16	GW Pharmaceuticals PLC	Healthcare	2nd	NASDAQ	Dismissed
7/29/16	Fiat Chrysler Automobiles N.V.	Consumer Cyclical	6th	New York SE	Settled
10/11/16	Mylan N.V.	Healthcare	2nd	NASDAQ	Ongoing
12/12/16	Rio Tinto plc	Basic Materials	2nd	New York SE	Dismissed
1/23/17	Mallinckrodt plc	Healthcare	D.C.	New York SE	Ongoing
1/25/17	BT Group plc : American Depositary Receipts	Technology	2nd	New York SE	Dismissed
2/24/17	Pearson plc : American Depositary Receipts	Services	2nd	New York SE	Dismissed
8/3/17	TechnipFMC, plc	Energy	5th	New York SE	Settled

10/23/17	Rio Tinto PLC : American Depositary Receipts	Basic Materials	2nd	New York SE	Ongoing
	Vodafone Group Public Limited Company : American Depositary				
1/18/18	Shares	Technology	2nd	NASDAQ	Dismissed
8/8/18	Nielsen Holdings PLC	Services	2nd	New York SE	Ongoing
1/22/19	Ferroglobe PLC	Basic Materials	2nd	NASDAQ	Dismissed
5/30/19	Metro Bank PLC	Financial	9th	OTC-BB	Dismissed
7/15/19	Reckitt Benckiser Group plc : American Depositary Shares	Consumer Non-Cyclical	3rd	OTC-BB	Ongoing
7/26/19	Mallinckrodt Public Limited Company	Healthcare	2nd	New York SE	Ongoing
7/31/19	Venator Materials PLC	Basic Materials	2nd	New York SE	Ongoing
8/20/19	Valaris plc	Energy	2nd	New York SE	Dismissed
12/2/19	Fiat Chrysler Automobiles N.V.	Consumer Cyclical	2nd	New York SE	Settled
12/16/19	Mylan N.V.	Healthcare	3rd	NASDAQ	Dismissed
6/26/20	Mylan N.V.	Healthcare	3rd	NASDAQ	Ongoing
1/26/21	Astrazeneca PLC : American Depositary Shares	Healthcare	2nd	NASDAQ	Ongoing

Online Appendix for *The economic consequences of introducing private rights of action in the legal system: Evidence from the United Kingdom*

Table OA.1
PRAs and management guidance, absolute forecast errors, audit fees, capital investment, and cash holdings

The table presents regression estimates on the association between PRAs and the incidence of management guidance, the informativeness of corporate disclosures (measured by the absolute error of earnings forecasts or “AFE”), capital investment (CAPEX), and cash holdings. In addition, the table presents summary statistics for the variables not summarized in Table 1 (that is, management guidance, audit fees, and forecast errors). CAPEX and cash holdings are scaled by total assets, and AFE is scaled by reported profits. The data on earnings forecasts and management guidance are from Capital IQ, and the remaining variables are from Compustat Global. The appendix in the published version of the paper includes additional details on the variable definitions, and the body of the paper provides details on the sample firms and periods of analysis. The control variables in the regressions include market capitalization, firm performance, leverage, and book-to-market value. The data are measured at the semiannual level and the sample period is one year before and after the regulatory changes. Panel A shows statistics over the entire sample period. Panel B shows univariate analyses of mean differences by period and treatment status. In that panel, $\Delta (T-C)$ means differences between the treatment and the control firms, $\Delta (T_{Post}-T_{Pre})$ means differences between the post- and pre-reform periods within the treatment group, and $\Delta (C_{Post}-C_{Pre})$ means differences between the post- and pre-reform periods within the control group, respectively. The statistical significance tests are *t*-tests. Panels C through E present the difference-in-differences regressions. The *t*-statistics are in parentheses and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Summary statistics on the full sample period

Variable	MM firms					AIM firms					Cross-listed firms				
	Mean	Median	S.D.	Firms	N	Mean	Median	S.D.	Firms	N	Mean	Median	S.D.	Firms	N
Guidance	0.21	0.00	0.33	226	1781	0.18	0.00	0.32	118	449	0.32	0.25	0.35	42	326
Audit fee	0.00	0.00	0.00	226	1786	0.00	0.00	0.01	118	458	0.00	0.00	0.00	42	322
Forecast errors	0.46	0.09	2.20	226	1415	1.60	0.22	5.18	118	333	1.04	0.05	4.93	42	258

