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Did the Adoption of IFRS Affect Corporate Tax Avoidance?

Oliver Nnamdi Okafor, Akinloye Akindayomi, and Hussein Warsame*

PRÉCIS

Cet article examine si l'adoption des normes internationales d'information financière (IFRS) a eu une incidence sur l'évitement fiscal des sociétés au Canada. Sur la base de 3 200 ensembles de données d'entreprise annuelles de 400 entreprises canadiennes cotées en bourse qui ont adopté les IFRS et de 400 entreprises américaines cotées en bourse, pour lesquelles on a effectué un appariement biunivoque à l'aide de l'appariement des coefficients de propension, les résultats de régression des auteurs montrent que l'adoption des IFRS a été suivie par une diminution du nombre de cas d'évitement fiscal des entreprises au Canada, du moins à court terme. L'étude révèle une augmentation importante de l'impôt payé comptant au cours de la période postérieure à l'adoption par les entreprises canadiennes qui ont adopté les IFRS par rapport aux entreprises américaines qui ont appliqué les principes comptables généralement reconnus aux États-Unis. D'autres résultats de régression fondés sur un petit échantillon de contrôle d'entreprises canadiennes qui n'ont pas adopté les IFRS présentent des données probantes de collaboration. Les auteurs examinent en outre certains attributs des contribuables et des questions comptables relevés dans les notes de service internes de l'Agence du revenu du Canada, en particulier les craintes que l'adoption des IFRS puisse accroître le risque d'évitement fiscal. Bien que les auteurs trouvent des preuves que les entreprises qui ont adopté les IFRS et se sont engagées dans la comptabilité d'exercice ont payé plus d'impôts au cours de la période postérieure à l'adoption des normes, leur analyse ne fournit aucune preuve de relations statistiquement significatives entre l'adoption des IFRS et l'évitement fiscal associé à la gestion des revenus, la propriété d'exploitations étrangères, l'appartenance à un secteur d'activité, la rentabilité, ou les pertes ou radiations de valeur. Globalement, les conclusions des auteurs présentent des preuves empiriques préliminaires mais solides

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que l'adoption des IFRS est associée à une diminution de l'évitement fiscal des sociétés, du moins à court terme.

ABSTRACT

This article investigates whether the adoption of international financial reporting standards (IFRS) affected corporate tax avoidance in Canada. Based on a 3,200 firm-year data set of 400 publicly listed Canadian firms that adopted IFRS and 400 listed US firms, matched one-to-one using propensity score matching, the authors' regression results show that IFRS adoption was followed by a decrease in corporate tax avoidance in Canada, at least in the short run. The study finds a significant increase in cash tax paid in the post-adoption period by Canadian firms that adopted IFRS compared to US firms that used US generally accepted accounting principles. Additional regression results based on a small control sample of Canadian firms that did not adopt IFRS present collaborative evidence. The authors further test specific taxpayer attributes and accounting issues identified in Canada Revenue Agency internal memorandums—in particular, concerns that the adoption of IFRS may increase the risk of tax avoidance. While the authors find evidence that the IFRS firms that engaged in accrual management paid more taxes in the post-adoption period, their analysis provides no evidence of statistically significant relationships between IFRS adoption and tax avoidance associated with revenue management, ownership of foreign operations, industry membership, profitability, or impairment losses or writeoffs. Taken together, the authors' findings present preliminary but strong empirical evidence that IFRS adoption is associated with a decrease in corporate tax avoidance, at least in the short run.

KEYWORDS: IFRS ■ INTERNATIONAL FINANCIAL REPORTING STANDARDS ■ TAX AVOIDANCE ■ CORPORATE TAXES ■ CANADA REVENUE AGENCY

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INTRODUCTION

A recent article by Okafor, Mains, Olabiyi, and Warsame¹ suggested that, on the basis of internal memorandums of the Canada Revenue Agency (CRA), the tax authority had concerns that the adoption of international financial accounting standards (IFRS) in Canada could affect the risk of inappropriate adjustments in corporate tax reporting. The authors of that article called for empirical studies on the effects of IFRS in relation to various tax issues. Prior studies had suggested that tax and financial reporting are linked, and the links may vary across jurisdictions and time.² Researchers have also found that the effects of IFRS on financial reporting are considerably heterogeneous across firms.³ Yet despite heightened interest in the effects of IFRS, very little is known about the impact on tax avoidance. In this study, we empirically investigate whether the adoption of IFRS affected corporate tax avoidance in Canada. We further test the effects of specific taxpayer attributes associated with the accounting issues identified in the CRA's internal bulletins on IFRS and corporate tax avoidance, including the attributes of revenue recognition, ownership of foreign operations, accrual management, profitability, and impairment losses or writeoffs. Since prior studies have suggested that the impact of the adoption of IFRS on financial reporting is not homogeneous across firms, we also test for the effects of taxpayer attributes such as firm size and industry membership.

Canada presents a unique setting for investigating the effects of IFRS because (1) its reporting environment mitigates self-selection bias,⁴ and (2) Canada permits

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- 1 Oliver Nnamdi Okafor, Dawn Mains, Olayemi M. Olabiyi, and Hussein Warsame, "How Did the CRA Expect the Adoption of IFRS To Affect Corporate Tax Compliance and Avoidance?" (2018) 66:1 *Canadian Tax Journal* 1-22.
 - 2 Martin N. Hoogendoorn, "Accounting and Taxation in Europe—A Comparative Overview" (1996) 5, supplement *European Accounting Review* 783-94 (<https://doi.org/10.1080/09638189600000050>); David A. Guenthera and Danqing Young, "The Association Between Financial Accounting Measures and Real Economic Activity: A Multinational Study" (2000) 29:1 *Journal of Accounting and Economics* 53-72 ([https://doi.org/10.1016/S0165-4101\(00\)00013-6](https://doi.org/10.1016/S0165-4101(00)00013-6)); Douglas A. Shackelford and Terry Shevlin, "Empirical Tax Research in Accounting" (2001) 31:1-3 *Journal of Accounting and Economics* 321-87 ([https://doi.org/10.1016/S0165-4101\(01\)00022-2](https://doi.org/10.1016/S0165-4101(01)00022-2)); In-Mu Haw, Bingbing Hu, Lee-Seok Hwang, and Woody Wu, "Ultimate Ownership, Income Management, and Legal and Extra-Legal Institutions" (2004) 42:2 *Journal of Accounting Research* 423-62; Maria Gee, Axel Haller, and Christopher Nobes, "The Influence of Tax on IFRS Consolidated Statements: The Convergence of Germany and the UK" (2010) 7:1 *Accounting in Europe* 97-122 (<https://doi.org/10.1080/17449480.2010.485382>); and Oliver Nnamdi Okafor, "Effects of IFRS on Accounting Quality and Tax Aggressiveness: Evidence from Canadian Mandatory Adoption" (PhD dissertation, Faculty of Graduate Studies, University of Calgary, 2015) (<http://dx.doi.org/10.11575/PRISM/25824>).
 - 3 Holger Daske, Luzi Hail, Christian Leuz, and Rodrigo Verdi, "Adopting a Label: Heterogeneity in the Economic Consequences Around IAS/IFRS Adoptions" (2013) 51:3 *Journal of Accounting Research* 495-547; and Michel Blanchette, François-Éric Racicot, and Komlan Sedzro, *IFRS Adoption in Canada: An Empirical Analysis of the Impact on Financial Statements* (Toronto: Certified General Accountants Association of Canada, October 2013).
 - 4 Hai Q. Ta, "Effects of IFRS Adoption on Earnings Quality: Evidence from Canada" (PhD dissertation, Drexel University, 2014).

firms listed on a US stock exchange to use US generally accepted accounting principles (GAAP) for financial reporting, thus presenting an opportunity for an additional control sample from the same institutional environment.⁵ We draw on bounded rationality theory⁶ and argue that organizations may adopt a satisficing alternative when the optimal option of maximizing after-tax income may not be viable owing to contexts and constraints. For example, the adoption of IFRS may create an uncertain reporting environment that prevents managers from pursuing aggressive tax avoidance in a country where tax enforcement is strong. Also, the additional disclosures required under IFRS may discourage aggressive tax avoidance by exposing firms that have greater tax-avoidance opportunities. To illustrate, *International Accounting Standard* IAS 12.81 mandates firms to disclose temporary differences associated with investments in subsidiaries, branches, and associates, and interests in joint arrangements for which deferred tax liabilities have not been recognized,⁷ unlike section 3465 of pre-IFRS Canadian GAAP, which merely recommends the disclosure.⁸

We use the non-GAAP cash effective tax rate⁹ as a proxy for corporate tax avoidance and present empirical evidence that the mandatory adoption of IFRS in Canada was followed by a decreased level of corporate tax avoidance. Our main analysis sample is a 3,200 firm-year data set of 400 publicly listed Canadian firms and 400 listed US firms, matched one-to-one using propensity score matching (PSM). Further, we find no evidence that the association between IFRS adoption and corporate tax avoidance was driven by revenue recognition, ownership of foreign operations, industry membership, profitability, and impairment losses or writeoffs. However, we find that IFRS firms that managed accruals paid more taxes in the post-IFRS adoption period.

Our findings are consistent with the predictions of bounded rationality theory that the uncertainty created by the change in GAAP, additional disclosures required under IFRS, and anticipation that the tax authority may heighten its monitoring

5 Oliver Nnamdi Okafor, Mark Anderson, and Hussein Warsame, "IFRS and Value Relevance: Evidence Based on Canadian Adoption" (2016) 12:2 *International Journal of Managerial Finance* 136-60.

6 Herbert A. Simon, "Theories of Bounded Rationality," in Charles Bartlett McQuire, ed., *Decision and Organization* (Amsterdam: North-Holland, 1972), 161-76 (http://innovbfa.viabloga.com/files/Herbert_Simon_theories_of_bounded_rationality_1972.pdf); Jens K. Roehrich, Johanne Grosvold, and Stefan U. Hoejmose, "Reputational Risks and Sustainable Supply Chain Management" (2014) 34:5 *International Journal of Operations & Production Management* 695-719 (<https://doi.org/10.1108/IJOPM-10-2012-0449>); and Laura Jean Carfang, "Choices, Decisions, and the Call To Take Action: A Phenomenological Study Utilizing Bounded Rationality To Explore Complex Decision-Making Processes" (PhD dissertation, School of Education, Northeastern University, 2015) (<http://hdl.handle.net/2047/d20128379>).

7 See *CPA Canada Standards and Guidance Collection*, available on *Knotia* (Toronto: CPA) (online database).

8 *Ibid.*, part V.

9 Also called the non-conforming cash effective tax rate.

deterred firms from engaging in tax avoidance. This study extends the literature on the effects of IFRS to include corporate tax avoidance.

The discussion in the article proceeds as follows. First we present background for the study by reviewing the extant literature on tax effects of IFRS adoption and our rationale for relying on bounded rationality theory to understand whether the adoption of IFRS affects corporate tax avoidance. Next we present our research methodology, including our research design and data collection techniques. Then we present our empirical results, and conclude with a discussion of the findings and their implications for further studies.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The current study was motivated by the need for a better understanding of the relationship between IFRS adoption and tax avoidance. Some previous studies have concentrated on the effect of IFRS adoption on financial reporting, including the impact on comparability and the relevance of financial reporting.¹⁰ Other studies have investigated the effect of IFRS adoption on the cost of capital,¹¹ accounting quality,¹² earnings quality,¹³ and market reaction.¹⁴ While findings are mixed, the

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- 10 Susana Callao, José I. Jarne, and José A. Laínez, "Adoption of IFRS in Spain: Effect on the Comparability and Relevance of Financial Reporting" (2007) 16:2 *Journal of International Accounting, Auditing and Taxation* 148-78 (<https://doi.org/10.1016/j.intaccudtax.2007.06.002>); Øystein Gjerde, Kjell Knivslå, and Frode Sættem, "The Value-Relevance of Adopting IFRS: Evidence from 145 NGAAP Restatements" (2008) 17:2 *Journal of International Accounting, Auditing and Taxation* 92-112 (<https://doi.org/10.1016/j.intaccudtax.2008.07.001>); Denis Cormier, Samira Demaria, Pascale Lapointe-Antunes, and Robert Teller, "First-Time Adoption of IFRS, Managerial Incentives, and Value-Relevance: Some French Evidence" (2009) 8:2 *Journal of International Accounting Research* 1-22; Nikolaos I. Karampinis and Dimosthenis L. Hevas, "Effects of IFRS Adoption on Tax-Induced Incentives for Financial Earnings Management: Evidence from Greece" (2013) 48:2 *The International Journal of Accounting* 218-47 (<https://doi.org/10.1016/j.intacc.2013.04.003>); and Okafor et al., *supra* note 5.
- 11 Mohammad Salam Al-Shiab, "The Effectiveness of International Financial Reporting Standards Adoption on Cost of Equity Capital: A Vector Error Correction Model" (2008) 13:3 *International Journal of Business* 271-98; and Holger Daske, Luzi Hail, Christian Leuz, and Rodrigo Verdi, "Mandatory IFRS Reporting Around the World: Early Evidence on the Economic Consequences" (2008) 46:5 *Journal of Accounting Research* 1085-1142 (<https://doi.org/10.1111/j.1475-679X.2008.00306.x>).
- 12 Mary E. Barth, Wayne R. Landsman, and Mark H. Lang, "International Accounting Standards and Accounting Quality" (2008) 46:3 *Journal of Accounting Research* 467-98; and Ioannis Tsalavoutas and Lisa Evans, "Transition to IFRS in Greece: Financial Statement Effects and Auditor Size" (2010) 25:8 *Managerial Auditing Journal* 814-42 (<https://doi.org/10.1108/02686901011069560>).
- 13 Muhammad Nurul Houqe, Tony van Zijl, Keitha Dunstan, and A.K.M. Waresul Karim, "The Effect of IFRS Adoption and Investor Protection on Earnings Quality Around the
- (Notes 13 and 14 are continued on the next page.)

preponderant view is that IFRS adoption has a net beneficial effect on financial reporting.

Only a few studies have examined how IFRS adoption relates to tax avoidance. These studies include some that

- modelled the connection between tax and financial reporting up to IFRS adoption in Norway;¹⁵
- examined the variability of effective tax rates before and after IFRS adoption in continental Europe;¹⁶
- investigated the impact on tax compliance of a departure from tax-based accounting to IFRS in the transition economy of China;¹⁷
- evaluated the tax and non-tax incentives for voluntary IFRS adoption in the United Kingdom;¹⁸ and
- studied the tax-induced incentives for earnings management in Greece.¹⁹

This article contributes to the above literature by examining the adoption of IFRS in Canada and its impact on corporate tax avoidance. It investigates the unanswered research question of whether the adoption of IFRS in Canada increased corporate tax avoidance, as anticipated by the CRA.

World" (2012) 47:3 *The International Journal of Accounting* 333-55 (<https://doi.org/10.1016/j.intacc.2012.07.003>); and Thomas Jeanjean, "The Effect of IFRS Adoption, Investor Protection and Earnings Quality: Some Reflections" (2012) 47:3 *The International Journal of Accounting* 356-62.

- 14 Christopher S. Armstrong, Mary E. Barth, Alan D. Jagolinzer, and Edward J. Riedl, "Market Reaction to the Adoption of IFRS in Europe" (2010) 85:1 *Accounting Review* 31-61; Joanne Horton and George Serafeim, "Market Reaction to and Valuation of IFRS Reconciliation Adjustments: First Evidence from the UK" (2010) 15:4 *Review of Accounting Studies* 725-51; and Wayne R. Landsman, Edward L. Maydew, and Jacob R. Thornock, "The Information Content of Annual Earnings Announcements and Mandatory Adoption of IFRS" (2012) 53:1-2 *Journal of Accounting and Economics* 34-54.
- 15 Christopher Nobes and Hans R. Schwencke, "Modelling the Links Between Tax and Financial Reporting: A Longitudinal Examination of Norway over 30 Years up to IFRS Adoption" (2006) 15:1 *European Accounting Review* 63-87 (<https://doi.org/10.1080/09638180500510418>).
- 16 Namyoung Lee and Charles Swenson, "Shock and Law: Fin 48 Report Card, IFRS and Beyond" (2010) 2:3 *International Journal of Economics and Finance* 222-33 (<https://doi.org/10.5539/ijef.v2n3p222>).
- 17 K. Hung Chan, Kenny Z. Lin, and Phyllis L.L. Mo, "Will a Departure from Tax-Based Accounting Encourage Tax Noncompliance? Archival Evidence from a Transition Economy" (2010) 50:1 *Journal of Accounting and Economics* 58-73 (<https://doi.org/10.1016/j.jaccoco.2010.02.001>).
- 18 Jeff Ng, "Tax and Non-Tax Incentives for Voluntary IFRS Adoption: Evidence from the UK" (PhD dissertation, Booth School of Business, University of Chicago, 2010).
- 19 Karampinis and Hevas, *supra* note 10.

While the CRA had legitimate concerns that the adoption of IFRS in Canada would heighten the risk of inappropriate tax adjustments that could increase corporate tax avoidance, the logic of Simon's bounded rationality theory²⁰ indicates that corporate tax avoidance would not have increased. Bounded rationality refers to a pattern of behaviour toward a goal within the boundary imposed by certain conditions and constraints in the environment, and the limitations of the actor. This definition is consistent with Scott's view that individuals "act within specific, given constraints and on the basis of the information that they have about the conditions under which they are acting."²¹ These individuals anticipate the consequences of alternative actions and choose the option that maximizes their self-interest.

As Simon explains, bounded rationality theory integrates the conditions and constraints on the abilities of actors, whether individuals or firms, to process information that maximizes the expected utility of their decisions.²² Simon adds that, when assessing firms, the theories of bounded rationality must be modified to include risk, uncertainty, difficulties in finding and formulating alternatives, complexities in the firm's cost function, and other environmental constraints.²³ Thus, bounded rationality theory explains how organizations make decisions when the optimal solution may not be possible owing to contexts and constraints that compel the decision makers to select satisficing alternatives.²⁴

In this study, we apply the logic of bounded rationality theory to the corporate tax-avoidance literature. Firms, as economic entities, are motivated to minimize their taxes so that they can maximize after-tax income. However, firms' reporting choices are subject to the conditions and constraints imposed by regulators and the environment. The implementation of IFRS created uncertainty for Canadian firms, which were required to provide additional disclosures. For example, as noted above, IAS 12.81 mandates the disclosure of temporary differences arising from investments in subsidiaries, branches, and associates, and interests in joint arrangements, whereas the pre-IFRS Canadian GAAP recommended, but did not require, such disclosure.²⁵ Canadian firms operate in a tax environment where the risk of enforcement is high and the consequences of non-compliance are significant. These constraints limit a firm's ability to maximize after-tax income through tax avoidance, which is likely when the firm adopts an accounting standard that lends itself to aggressive reporting. Our view is consistent with the findings of Allingham and

20 Simon, *supra* note 6.

21 John Scott, "Rational Choice Theory," in Gary Browning, Abigail Halcli, and Frank Webster, eds., *Understanding Contemporary Society: Theories of the Present* (London, UK: SAGE, 2000), 126-38, at 127-28.

22 Simon, *supra* note 6, at 161-76.

23 *Ibid.*

24 See *ibid.* and the other sources cited in note 6, *supra*.

25 See *supra* notes 7 and 8.

Sandmo,²⁶ which, based on an economic analysis of crime,²⁷ suggest that taxpayers are rational and that a decision to avoid tax depends on a tradeoff between the expected payoff from underreporting and the severity of the punishment if they are caught cheating.

Recent studies further support the view that context and constraints affect tax compliance. Akhand and Hubbard²⁸ examine the relative effectiveness of coercive and persuasive approaches to promoting compliance and find that the use of these approaches in combination is more effective than the use of either separately. Farrar and Thorne include interactional fairness in the equation in their study and conclude that “compliance is highest in the presence of high information and an authoritative tone.”²⁹ Hanlon, Hoopes, and Shroff³⁰ argue that the government, through its tax authority, is the largest minority shareholder in any firm, since it shares both profits and deductible losses with the firm. Consistent with these findings and the bounded rationality argument, we postulate that the tax law, tax enforcement, additional disclosure requirements, and uncertainties associated with the new accounting standards may constrain firms from engaging in corporate tax avoidance. Prior studies have also found there is a tradeoff between financial-reporting and tax-reporting incentives.³¹ At the extreme end, if the adoption of IFRS causes managers of firms to become more aggressive in financial reporting to the extent that they may commit fraud, they may become less tax aggressive to avoid suspicion from tax authorities.³² Therefore, we examine the alternative prediction that corporate tax avoidance decreases in mandatory IFRS adoption in a high

26 Michael G. Allingham and Agnar Sandmo, “Income Tax Evasion: A Theoretical Analysis” (1972) 1:3-4 *Journal of Public Economics* 323-38 ([https://doi.org/10.1016/0047-2727\(72\)90010-2](https://doi.org/10.1016/0047-2727(72)90010-2)).