Panel B. Univariate tests on mean differences by treatment status and period

Variable	Before regulatory event			After regulatory event				
	Treatment	Control	Δ (T-C)	Treatment	Control	Δ (T-C)	Δ (T _{Post} -T _{Pre})	Δ (C _{Post} -C _{Pre})
Adoption of PRAs in MM								
Guidance	0.09	0.22	-0.13***	0.14	0.21	-0.07**	0.06***	-0.01
Forecast error	0.28	0.08	0.20*	0.17	0.06	0.11*	0.00	0.00
Audit fee	0.00	0.00	0.00**	0.00	0.00	0.00**	0.00	0.00
Adoption of PRAs in AIM								
Guidance	0.15	0.38	-0.23***	0.22	0.47	-0.25***	0.08**	0.09
Forecast error	1.26	1.31	-0.05	1.94	2.33	-0.39	0.68	1.02
Audit fee	0.01	0.00	0.01	0.00	0.00	0.00***	0.00	0.00
Extension of the scope of PRAs in MM								
Guidance	0.22	0.38	-0.16***	0.37	0.47	-0.1**	0.15***	0.09
Forecast error	0.62	1.31	-0.69*	0.72	2.33	-1.61***	0.10	1.02
Audit fee	0.00	0.00	0.00***	0.00	0.00	0.00	0.00	0.00

Panel C. Regression analysis of the adoption of PRAs in MM

Dependent variable	Guidance	AFE	Audit fee	CAPEX	Cash
Model	(1)	(2)	(3)	(4)	(5)
$MM_{NCL} \times Post_{Nov.2006}$	0.062 (1.56)	-0.095 (-1.47)	0.000 (1.09)	0.000 (0.14)	0.000 (0.03)
R-squared	0.028	0.018	0.111	0.001	0.050
Firms	266	204	265	268	268
N	1049	768	1052	1068	1072

Panel D. Regression analysis of the adoption of PRAs in AIM

Dependent variable	Guidance	AFE	Audit fee	CAPEX	Cash
Model	(1)	(2)	(3)	(4)	(5)
$AIM_{NCL} \times Post_{Oct.2010}$	-0.014 (-0.24)	-0.205 (-0.18)	-0.001 (-1.11)	-0.001 (-0.30)	0.002 (0.11)
R-squared	0.061	0.000	0.164	0.012	0.005
Firms	159	126	156	159	160
N	611	475	618	632	640

Panel E. Regression analysis of the expansion of the scope of PRAs in MM

Dependent variable	Guidance	AFE	Audit fee	CAPEX	Cash
Model	(1)	(2)	(3)	(4)	(5)
$MM_{NCL} \times Post_{Oct.2010}$	0.059 (1.02)	-0.939 (-0.98)	-0.001 (-0.96)	0.002 (0.79)	-0.006 (-0.86)
R-squared	0.059	0.004	0.341	0.007	0.054
Firms	267	233	266	268	268
N	1058	905	1056	1068	1072

Table OA.2
Regression results using separately each component of the illiquidity factor

The table shows regressions results on the association between the PRAs reforms and each component of the illiquidity factor. The sample firms and periods of analysis are defined in the body of the paper. The control variables include market capitalization, firm performance (EBITDA), leverage, and book-to-market value. The *t*-statistics are in parentheses and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Sensitivity analysis	Bid-ask spread			Amihud illiquidity factor			Zero returns		
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$MM_{NCL} \times Post_{Nov.2006}$	-0.197*** (-5.18)			-0.122** (-2.46)			-0.122*** (-3.87)		
$AIM_{NCL} \times Post_{Oct.2010}$		-0.235*** (-6.02)			-0.484*** (-6.66)			-0.144*** (-4.23)	
$MM_{NCL} \times Post_{Oct.2010}$			-0.179*** (-5.68)			-0.288*** (-5.67)			-0.070** (-2.47)
R-squared	0.614	0.628	0.688	0.718	0.693	0.746	0.320	0.406	0.416
Number of firms	268	160	268	268	160	268	268	160	268
N	6432	3838	6430	6432	3840	6432	6432	3840	6432

Table OA.3
Valuation effects of PRAs using index-adjusted returns as the dependent variable