27 Gary S. Becker, “Crime and Punishment: An Economic Approach” (1968) 76:2 *Journal of Political Economy* 169-217.

28 Zakir Akhand and Michael Hubbard, “Coercion, Persuasion, and Tax Compliance: The Case of Large Corporate Taxpayers” (2016) 64:1 *Canadian Tax Journal* 31-63.

29 Jonathan Farrar and Linda Thorne, “Written Communications and Taxpayers’ Compliance: An Interactional Fairness Perspective” (2016) 64:2 *Canadian Tax Journal* 351-70, at 352.

30 Michelle Hanlon, Jeffrey L. Hoopes, and Nemit Shroff, “The Effect of Tax Authority Monitoring and Enforcement on Financial Reporting Quality” (2014) 36:2 *Journal of the American Taxation Association* 137-70 (<https://doi.org/10.2308/atax-50820>).

31 Steve Matsunaga, Terry Shevlin, and D. Shores, “Disqualifying Dispositions of Incentive Stock Options: Tax Benefits Versus Financial Reporting Costs” (1992) 30, supplement *Journal of Accounting Research* 37-68; Kenneth J. Klassen and Amin Mawani, “The Impact of Financial and Tax Reporting Incentives on Option Grants to Canadian CEOs” (2000) 17:2 *Contemporary Accounting Research* 227-62; and Amin Mawani, “Cancellation of Executive Stock Options: Tax and Accounting Income Considerations” (2003) 20:3 *Contemporary Accounting Research* 495-518 (<https://doi.org/10.1506/VNVL-GVQ9-GYYQ-Y3NK>).

32 Merle Erickson, Michelle Hanlon, and Edward L. Maydew, “How Much Will Firms Pay for Earnings That Do Not Exist? Evidence of Taxes Paid on Allegedly Fraudulent Earnings” (2004) 79:2 *The Accounting Review* 387-408.

tax-enforcement environment, at least in the short run. This is expressed in our first hypothesis:

Hypothesis 1: Corporate tax avoidance decreased in mandatory IFRS adoption in Canada.

Leuz and Wysocki³³ investigate the economics of disclosure and financial-reporting regulations and conclude that

- the costs and benefits of regulatory changes are difficult to estimate, and they largely remain an empirical issue;
- there is a lack of evidence on the externalities of reporting standards;
- the empirical literature has focused heavily on US regulatory changes, with a shortage of evidence on major regulatory changes in other countries; and
- it is difficult to isolate the effects of IFRS from other concurrent institutional changes, but important interactions between IFRS and institutional factors present major opportunities for research.

Prior studies also suggest that the effects of IFRS are not homogeneous across firms. Daske, Hail, Leuz, and Verdi³⁴ classify firms as either “serious adopters” or “label adopters.” They then examine firm-level heterogeneity using proxies that affect reporting incentives, reporting behaviours, and earnings quality, including firm size, ownership of foreign operation, and accruals, and they find that the effects of IFRS adoption are not homogeneous among the adopters. Blanchette, Racicot, and Sedzro³⁵ further present evidence, based on the adoption of IFRS in Canada, that the effects of adoption differ across firms. They find that differences between IFRS and Canadian GAAP have an industry effect on net income or loss, and on comprehensive income or loss, in the finance sector.

These findings are consistent with the concerns of the CRA discussed in recent studies.³⁶ The CRA internal bulletins allude to the risk that inappropriate revenue recognition, impairment losses, thin capitalization, and the deduction of borrowing costs may increase upon IFRS adoption. Thus, it is important to investigate these risks, and analyze how various firm characteristics and institutional factors interacted with IFRS adoption to affect corporate tax avoidance in Canada. This study further analyzes the interaction effects of revenue management, ownership of foreign operations, industry membership, firm size, profitability, accruals, and impairment

33 Christian Leuz and Peter D. Wysocki, “The Economics of Disclosure and Financial Reporting Regulation: Evidence and Suggestions for Future Research” (2016) 54:2 *Journal of Accounting Research* 525-622 (<https://doi.org/10.1111/1475-679X.12115>).

34 Daske et al., *supra* note 3.

35 Blanchette et al., *supra* note 3.

36 Okafor, *supra* note 2; and Okafor et al., *supra* note 1.

losses or writeoffs on the impact that the IFRS adoption had on cash taxes paid in Canada. Therefore, we formulate our second hypothesis as follows:

Hypothesis 2: The interaction of IFRS with firm characteristics and institutional factors likely affected corporate tax avoidance in Canada.

RESEARCH METHODOLOGY

Research Design

We use the non-GAAP cash effective tax rate (our dependent variable) as a proxy for corporate tax avoidance. The non-GAAP cash effective tax rate was computed by dividing cash paid or received in income taxes by cash flow from operations. We gave serious consideration to the selection of our proxy because we wanted to capture the unbiased effect of IFRS on corporate tax avoidance.

Blanchette, Racicot, and Girard examine the effects of IFRS on financial ratios in Canada and find that “ratios computed under IFRS are not directly comparable with those derived under pre-changeover Canadian GAAP.”³⁷ This suggests that proxies based on income statement items, such as the GAAP effective tax rate (the ratio of income tax expense to net income before taxes) and the accrual-based cash effective tax rate (the ratio of cash tax paid to net income before taxes), could produce spurious results. Since IFRS adoption may alter the calculation of the accrual-based numbers—for example, accounting income—researchers may not be able to isolate the effect of the accounting numbers on tax avoidance.

Hanlon and Heitzman³⁸ posit that changes in tax-accounting accruals do not affect cash effective tax rates. Hoopes, Mescall, and Pittman³⁹ further document that the use of cash flows from operations as a denominator in the computation of cash effective tax rates eliminates mechanical effects that may arise from the use of an accrual-based denominator such as accounting net income. Thus, a variable that uses cash taxes as the numerator and cash flows from operations as the denominator has more desirable properties in this case.

To address a concern that IFRS may have affected the computation of cash flows from operating activities used as the denominator, we reviewed section 1540 of the pre-changeover accounting standards⁴⁰ and IAS 7.⁴¹ Section 1540 and IAS 7

37 Michel Blanchette, François-Éric Racicot, and Jean-Yves Girard, *The Effects of IFRS on Financial Ratios: Early Evidence in Canada* (Burnaby, BC: Certified General Accountants Association of Canada, 2011), at 5 (<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.662.1248&rep=rep1&type=pdf>).

38 Michelle Hanlon and Shane Heitzman, “A Review of Tax Research” (2010) 50:2-3 *Journal of Accounting and Economics* 127-78 (<https://doi.org/10.1016/j.jacceco.2010.09.002>).

39 Jeffrey L. Hoopes, Devan Mescall, and Jeffrey A. Pittman, “Do IRS Audits Deter Corporate Tax Avoidance?” (2012) 87:5 *The Accounting Review* 1603-39 (<https://doi.org/10.2308/accr-50187>).

40 *CPA Canada Standards and Guidelines Collection*, supra note 7, part V.

41 *Ibid.*, part I (as of January 1, 2012).

converged. We conclude that IFRS had no significant effect on the computation of cash flows from operating activities across the adoption period. Therefore, the non-GAAP cash effective tax rate is robust for examining the effects of IFRS on corporate tax avoidance.

Data Collection

This study collected and analyzed two years of pre-adoption and two years of post-adoption data, which are the years 2008 and 2009, and 2012 and 2013, respectively.⁴² Data from 2007 were collected to obtain opening balances for the 2008 fiscal year. We used two categories of sample firms in this study: Canadian firms (treatment) and propensity-matched US firms (control). Three criteria were used to select firms for inclusion in the treatment group:

1. listed on the Toronto Stock Exchange (TSX) in the period 2007–2013,
2. adopted IFRS in 2011, and
3. data on Bloomberg, Compustat, Yahoo Finance, and/or SEDAR.⁴³

To obtain data on our measure of goodwill impairment, we hand-collected the measure from Mergent Online, which covers most of the Canadian public companies. In cases where there is missing information for our variable, we manually search the 10-K filing of the firms through the SEDAR filing system. If the goodwill impairment writeoff variable is not reported in this system, we further search the company's website and other business websites, such as Yahoo Finance. We obtained Canadian data on enforcement from the CRA's website and the annual reports of the CRA to Parliament.

For the US firms used as the control sample, we obtained the financial data from Compustat. The US firms report under a different accounting regime, predominantly US GAAP. After identifying US firms with non-missing information for most of our regression variables, we used a PSM (propensity score matching) approach for one-to-one matching of the Canadian firms with the US firms using the pre-IFRS measures of industry, size, profitability, and growth.⁴⁴ Our final sample consists of 3,200 firm-year observations with 400 unique firms for each of the treatment and the propensity-matched control samples.

The nearest-neighbour match with no replacement of the PSM approach that we used, in addition to various robustness checks, helps to mitigate concern that the results in the post-adoption period are driven by the type of firms in our treatment sample that recovered after the global financial crisis. All observations of our dependent variable lie between zero and 1, and we coded cash tax received as zero. We note

42 We eliminated the year 2010 because IFRS adopters were required to restate their financial data for that year as if IFRS had been used for financial reporting.

43 The System for Electronic Document Analysis and Retrieval.

44 We are grateful to the anonymous reviewer who recommended that we use this approach to obtain the control sample.

that the research samples include the same firms in both the pre-adoption and post-adoption periods. Thus, each firm also acts as its own control.

Regression Model

We used ordinary least squares (OLS) regression to investigate corporate tax avoidance and adopted explanatory variables used in previous studies. Independent variables include the logarithms of average total assets, market value of equity, revenue, and leverage, as well as net operating loss, capital expenditure, inventory, and foreign operations. In addition to the variables of *IFRS* and *POST* (to control for time-fixed effects), we added an interaction variable *IFRSPOST* (β_3) as our main variable of interest, specifically to capture the tax effects attributable to IFRS adoption in the post-adoption period relative to the pre-adoption period between IFRS adopters and non-adopters. We also added an *INDUSTRY* dummy variable to moderate industry effects.

In equation 1 below, we present our baseline regression model for estimating the effects of mandatory adoption of IFRS on corporate tax avoidance.

$$\begin{aligned}
 CTA_{it} = & \beta_1(IFRS_{it}) + \beta_2(POST_{it}) + \beta_3(IFRSPOST_{it}) + \beta_4 \log(SIZE_{it}) + \beta_5 \log(MVE_{it}) \\
 & + \beta_6 \log(REVENUE_{it}) + \beta_7 \log(LEVERAGE_{it}) + \beta_8(INDUSTRY_{it}) + \beta_9(NOL_{it}) \\
 & + \beta_{10}(CAPEX_{it}) + \beta_{11}(INVENTORY_{it}) + \beta_{12}(FOREIGN_{it}) + \beta_{13}(GDPGRWT_t) \\
 & + \beta_{14}(CHGTAX_t) + \beta_{15}(ENFORCE_t) + U_{it},
 \end{aligned} \tag{1}$$

where

CTA = a corporate tax-avoidance proxy, namely, *NON-GAAP CASH ETR*, computed as cash taxes paid or received scaled by cash flow from operations;⁴⁵

IFRS = a dummy variable that equals 1 for firms that adopted IFRS and zero for firms that did not adopt IFRS;

POST = an indicator variable that equals 1 for years after the adoption of IFRS and zero for the years before mandatory IFRS adoption;

IFRSPOST = an interaction variable that measures the effects of IFRS adoption;

$\log(SIZE)$ = the natural logarithm of average total assets;

$\log(MVE)$ = the natural logarithm of market value of equity;

$\log(REVENUE)$ = the natural logarithm of total sales;

$\log(LEVERAGE)$ = the logarithm of year-end total liability divided by year-end total equity;

INDUSTRY = a dummy variable that equals 1 for financial and rate-regulated entities and zero otherwise;

NOL = an indicator variable that equals 1 for a firm with a preceding-year net loss and zero otherwise;

CAPEX = capital expenditures scaled by average total assets;

45 We coded Tax refund as 0, and where either the numerator or denominator is 0, we coded *NON-GAAP CASH ETR* as 0.

- INVENTORY* = total inventory scaled by average total assets;
FOREIGN = an indicator variable that equals 1 for a firm with foreign operations and zero otherwise;⁴⁶
GDPGRWT = the annual percentage rate of growth in gross domestic product (GDP);⁴⁷
CHGTAX = the change in tax rate,⁴⁸ measured as the difference between the tax rate at time t and the tax rate at time $t - 1$;⁴⁹
ENFORCE = the percentage change in total audited files per year by the appropriate tax authorities;⁵⁰ and
U = the idiosyncratic error.

To further test the CRA's concerns that the change to IFRS in 2011 might result in an increased risk that adopters would not make appropriate adjustments for certain enumerated items,⁵¹ we identify seven vulnerable areas of accounting reporting that firms could target to engage in corporate tax avoidance. These contexts are

1. revenue management,
2. profitability,
3. foreign operations,
4. impairment writeoffs,
5. accrual management,
6. size, and
7. industry membership.⁵²

In other words, we anticipate that IFRS adopters within those seven contexts are likely to have an increased appetite for corporate tax avoidance in the post-adoption period. Therefore, for empirical operationalization, we have equation 2 below.

46 Firms with foreign exchange gains or losses are identified as having foreign operations.

47 This variable is defined as the annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 US dollars. Data obtained from the World Bank, "GDP Growth (Annual %)" (<https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>).

48 We used lagged differencing to mitigate multicollinearity and autocorrelation.

49 Canada, Library of Parliament, "Corporate Income Taxes in Canada: Revenue, Rates and Rationale," *Hillnotes*, March 21, 2017 (<https://hillnotes.ca/2017/03/21/corporate-income-taxes-in-canada-revenue-rates-and-rationale>).

50 Enforcement data were obtained from the websites of each tax authority. In particular, we obtained the CRA enforcement data from the CRA annual reports (see, for example, *infra* note 60).

51 Okafor et al., *supra* note 1; and Okafor, *supra* note 2.

52 We refer to items 1 through 5 as the primary enumerated items, and 6 and 7 as moderating items.

$$\begin{aligned}
CTA_{it} = & \beta_1(IFRS_{it}) + \beta_2(POST_{it}) + \beta_3(IFRSPPOST_{it}) + \beta_4 \log(SIZE_{it}) + \beta_5 \log(MVE_{it}) \\
& + \beta_6 \log(REVENUE_{it}) + \beta_7 \log(LEVERAGE_{it}) + \beta_8(INDUSTRY_{it}) + \beta_9(NOL_{it}) \\
& + \beta_{10}(CAPEX_{it}) + \beta_{11}(INVENTORY_{it}) + \beta_{12}(FOREIGN_{it}) + \beta_{13}(GDPGRWT_t) \\
& + \beta_{14}(CHGTAX_t) + \beta_{15}(ENFORCE_t) + \beta_{16}TARGETS_{it} + U_t.
\end{aligned}
\tag{2}$$

In equation 2 above, $\beta_{16}TARGETS_{it}$ is the vector of the seven individual contexts identified above. The variables for these target areas are as follows:

IFRSPPOSTREV = (*IFRS* × *POST* × *log(REVENUE)*), an interaction variable that measures the effects of IFRS adoption within the context of revenue management.

IFRSPPOSTROA = (*IFRS* × *POST* × *ROA*), an interaction variable that measures the effects of IFRS adoption within the context of the firm's profitability. *ROA* is the return on assets, measured by dividing net income by average total assets.

IFRSPPOSTFOREIGN = (*IFRS* × *POST* × *FOREIGN*), an interaction variable that measures the effects of IFRS adoption within the context of the firm's foreign operations.

IFRSPPOSTIMPAIR = (*IFRS* × *POST* × *IMPAIR*), an interaction variable that measures the effects of IFRS adoption within the context of goodwill impairment writeoffs. *IMPAIR* is the impairment of goodwill.

IFRSPPOSTTACC = (*IFRS* × *POST* × *TACC*), an interaction variable that measures effects of IFRS adoption within the context of accrual management. We follow Hribar and Collins⁵³ to measure *TACC* as net income minus cash flow from operations scaled by average total assets.

IFRSPPOSTSIZE = (*IFRS* × *POST* × *log(SIZE)*), an interaction variable that measures the effects of IFRS adoption controlling for the firm's size post-adoption.

IFRSPPOSTINDUSTRY = (*IFRS* × *POST* × *INDUSTRY*), an interaction variable that measures the effects of IFRS adoption controlling for the firm's industry membership.

All other variables in equation 2 are as defined in the list following equation 1.

We note that the seven contexts identified above empirically test the concerns highlighted in the CRA's internal bulletins referred to earlier, relating to the potential negative impact of IFRS adoption on corporate tax avoidance by IFRS adopters in the post-adoption period. We present and discuss our findings in the empirical results section below.

Our rationale for controlling for enforcement effects in our analysis (*ENFORCE*) was driven by assertions in the tax-enforcement literature where Hanlon et al. state that the government is the largest minority shareholder in any firm because, through its tax authority and enforcement mechanisms, it shares in the firm's profits

53 Paul Hribar and Daniel W. Collins, "Errors in Estimating Accruals: Implications for Empirical Research" (2002) 40:1 *Journal of Accounting Research* 105-34 (<https://doi.org/10.1111/1475-679X.00041>).

and deductible losses.⁵⁴ In addition to the rationale advanced above regarding the potential impact of heightened awareness of tax monitoring on firms' corporate tax-avoidance behaviour, we contextualize Hanlon et al.'s assertion within the bounded rationality framework by including the *ENFORCE* variable in our analysis.

Descriptive Statistics

We present the descriptive statistics and correlation coefficients of the main variables used in this study in panels A and B of table 1, respectively. The mean (median) of the dependent variable, *NON-GAAP CASH ETR*, is 0.127 (0.029) for the 800 unique firms with 3,200 firm-year observations. We will further analyze descriptive statistics later in this section. Recall that our design produced 400 unique Canadian firms that are IFRS adopters (the treatment group) and 400 unique US firms that used non-IFRS or US GAAP financial reporting (the control group). Each firm serves as its own control throughout the sample period for the main analysis and the "Canadian companies only" analysis.

Panel B of table 1 presents the Pearson correlation coefficients for the full sample. The correlation coefficients show the linear interdependence (or lack thereof) of the *NON-GAAP CASH ETR* on the predictor variables. For example, we find a negative (positive) and significant correlation between the variables *IFRSPOST* and *NON-GAAP CASH ETR*. This could signal that *NON-GAAP CASH ETR* increased for all companies after the adoption of IFRS, although one could argue that it also signals multicollinearity in the model. However, we note that a linear relationship between the two variables does not automatically mean that multicollinearity is a problem, because the variance of the OLS coefficient estimator does not depend only on strong linear relationships among the independent variables; it also depends on the size of error variance and the total sample variation.⁵⁵ Wooldridge elucidates that "for statistical inference, what ultimately matters is how big $\hat{\beta}_j$ is in relation to its standard deviation"⁵⁶ and Allison documents instances where multicollinearity can be safely ignored.⁵⁷ We define $\hat{\beta}_j$ as the OLS coefficient estimator and the index j as our main variable of interest, which is the interaction of *POST* and IFRS. Where a regression result signals the possibility of multicollinearity problems, we would rerun the regression without the potentially offending variable to confirm the consistency of our results.⁵⁸

54 See supra note 30.

55 Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*, 5th ed. (Mason, OH: South-Western, Cengage Learning, 2013).

56 Ibid., at 96.

57 Paul Allison, "When Can You Safely Ignore Multicollinearity?" *Statistical Horizons*, September 10, 2012 (<http://statisticalhorizons.com/multicollinearity>).

58 In fact, in our regression models, we run the multicollinearity diagnostics, and the variance inflation factors (VIF) show acceptable numbers for our variables of interest; this finding further reinforces the notion that multicollinearity problems do not influence our results.