The table presents sensitivity analyses on the cumulative returns of the treatment firms in relation to the returns of the control firms around the PRA reforms. The dependent variable in these models is the difference between the raw returns of the sample firms and the returns of the MSCI-Europe index over a time window of 30 days around each regulatory event. Models 1-3 show the regressions without controls and Models 4-7 include controls. The *t*-statistics are in parentheses and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Sensitivity analysis	Models without controls			Models with controls		
Model	(1)	(2)	(3)	(4)	(5)	(6)
<i>MM_{NCL(2006)}</i>	0.013*** (8.23)			0.051*** (21.40)		
<i>AIM_{NCL}</i>		0.018*** (6.93)			0.048*** (7.01)	
<i>MM_{NCL(2010)}</i>			0.019*** (11.75)			0.031*** (11.16)
R-squared	0.003	0.002	0.004	0.042	0.027	0.039
Number of firms	268	160	268	268	160	268
N	16348	9760	16348	16348	9760	16348

Table OA.4
Additional details on the matched sample

The table shows two additional sets of details about the matched sample used in the sensitivity analyses. Panel A shows univariate tests for pre-treatment differences between the treatment and the control groups. In the analysis of the adoption and extension of the scope of PRAs in MM, there are 222 treatment firms and 33 control firms; in the analysis of the adoption of PRAs in AIM, there are 118 treatment firms and 14 control firms. In the results reported in the table, I did not re-use control observations. However, the results are qualitatively similar if I employ matching with replacement – in which case the number of treatment and control firms is the same. The body of the paper discusses additional details on the matching procedure and untabulated tests. Panel B is a visual inspection of the areas in which there was common support – that is, overlap in the distribution of the propensity scores of the treatment group and the control group.

Panel A. Pre-treatment differences in the matched sample

Variable	MM and control firms			AIM and control firms		
	MM firms	Control firms	Δ (T-C)	AIM firms	Control firms	Δ (T-C)
Illiquidity factor	-0.81	-2.50	1.69***	0.52	-2.54	3.06***
Log(market capitalization)	5.48	9.01	-3.52***	3.94	9.04	-5.10***
CAPEX	0.05	0.05	0.00	0.07	0.06	0.01
Cash holdings	0.12	0.11	0.01	0.26	0.11	0.14*
EBITDA	0.14	0.14	0.00	-0.08	0.14	-0.22*
Leverage	0.14	0.20	-0.06	0.06	0.15	-0.09**
Book to market value	2.67	3.21	-0.54	2.32	1.77	0.55

Panel B. Graphical evidence on common support in the propensity score matching procedure

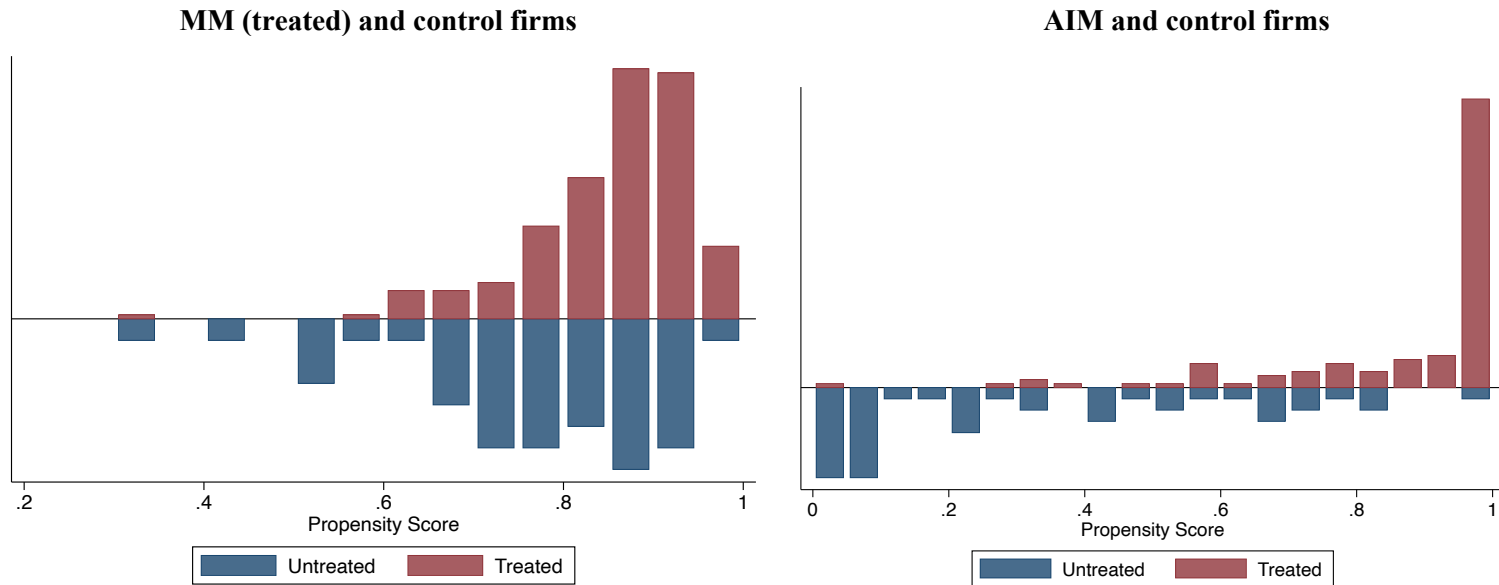


Table OA.5
Matched regressions using exact matching on Fama-French industry classifications