TABLE 1 Descriptive Statistics and Correlation Coefficients

Panel A: Mean, standard deviation, and median

Variable	Mean	Standard deviation	Median
NON-GAAP CASH ETR	0.127	0.190	0.029
POST	0.500	0.500	0.500
IFRS	0.500	0.500	0.500
log(MVE)	3.929	2.001	3.405
log(REVENUE)	3.711	2.161	3.364
log(LEVERAGE)	-0.416	1.239	-0.342
NOL	0.290	0.454	0.000
CAPEX	0.076	0.095	0.044
INVENTORY	0.091	0.455	0.024
FOREIGN	0.346	0.476	0.000
log(SIZE)	4.045	1.832	3.633
INDUSTRY	0.165	0.371	0.000
IFRSPOSTROA	-0.235	2.652	0.006
IFRSPOSTIMPAIR	0.472	12.685	0.000
IFRSPOSTTACC	-0.087	0.233	-0.064
ENFORCE	0.202	0.340	0.198
GDPGRWT	0.412	2.055	1.373
CHGTAX	-0.60	0.899	-0.085
Observations	3,200		

(Table 1 is continued on the next page.)

TABLE 1 Continued

Panel B: Correlation matrix

	<i>NON-GAAP CASH ETR</i>	<i>IFRS</i>	<i>POST</i>	<i>log(SIZE)</i>	<i>log(MVE)</i>	<i>log(REVENUE)</i>	<i>log(LEVERAGE)</i>	<i>NOL</i>
<i>NON-GAAP CASH ETR</i>	1.000							
<i>IFRS</i>	-0.376	1.000						
<i>POST</i>	0.069	0.000	1.000					
<i>log(SIZE)</i>	0.370	-0.761	0.079	1.000				
<i>log(MVE)</i>	0.405	-0.728	0.106	0.925	1.000			
<i>log(REVENUE)</i>	0.433	-0.753	0.066	0.927	0.880	1.000		
<i>log(LEVERAGE)</i>	0.013	-0.077	0.029	0.249	0.104	0.308	1.000	
<i>NOL</i>	-0.318	0.214	-0.101	-0.364	-0.383	-0.424	-0.135	1.000
<i>CAPEX</i>	-0.141	0.187	-0.018	-0.146	-0.114	-0.189	-0.107	0.086
<i>INVENTORY</i>	0.052	-0.042	-0.014	-0.013	-0.008	0.042	-0.009	-0.005
<i>FOREIGN</i>	-0.006	0.107	0.049	-0.020	0.007	0.041	-0.035	0.036
<i>IFRSPOSTROA</i>	0.084	-0.090	-0.034	0.185	0.154	0.178	0.074	-0.243
<i>IFRSPOSTIMP AIR</i>	-0.024	0.037	0.011	-0.028	-0.029	-0.042	-0.032	0.025
<i>IFRSPOSTTACC</i>	0.098	-0.001	0.057	0.074	0.074	0.044	-0.026	-0.118
<i>INDUSTRY</i>	-0.079	0.014	0.000	0.157	0.068	0.024	0.278	-0.093
<i>ENFORCE</i>	-0.150	0.190	-0.590	-0.195	-0.201	-0.189	-0.042	0.127
<i>GDPGRWT</i>	0.051	0.076	0.811	0.002	0.003	-0.001	0.035	-0.088
<i>CHGTAX</i>	0.250	-0.598	0.211	0.473	0.467	0.463	0.046	-0.129

(Table 1 is concluded on the next page.)

TABLE 1 Concluded

Panel B Concluded										
	CAPEX	INVENTORY	FOREIGN	IFRSPST ROA	IFRSPST IMPAIR	IFRSPST TACC	INDUSTRY	ENFORCE	GDPGRWT	CHGTAX
CAPEX	1.000									
INVENTORY	-0.055	1.000								
FOREIGN	0.037	-0.014	1.000							
IFRSPSTROA	-0.020	0.008	-0.052	1.000						
IFRSPSTIMPAIR	0.007	-0.005	0.015	-0.007	1.000					
IFRSPSTTACC	-0.073	0.001	-0.023	0.672	-0.005	1.000				
INDUSTRY	-0.089	-0.080	-0.187	0.067	-0.016	0.079	1.000			
ENFORCE	-0.010	-0.011	-0.016	-0.029	0.010	-0.042	0.003	1.000		
GDPGRWT	0.073	0.006	0.043	-0.013	0.023	0.007	0.001	0.066	1.000	
CHGTAX	-0.205	-0.003	-0.051	0.091	-0.012	0.044	-0.008	0.006	-0.113	1.000

Notes: Panel A presents the descriptive statistics and panel B presents the correlation coefficients for the primary variables in this study. See the accompanying text for the definitions of these variables. The sample contains Canadian firms listed on the Toronto Stock Exchange that adopted international financial reporting standards (IFRS adopters) and a controlled sample of US firms that use reporting standards different from IFRS (control firms). The sample period covers 2008, 2009, 2012, and 2013. Capital expenditure obtained from Bloomberg has a negative sign for all items. As a result, each capital expenditure was multiplied by a minus sign. The coefficients shown in bold in panel B represent significance at the conventional levels (1 percent, 5 percent, and 10 percent).

As part of the additional analysis we conducted, we present in panel A of table 4 the results of the descriptive statistics for IFRS and non-IFRS adopting firms with *NON-GAAP CASH ETR* greater than zero. (Table 4 appears below in the section headed “Additional Sensitivity Analysis.”) For this category of firms, the mean of the *NON-GAAP CASH ETR* for the IFRS (non-IFRS) firms is 0.188 (0.219). The mean *NON-GAAP CASH ETR* for Canadian firms (*IFRS* = 1) in the post-adoption period (*POST* = 1) equals 0.198, while their pre-adoption mean is equal to 0.170, translating to nearly 116.5 percent of the pre-adoption *NON-GAAP CASH ETR*. A similar analysis produced a reduced percentage of approximately 105 percent for the American firms with mean *NON-GAAP CASH ETR* (*IFRS* = 0) in the post-adoption period (*POST* = 1) of 0.224 and in the pre-adoption period (*POST* = 0) of 0.213.

For pictorial contexts, we provide graphic representations in figures 1 through 3 as complements to some of the descriptive and other analyses provided earlier. These graphs show the *NON-GAAP CASH ETR* movements across the sample period for firms in our overall sample (figure 1) and subsamples (figures 2 and 3). These graphs indicate consistent patterns with our descriptive and regression analysis findings.

EMPIRICAL RESULTS

Regression Results

In table 2, we offer some preliminary, but strong, evidence that relative to non-adopters, Canadian firms that adopted IFRS did not engage in corporate tax avoidance during the post-adoption period. Our primary variable of interest, *IFRSPPOST*, is consistently positive and significant across all of the eight models at the 5 percent or better significance level. Other variables generally have the relationship and sign that we anticipated. For example, we find

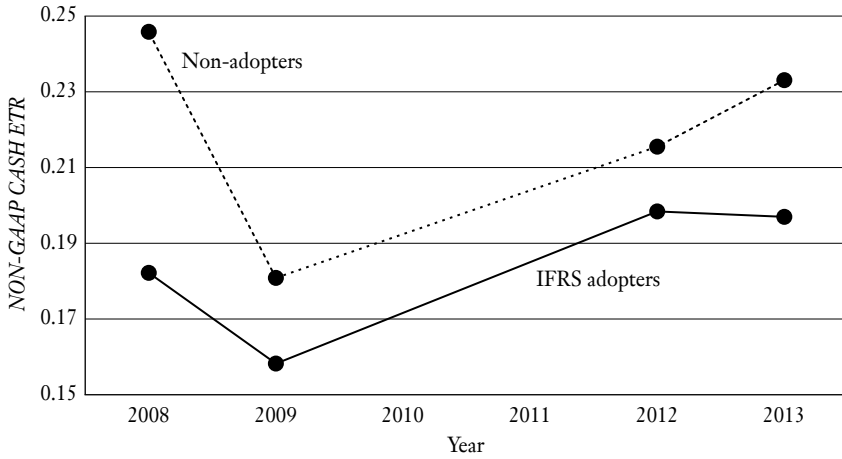
- a positive relationship between cash tax paid (the dependent variable) and revenue, market value of equity, GDP, and tax rate⁵⁹ (independent variables);
- a negative relationship between cash tax paid and leverage, capital expenditure, and operating loss; and
- less cash tax paid by larger firms and regulated entities.

Prior studies have documented mixed findings on the relationships between tax avoidance and firm characteristics.⁶⁰ We also find a negative relationship between our proxy for tax enforcement and cash tax paid by firms. Since it seems anomalous

59 We thank an anonymous reviewer for suggesting the addition of some control variables.

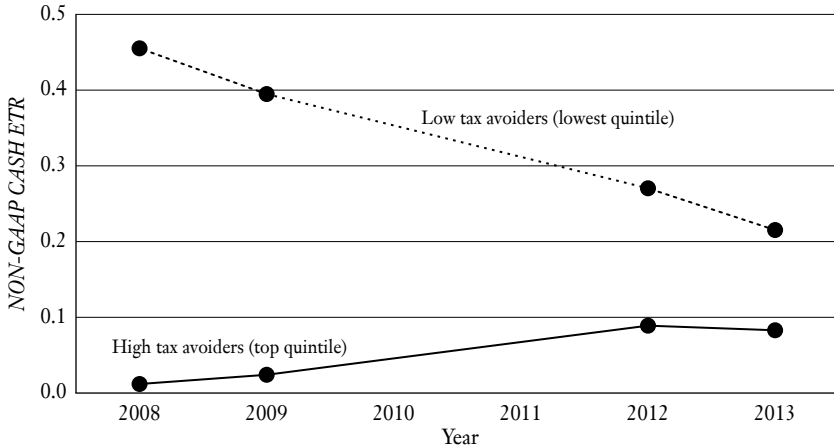
60 See Scott D. Dyreng, Michelle Hanlon, and Edward L. Maydew, “Long-Run Corporate Tax Avoidance” (2008) 83:1 *Accounting Review* 61-82; and T.J. Atwood, Michael S. Drake, James N. Myers, and Linda A. Myers, “Home Country Tax System Characteristics and Corporate Tax Avoidance: International Evidence” (2012) 87:6 *Accounting Review* 1831-60 (<https://doi.org/10.2308/accr-50222>).

FIGURE 1 Tax Avoidance, IFRS Adopters Versus Non-Adopters



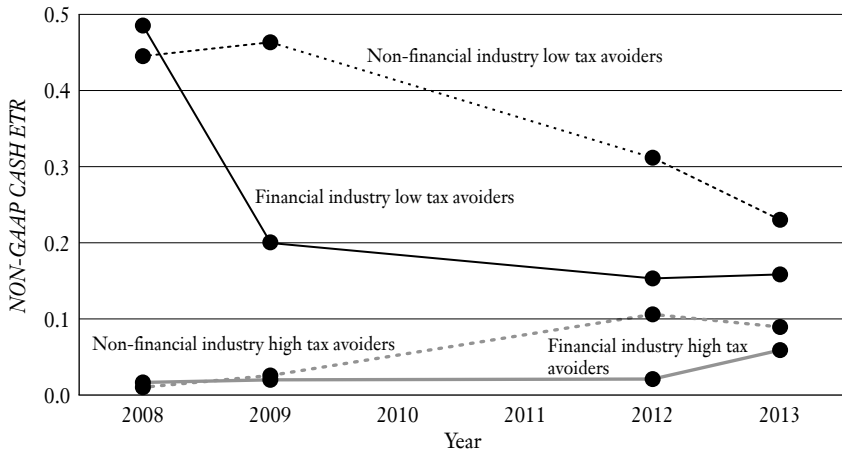
IFRS = international financial reporting standards; GAAP = generally accepted accounting principles; ETR = effective tax rate.

FIGURE 2 Tax Avoidance in Quintiles, IFRS Adopters



IFRS = international financial reporting standards; GAAP = generally accepted accounting principles; ETR = effective tax rate.

Note: Quintiles calculated in the pre-IFRS adoption period.

FIGURE 3 Tax Avoidance in Quintiles by Industry (Financial and Non-Financial), IFRS Adopters

IFRS = international financial reporting standards; GAAP = generally accepted accounting principles; ETR = effective tax rate.

Note: Quintiles calculated in the pre-IFRS adoption period.

to suggest that a decrease in audit intensity is related to a higher payment of cash taxes, we were concerned. However, following a tenacious bottom-up investigation, we found that tax authorities are strategically targeting their audits to achieve higher impacts with lower number of audited files. According to the CRA, in the 2012-13 fiscal year,

[O]ur audit activities generated a higher fiscal impact per full-time equivalent (auditor). We did, however, complete a lower number of total audits than we did in 2011-2012. This is in part because of our strategic decision to focus more resources on auditing high-risk files.⁶¹

Our analysis indicates that while cash tax paid increased in the post-adoption period, the number of tax audits continually decreased over the study period. Thus, our findings support the CRA's statements pertaining to the effectiveness of its enforcement strategy in its 2012-13 annual report to Parliament. This suggests that, to the extent that a tax authority is effectively involved in high-impact audits, more cash taxes may be collected even with a smaller number of completed files. However, we caution that while this conjecture has held over our short study window, it may not persist in the long run, and tax authorities would need to increase

61 Canada Revenue Agency, *Annual Report to Parliament 2012-2013* (Ottawa: CRA, 2013), at 43 (www.canada.ca/content/dam/cra-arc/migration/cra-arc/gncy/nnnl/2012-2013/images/ar-2012-13-eng.pdf).

TABLE 2 Regression Results

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<i>IFRS</i>	-0.058*** (-4.39)	-0.056*** (-4.21)	-0.058*** (-4.44)	-0.057*** (-4.36)	-0.057*** (-4.35)	-0.054*** (-4.08)	-0.058*** (-4.43)	-0.058*** (-4.38)
<i>POST</i>	-0.056*** (-3.98)	-0.056*** (-3.98)	-0.056*** (-3.97)	-0.056*** (-3.98)	-0.056*** (-4.00)	-0.056*** (-4.00)	-0.056*** (-4.00)	-0.056*** (-3.98)
<i>IFRSPOST</i>	0.034*** (2.71)	0.044** (2.41)	0.039*** (2.81)	0.038*** (2.92)	0.041*** (3.13)	0.063*** (2.62)	0.035*** (2.76)	0.034*** (2.71)
<i>IFRSPOSTREVENUE</i>		-0.004 (-0.73)						
<i>IFRSPOSTFOREIGN</i>			-0.012 (-0.84)					
<i>IFRSPOSTINDUSTRY</i>				-0.022 (-1.25)				
<i>IFRSPOSTTACC</i>					0.096** (2.07)			
<i>IFRSPOSTSIZE</i>						-0.010 (-1.40)	0.000 (1.03)	
<i>IFRSPOSTROA</i>								-0.000 (-0.19)
<i>IFRSPOSTIMPAIR</i>								0.021*** (4.84)
<i>log(MVE)</i>	0.021*** (4.84)	0.021*** (4.84)	0.021*** (4.81)	0.021*** (4.87)	0.020*** (4.74)	0.021*** (4.84)	0.021*** (4.86)	0.021*** (4.84)
<i>log(REVENUE)</i>	0.038*** (8.45)	0.038*** (8.44)	0.038*** (8.43)	0.038*** (8.52)	0.038*** (8.50)	0.037*** (8.43)	0.037*** (8.32)	0.038*** (8.44)
<i>NOI</i>	-0.069*** (-9.39)	-0.070*** (-9.37)	-0.069*** (-9.39)	-0.069*** (-9.40)	-0.068*** (-9.22)	-0.070*** (-9.48)	-0.067*** (-9.01)	-0.069*** (-9.38)

(Table 2 is concluded on the next page.)

TABLE 2 Concluded

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<i>CAPEX</i>	-0.130*** (-4.05)	-0.128*** (-3.99)	-0.129*** (-4.03)	-0.131*** (-4.08)	-0.123*** (-3.80)	-0.127*** (-3.96)	-0.131*** (-4.09)	-0.130*** (-4.05)
<i>INVENTORY</i>	0.007 (1.08)	0.007 (1.10)	0.007 (1.08)	0.007 (1.09)	0.007 (1.04)	0.007 (1.11)	0.007 (1.07)	0.007 (1.08)
<i>FOREIGN</i>	0.006 (0.98)	0.006 (0.97)	0.009 (1.27)	0.006 (1.03)	0.007 (1.03)	0.006 (0.93)	0.007 (1.02)	0.006 (0.99)
<i>log(LEVERAGE)</i>	-0.012*** (-4.20)	-0.012*** (-4.00)	-0.012*** (-4.19)	-0.012*** (-4.18)	-0.012*** (-4.19)	-0.012*** (-4.02)	-0.012*** (-4.21)	-0.012*** (-4.20)
<i>log(SIZE)</i>	-0.040*** (-6.64)	-0.040*** (-6.67)	-0.040*** (-6.64)	-0.041*** (-6.70)	-0.040*** (-6.62)	-0.039*** (-6.38)	-0.040*** (-6.61)	-0.040*** (-6.63)
<i>INDUSTRY</i>	-0.019*** (-1.98)	-0.018* (-1.95)	-0.019*** (-2.02)	-0.013 (-1.23)	-0.020** (-2.18)	-0.018* (-1.88)	-0.019*** (-2.04)	-0.019*** (-1.99)
<i>GDPGRWT</i>	0.009*** (2.94)	0.009*** (2.93)	0.009*** (2.93)	0.009*** (2.94)	0.009*** (3.03)	0.009*** (2.94)	0.009*** (2.99)	0.009*** (2.94)
<i>CHGTAX</i>	0.013** (2.51)	0.013** (2.52)	0.013** (2.50)	0.013** (2.51)	0.014*** (2.66)	0.013** (2.53)	0.013** (2.56)	0.013** (2.52)
<i>ENFORCE</i>	-0.039*** (3.05)	-0.039*** (3.04)	-0.039*** (3.05)	-0.039*** (3.05)	-0.038*** (2.99)	-0.039*** (3.04)	-0.039*** (3.03)	-0.039*** (3.05)
Observations	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200
Adjusted <i>R</i> ²	0.256	0.256	0.256	0.256	0.257	0.256	0.256	0.256

Notes: This table presents the regression results of the baseline model and the other seven models explored in the study. The sample contains Canadian firms listed on the Toronto Stock Exchange that adopted international financial reporting standards (IFRS adopters) and a controlled sample of US firms that use reporting standards different from IFRS (control firms). The sample period covers 2008, 2009, 2012, and 2013. (Variable definitions are included in the accompanying text.) Capital expenditure obtained from Bloomberg has a negative sign for all items. As a result, each capital expenditure was multiplied by a minus sign.

*, **, *** Significant at the 10 percent, 5 percent, and 1 percent levels, respectively. The *t*-statistics are in parentheses.

their audit intensity to collect more taxes. Further, we rerun our regression without the enforcement variable, and our findings (not tabulated) remain consistent. Thus, our study has found overwhelming empirical evidence that does not support the CRA's anxieties regarding the likelihood that IFRS adopters would pay less tax in the post-adoption period. After we have controlled for factors that tend to increase the likelihood that more cash taxes would be collected, including revenue, profitability, change in tax rate, GDP growth, and enforcement, our variable of interest—*IFRSPPOST*—remains significantly positive. We further test empirically the CRA's concerns highlighted in the related bulletins that there is an increased risk that companies would not make appropriate adjustments for certain enumerated items.

As previously noted, we identify the following vulnerable areas of accounting reporting that firms could target to engage in corporate tax avoidance:

1. revenue management (*IFRSPPOSTREV*),
2. profitability (*IFRSPPOSTROA*),
3. foreign operations (*IFRSPPOSTFOREIGN*),
4. impairment writeoffs (*IFRSPPOSTIMPAIR*),
5. accrual management (*IFRSPPOSTTACC*),
6. size (*IFRSPPOSTSIZE*), and
7. industry membership (*IFRSPPOSTINDUSTRY*).