The table shows regressions using a sample obtained by performing exact matching on the Fama-French five-industry classification. The dependent variable is the illiquidity factor in models 1 through 3 and firm returns in models 4 through 6. The *t*-statistics are in parentheses and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Sensitivity analysis	Illiquidity analysis			Analysis of valuation effects		
Model	(1)	(2)	(3)	(4)	(5)	(6)
<i>MM_{NCL(2006)}</i>	0.122*** (-4.32)			0.059*** (19.88)		
<i>AIM_{NCL}</i>		0.207** (-6.09)			0.060*** (6.86)	
<i>MM_{NCL(2010)}</i>			0.108*** (-4.75)			0.024*** (6.25)
R-squared	0.755	0.479	0.795	0.070	0.027	0.036
Firms	144	132	144	144	132	144
N	3456	3168	3466	8784	8052	8784

Table OA.6
Analysis of heterogeneity in the treatment effects by size, volume traded or inclusion in the FTSE index

The table shows regressions by subsets of the treatment group. These subsets are formed using the size, liquidity, and inclusion in the FTSE index of the treatment observations, as explained in the body of the text. Panel A shows the analysis of liquidity and Panel B shows the analysis of returns. The *t*-statistics are in parentheses and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Analysis of the liquidity effects of PRAs

Model	Treatment firms with above-the-median size or volume traded, or included in the FTSE index			Treatment firms with below-the-median size and volume traded, and excluded from the FTSE index			Difference in coefficients (<i>p</i> -value)
	(1)	(2)	(3)	(4)	(5)	(6)	
$MM_{NCL} \times Post_{Nov.2006}$	-0.159*** (-6.23)			-0.091*** (-3.28)			0.44
$AIM_{NCL} \times Post_{Oct.2010}$		-0.204*** (-5.48)			-0.240*** (-5.36)		0.63
$MM_{NCL} \times Post_{Oct.2010}$			-0.055*** (-2.80)			-0.248*** (-8.20)	0.00
R-squared	0.398	0.614	0.307	0.824	0.761	0.880	
Treatment & control firms	128-42	78-42	134-42	98-42	41-42	92-42	
Firms	170	120	176	140	83	134	
N	4080	2878	4222	3360	1990	3214	

Panel B. Analysis of the valuation effects of PRAs

Model	Treatment firms with above-the-median size or volume traded, or included in the FTSE index			Treatment firms with below-the-median size and volume traded, and excluded from the FTSE index			Difference in coefficients (<i>p</i> -value)
	(1)	(2)	(3)	(4)	(5)	(6)	
$MM_{NCL(2006)}$	0.054*** (20.57)			0.021*** (4.10)			0.00
AIM_{NCL}		0.036*** (4.99)			0.025*** (3.19)		0.17
$MM_{NCL(2010)}$			0.018*** (5.59)			0.055*** (9.32)	0.00
R-squared	0.047	0.032	0.026	0.044	0.091	0.074	
Treatment & control firms	128-42	78-42	134-42	98-42	41-42	92-42	
Firms	170	120	176	140	83	134	
N	11590	7991	11590	7320	4392	7320	

Table OA.7
Directors & Officers (D&O) insurance over time

The table shows the evolution of D&O insurance over time. The information on insurance coverage comes from the SAMPLE companies' annual reports. The figures are the average number of firms that purchased insurance premiums across three periods: before PRAs were introduced in MM (2005-2006); after PRAs were introduced in MM but before the rights were introduced in AIM and expanded in MM (2007-2010); and after PRAs were introduced in AIM and expanded in MM (2011). The tests of statistical significance show changes in D&O coverage in relation to the first period – i.e., before PRAs were introduced for the first time in the legal system. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Period	MM firms	Cross-listed firms	AIM firms
Pre-2006	0.39	0.46	0.08
Post-2006, pre-2010 reforms	0.56***	0.59	0.22***
Post-2010 reforms	0.64***	0.64*	0.28***