We report the results of this empirical exercise in model 2 through model 8 of table 2. From these seven model tests, IFRS post-adoption variables are not statistically significant for revenue management, foreign operations, industry membership, firm size, profitability, and impairment writeoffs or losses. On the other hand, we obtain positive and significant results for the IFRS post-adoption variable relating to accrual management. This indicates that there is no empirically justifiable support for the CRA's anxiety regarding the use of these targets or vulnerable areas, including accrual management, as sources of corporate tax avoidance following IFRS adoption. (*IFRSPPOSTTACC* in model 5 shows positive and significant results at the 5 percent or better significance level.) In other words, our results suggest that relative to non-adopters, Canadian firms that have adopted IFRS appear to engage in less corporate tax avoidance during the post-adoption period even as they engage in more accrual management. This finding arising from the interaction of IFRS with accrual management is consistent with the findings of prior studies that firms forgo tax benefits for financial reporting benefits.⁶²

To address the concern that the variables *MVE* and *SIZE* might be capturing the same measure of firms' overall size, we rerun our regression twice, each time omitting one of these variables. The results (which are not tabulated here for readability and parsimony) do not change our findings and remain qualitatively similar.

62 See the sources cited in note 31, *supra*.

Additional Sensitivity Analysis

Median Analysis of Enumerated Items

To ensure that the potential skewness of our data on either extreme of the data-points plane does not drive our results, we conduct a median analysis of equation 2 above and present the results in table 3. These analyses relate only to the continuous variables, since performing such analyses using a dichotomous variable may generate spurious and misleading inferences.⁶³ The inferences of our findings largely hold, especially relating to the primary enumerated items.⁶⁴

Non-Financial Firms, Positive Non-GAAP Cash Effective Tax Rate, and Alternative Control Sample

We present the regression results of other analyses that we conducted in panel B of table 4. First, we follow several IFRS studies that have documented the non-homogeneous impact on firms' financial reporting (financial versus non-financial firms), thereby testing whether the tax impacts are also heterogeneous.⁶⁵ To this end, we drop all financial firms in our main sample, and we continue to find that our main variable of interest (*IFRSPOST*) remains statistically significant at the 5 percent level (see model 1 in panel B of table 4). Although our sample size is thus reduced, we do not lose statistical analysis power since the adjusted R^2 remains unchanged.

Next, we repeat our main analysis for firms with *NON-GAAP CASH ETR* greater than zero, in two ways:

1. We select all firms that have at least one year of *NON-GAAP CASH ETR* greater than zero in our study period (model 2 in panel B of table 4).⁶⁶ The analysis involves a total of 2,320 firm-year observations of Canadian and US firms obtained from the full sample. Our main variable of interest (*IFRSPOST*) remains positive and significant at the conventional level.
2. We analyze 1,929 firm-year observations that have *NON-GAAP CASH ETR* (positive *CTA*) greater than zero. Again, *IFRSPOST* continues to retain a significant positive relationship with our proxy for corporate tax avoidance (see model 3 in panel B of table 4).

Finally, we examine an alternative control sample. Recall that our control sample is generated through the PSM technique applied to US firms that did not adopt IFRS.

63 Patrick Royston, Douglas G. Altman, and Willi Sauerbrei, "Dichotomizing Continuous Predictors in Multiple Regression: A Bad Idea" (2006) 25:1 *Statistics in Medicine* 127-41 (<https://doi.org/10.1002/sim.2331>).

64 It must be noted that we do not report other control variables for parsimony and readability, since the control variables largely reflect similar sign, significance properties, and magnitude when compared with table 2.

65 We are grateful to the anonymous reviewer who suggested that we conduct this analysis.

66 We term this group "profitable firms."

TABLE 3 Median Analysis of Variables of Interest

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
<i>IFRSPOSTREV</i>	-0.023 (-1.26)				
<i>IFRSPOSTTACC</i>		0.047** (3.97)			
<i>IFRSPOSTSIZE</i>			-0.035* (-2.03)		
<i>IFRSPOSTROA</i>				0.015 (1.14)	
<i>IFRSPOSTIMPAIR</i>					0.016 (0.87)
Observations	3,200	3,200	3,200	3,200	3,200
Adjusted R ²	0.256	0.259	0.257	0.256	0.256

Notes: This table presents the median analysis of the continuous variables selected to test the CRA’s concerns that Canadian companies adopting international financial reporting standards (IFRS) in 2011 and beyond might avoid making appropriate adjustments for revenue management (*IFRSPOSTREV*), profitability (*IFRSPOSTROA*), accrual management (*IFRSPOSTTACC*), and impairment writeoffs (*IFRSPOSTIMPAIR*). The analysis also tests the effect of size (*IFRSPOSTSIZE*). Other items, such as foreign operations and industry membership, are not tested because the measure of these two variables is dummy-coded and not continuous.

*, ** Significant at the 5 percent and 1 percent levels, respectively. The *t*-statistics are in parentheses.

To further check that our findings are not driven by the environmental differences between the United States and Canada, we rerun our regression using Canadian firms that did not adopt IFRS. We identify 40 Canadian firms that meet this primary reporting criterion and other data requirements, and 400 Canadian firms that are IFRS adopters. We present the results in models 4 and 5 in table 4, panel B. Our results consistently show that our primary variable of interest continues to maintain the sign and statistical significance at the conventional significance thresholds.⁶⁷ We continue to find stability and consistency in our model properties regarding variable signs and significance levels. In essence, our inferences hold even when we use Canadian companies as a control sample. We note, however, that we have a very limited number of Canadian firms (40) that meet the control sample criteria.

67 We run separate regressions with and without the variable *ENFORCE* (model 4 and model 5) to confirm that the results of our regressions are not endogenously driven. In model 4, the Stata analysis “omitted” *ENFORCE* from the regression. Therefore, in model 5, we dropped the *GDPGRWT* variable to capture the effect of the *ENFORCE* variable.

TABLE 4 Descriptive Statistics and Regression Results (Additional Analysis)

Panel A: Descriptive statistics (mean, standard deviation, and median)

	Mean		Standard deviation		Median	
	IFRS	Non-IFRS	IFRS	Non-IFRS	IFRS	Non-IFRS
NON-GAAP CASH ETR.....	0.188	0.219	0.227	0.198	0.108	0.173
POST	0.635	0.506	0.482	0.500	1.000	1.000
IFRS	1.000	0.000	0.000	0.000	1.000	0.000
log(MVE)	2.851	5.583	0.785	1.537	2.834	5.767
log(REVENUE).....	2.738	5.607	0.738	1.323	2.615	5.827
log(LEVERAGE).....	-0.060	-0.328	1.103	1.042	-0.130	-0.358
NOI	0.150	0.146	0.357	0.353	0.000	0.000
CAPEX	0.075	0.058	0.075	0.070	0.052	0.036
INVENTORY	0.067	0.111	0.108	0.128	0.016	0.076
FOREIGN	0.407	0.313	0.492	0.464	0.000	0.000
log(SIZE).....	3.023	5.620	0.838	1.226	2.935	5.825
INDUSTRY.....	0.213	0.153	0.410	0.360	0.000	0.000
IFRSPOSTROA.....	3.359	0.048	17.640	0.112	4.331	0.054
IFRSPOSTIMPAIR.....	133.955	3.806	1578.41	23.927	0.000	0.000
IFRSPOSTTACC.....	-0.082	-0.082	0.195	0.099	-0.063	-0.065
GDPGRWT.....	1.008	0.269	1.936	2.004	1.745	1.842
CHGTAX	-0.990	-0.063	1.005	0.027	-0.500	-0.080
ENFORCE	-0.158	-0.267	0.182	0.438	-0.067	-0.304
Observations	474	1,455	474	1,455	474	1,455

(Table 4 is continued on the next page.)

TABLE 4 Continued

Panel B: Regression results					
	Model 1: Non-financial firms	Model 2: Profitable firms	Model 3: Positive non- GAAP cash effective tax rate	Model 4: Canadian companies only	Model 5: Canadian companies only
<i>IFRS</i>	-0.044*** (-2.91)	-0.045** (2.38)	0.009 (0.36)	-0.030* (-1.78)	-0.030* (-1.78)
<i>POST</i>	-0.055*** (-3.46)	-0.062*** (3.56)	-0.072*** (3.60)	-0.036 (-1.42)	0.018 (0.63)
<i>IFRSPOST</i>	0.036** (2.55)	0.063*** (3.68)	0.038* (1.66)	0.041* (1.76)	0.041* (1.76)
<i>log(MVE)</i>	0.162*** (3.31)	0.025*** (4.41)	0.033*** (5.01)	0.016* (1.81)	0.016* (1.81)
<i>log(REVENUE)</i>	0.044*** (8.07)	0.047*** (6.63)	0.025*** (2.76)	0.028*** (5.20)	0.028*** (5.20)
<i>NOL</i>	-0.069*** (-8.37)	-0.083*** (-7.88)	-0.088*** (-6.75)	-0.046*** (-5.52)	-0.046*** (-5.52)
<i>CAPEX</i>	-0.109*** (-3.07)	-0.193*** (-3.94)	-0.243*** (-3.83)	-0.049 (-1.44)	-0.049 (-1.44)
<i>INVENTORY</i>	0.007 (1.04)	0.005 (0.74)	0.267*** (6.39)	0.002 (0.40)	0.002 (0.40)
<i>FOREIGN</i>	0.003 (0.45)	0.010 (1.18)	0.004 (0.45)	-0.010 (-1.38)	-0.010 (-1.38)
<i>log(LEVERAGE)</i>	-0.015*** (-4.53)	-0.015*** (-3.47)	-0.013** (-2.53)	-0.001 (-1.18)	-0.001 (-1.18)
<i>log(SIZE)</i>	-0.039*** (-5.37)	-0.056*** (-6.53)	-0.049*** (-4.88)	-0.027** (-2.58)	-0.027** (-2.58)
<i>INDUSTRY</i>	Omitted	-0.010 (-0.79)	-0.007 (-0.46)	-0.031*** (-2.97)	-0.031*** (-2.97)

(Table 4 is concluded on the next page.)

TABLE 4 Concluded

Panel B Concluded					
	Model 1: Non-financial firms	Model 2: Profitable firms	Model 3: Positive non- GAAP cash effective tax rate	Model 4: Canadian companies only	Model 5: Canadian companies only
<i>GDPGRWT</i>	0.008** (2.41)	0.010** (2.32)	0.011** (2.02)	0.006* (1.91)	
<i>CHGTAX</i>	0.016*** (2.74)	0.016** (2.00)	0.005 (0.45)	0.006 (1.32)	-0.012 (-1.57)
<i>ENFORCE</i>	-0.047*** (3.26)	-0.040** (2.50)	-0.044** (2.41)	Omitted	-0.095* (1.91)
Observations.....	2,672	2,320	1,929	1,760	1,760
Adjusted <i>R</i> ²	0.256	0.170	0.129	0.092	0.092

Notes: Panel A presents the descriptive statistics and panel B presents further analyses, including the regression results for the primary variables in the study for firms with a non-zero non-GAAP cash effective tax rate—that is, firms that paid taxes. See the accompanying text for the definitions of these variables. The sample contains Canadian firms listed on the Toronto Stock Exchange that adopted international financial reporting standards (IFRS adopters) and a controlled sample of US firms that use reporting standards different from IFRS (control firms). The high value for impairment for the IFRS firms was partly driven by a huge non-cash impairment charge in 2013. See “First Majestic Announces Financial Results for Q4 and Year End 2013,” *Firstmajestic.com*, February 26, 2014 (www.firstmajestic.com/news/2014/index.php?content_id=273); and “Epsilon Energy Ltd. Announces Full Year 2013 Results,” *Globenewswire.com*, March 20, 2014 (www.globenewswire.com/news-release/2014/03/20/1412281/0/en/Epsilon-Energy-Ltd-Announces-Full-Year-2013-Results.html). Capital expenditure obtained from Bloomberg has a negative sign for all items. As a result, each capital expenditure was multiplied by a minus sign.

The five models in panel B are described as follows. Model 1 shows the regression after dropping the firms in the financial or regulatory industry. Model 2 shows the regression for a subsample of firms that paid some taxes. Model 3 shows the regression using only firms with a positive non-GAAP cash effective tax rate; firms with zero corporate tax avoidance are dropped. Models 4 and 5 show the regression using only Canadian firms—that is, IFRS adopters and non-adopters. In model 4, the Stata analysis “omitted” *ENFORCE* from the regression. Therefore, in model 5, we dropped the *GDPGRWT* variable to capture the effect of the *ENFORCE* variable.

*, **, *** Significant at the 10 percent, 5 percent, and 1 percent levels, respectively. The *t*-statistics are in parentheses.

SUMMARY, DISCUSSION, AND CONCLUSION

We have examined whether the adoption of IFRS as the recommended GAAP for Canadian public companies in 2011 affected the tax-avoidance tendencies of these companies. The impact of IFRS adoption on corporate tax avoidance did not receive as much attention from academics as did its impact on financial reporting. Some of the main IFRS studies include its effect on comparability and the relevance of financial reporting, the cost of capital, accounting quality, earnings quality, and market reaction. The main findings are that the effect was generally positive. The few existing tax-related IFRS studies, which for the most part use European data, do not directly involve the likely impact of adoption on the tax-avoidance tendencies (tax aggressiveness) of public firms.

In designing our study, we recognized that the adoption of IFRS in Canada was unique, in that it was not part of the wave of European conversion that took place in the mid-2000s, and it was not followed by adoption in the United States. Accordingly, we used a pre-post research design in which Canadian companies acted as their own controls. More importantly, we also took advantage of the fact that the United States did not adopt IFRS and, using a PSM approach, put together a non-Canadian (US) control sample. Our main sample consists of 400 Canadian IFRS users matched one-to-one with 400 US firms that do not use IFRS. In the sensitivity tests, we made use of non-financial firms, profitable firms that paid taxes in at least one year of our study period, observations for which the non-GAAP cash effective tax rate was greater than zero, and a small sample of 40 Canadian public firms that did not convert to IFRS during our study period. We chose 2008 and 2009 as the pre-adoption period, and 2012 and 2013 as the post-adoption period. Since 2008 and 2009 were recession years in both Canada and the United States, we are interested in the relative increases in the non-GAAP cash effective tax rate among different samples, and we added GDP growth as a control variable. In all, our sample consists of

- 3,200 observations of US and Canadian firms for the main tests, and
- subsamples of 2,320 observations of US and Canadian firms that paid some taxes, 1,929 observations for a non-GAAP cash effective tax rate greater than zero, and 1,670 observations of Canadian companies only, for the sensitivity tests.

We hypothesized that, even though the CRA warned its tax auditors about, and trained them to look for, tax-aggressive transactions occasioned by the conversion to IFRS,⁶⁸ firms' tax-aggressiveness tendencies will decrease (at least in the short run) after IFRS adoption owing to uncertainties and complexities created by the conversion. We rely on the logic of bounded rationality theory to justify our hypothesis of a decrease in tax aggressiveness immediately after the adoption of IFRS. The

68 See Okafor et al., *supra* note 1.

theory suggests that when decision makers are confronted with constraints and uncertainties, they make satisficing decisions. One of the main features of IFRS is that while it gives some flexibility to managers, it also requires disclosures about transactions and estimates that may cause managers to release proprietary information. The tax authority, as a stakeholder in firms, could use such disclosures as the basis for additional tax audits. Therefore, managers are expected to moderate their tax-avoidance tendencies after IFRS adoption.

As our second hypothesis, we posited that, for the same bounded rationality reasons, we may not observe the tax-reducing adjustments that the CRA was concerned that managers may make to certain accounting items, such as revenue, profitability accounts, foreign operations, impairment writeoffs, and accruals. We also investigated whether firm size and industry membership affect the amount of tax that the government collects after the adoption of IFRS. One of our most important decisions in operationalizing the variables that went into our regression-based testing model was the choice of proxy for our corporate tax avoidance variable. Instead of using the usual GAAP-based effective tax rate as a proxy for corporate tax avoidance, we used the non-GAAP cash effective tax rate. Since the adoption of IFRS involved GAAP numbers, we argue that if either the numerator or the denominator of our proxy uses non-cash accounting numbers or GAAP-based tax rates, we may get spurious results. Therefore, our variable uses cash tax paid or received as the numerator and cash flows from operations as the denominator.

The results are consistent with our hypotheses and allay the CRA's concern about loss of taxes owing to users of Canadian GAAP switching to IFRS. In our main tests, where the control sample consists of US firms, the coefficient of the main variable of interest (*IFRSPOST*) in our regression model is positive and significant at conventional levels. Our interpretation of the positive coefficient of *IFRSPOST* in table 2, model 1, which captures the differential impact of IFRS after adoption, is that Canadian companies became less tax-aggressive, compared to US control firms, after the adoption of IFRS in 2011. The higher the *NON-GAAP CASH ETR*, the lower the tax aggressiveness. The results in table 2, model 1 also show that Canadian sample firms generally engage in more tax avoidance than their US counterparts, as indicated by the negative and significant coefficient of the IFRS variable. We also carried out a co-test of the variables *IFRS* and *IFRSPOST*, and the resultant coefficient is negative and significant. That is, while the Canadian IFRS-using firms became less tax-aggressive after the adoption year of 2011, they are still more tax-aggressive than the US control firms.

The sensitivity tests reported in panel B of table 4 (models 1 to 4) confirm the results from the main regression reported in table 2, model 1. The significant positive coefficient of the *IFRSPOST* variable indicates that Canadian firms that converted to IFRS became less tax-aggressive after 2011. In a nutshell, all the sensitivity tests show that IFRS converters became less tax-aggressive after the adoption of IFRS in 2011. The tests also show that, in general, Canadian firms seem to be more tax-aggressive than US firms, while Canadian IFRS users lost some tax aggressiveness relative to Canadian users of US GAAP after 2011.

The results of the test for our second hypothesis reported in table 2, models 2 to 8, show that the concerns of the CRA that managers may inappropriately adjust balances of accounts that relate to revenues, profitability, foreign operations, impairment writeoffs, and accruals may not materialize after the adoption of IFRS. With the exception of accruals, none of the proxies for these accounts are significant, while the coefficients of the variables of interest remain significant and the R^2 remains unchanged at 0.256. That is, while the training provided to CRA auditors to alert them to any inappropriately adjusted balances could be useful, it seems that IFRS conversion may not put the CRA at a disadvantage compared to old Canadian GAAP. The significant relationship between our corporate tax-avoidance proxy and accrual management is an interesting addition to the line of literature on the tradeoff that firms face in choosing between tax benefits and financial-reporting benefits. Our results are consistent with the findings in prior studies that firms would forgo tax benefits to appeal to their investors.

We ran some additional tests to rule out the possibility that our results are driven by measurement errors in these variables. More specifically, to rule out the possibility that skewness in the means of our variable *NON-GAAP CASH ETR* is driving our results, we reran the models using the median values of the variables. The coefficients and the significance levels of the variables are, by and large, similar to those in table 2. Furthermore, the additional sensitivity tests reported in table 3 do not change the conclusion that the CRA's concerns about improper adjustment of tax-related account balances by managers after the adoption of IFRS are allayed.

Lastly, we graphically illustrated the trajectory of *NON-GAAP CASH ETR* across the sample period for our sample of IFRS and non-IFRS firms that paid taxes in the study period (figure 1). We also grouped tax avoidance into quintiles and graph the top quintile of tax avoidance (lowest *NON-GAAP CASH ETR*) versus the lowest quintile of tax avoidance (highest *NON-GAAP CASH ETR*) for IFRS adopters (figure 2). We then identified the top quintile and lowest quintile by industry membership (financial or non-financial) (figure 3). While figure 1 shows a consistent pattern with our descriptive and regression analysis results for IFRS and non-IFRS adopters, figures 2 and 3 suggest that the top and lowest tax avoiders tend to converge after the adoption of IFRS across the industry categories, at least in the short run.

Overall, the results of our study give some comfort to the tax authorities, especially to the CRA, which was concerned about potential negative impacts occasioned by the conversion from Canadian GAAP to IFRS for public companies. The adoption of IFRS does not seem to increase the tax aggressiveness of Canadian public companies, at least in the short run. The long-run implications of our findings could be fertile ground for future research. The results also give comfort to Canadian accounting standard setters in providing empirical evidence that they did not inadvertently cause Canadian public firms to become more tax-aggressive. Our findings may also be beneficial to other countries still contemplating the adoption of IFRS. But a couple of caveats are in order. We assumed that US firms are good controls for Canadian firms that converted to IFRS. To the extent that the controls are incongruous owing to different economic and standard-setting environments in Canada and the

United States, our results may not be relied on. However, since our Canadian control sample, albeit small in number (160 observations), gives the same results, the concerns are partially ameliorated. An additional caveat relates to the proxies for some of the variables that we used to operationalize the concerns of the CRA about account balance adjustments. Again, several additional analyses produce consistent results, and future research may further refine our measures.

