

Antonio De Vito

Legal Institutions and Tax Avoidance

Dissertation
for obtaining the degree of Doctor of Business and Economics
(Doctor rerum politicarum - Dr. rer. pol.)

at WHU – Otto Beisheim School of Management

May 16th, 2018

First Advisor: *Prof. Dr. Martin Jacob*

Second Advisor: *Prof. Dr. B. Burcin Yurtoglu*

Summary of Contents

Summary of Contents	II
Table of Contents	III
List of Figures	VIII
List of Tables	IX
1 Introduction	1
2 Employment Protection and Tax Avoidance	8
3 Creditor Rights, Enforcement and Tax Avoidance	69
4 Corporate Tax Reforms and Tax-Motivated Profit Shifting: Evidence from the EU	126
5 Conclusion	168
Appendix	171
References	196
Acknowledgements	211

Table of Contents

Summary of Contents	II
Table of Contents	III
List of Figures	VIII
List of Tables	IX
1 Introduction	1
2 Employment Protection and Tax Avoidance	8
2.1 Introduction	8
2.2 Theoretical link between Employment Protection and Tax Avoidance	15
2.3 Research Design and Data	17
2.3.1 Employment Protection Indicators	17
2.3.2 Firm-level data	22
2.3.3 Baseline Regression	22
2.3.4 Summary Statistics	26
2.4 Empirical Results	29
2.4.1 Baseline Results	29
2.4.2 Econometric concerns	33
2.4.2.1 The timing of changes in Tax Avoidance	33
2.4.2.2 The effect of unobserved time-invariant firm characteristics	36
2.4.2.3 Robustness to controlling for country trends and extended fixed effects, and to excluding recession years	38
2.4.2.4 Entropy balance matching	43
2.4.3 Assessing the Capital Deepening channel	45

2.4.4	Exploiting sources of cross-sectional variation in firm, industry, and country characteristics	50
2.4.4.1	Cross-sectional variation in Capital Intensity	50
2.4.4.2	Cross-sectional variation in Employment Volatility	54
2.4.4.3	Cross-sectional variation in Enforcement	57
2.5	Additional analyses	60
2.5.1	Alternative indicator of EPL	60
2.5.2	Additional Sample Restrictions	63
2.5.3	Alternative definitions of Tax Avoidance	64
2.5.4	An alternative explanation: value transfer amongst stakeholders	66
2.6	Conclusion	67
3	Creditor Rights, Enforcement and Tax Avoidance	69
3.1	Introduction	69
3.2	Theoretical link between Creditor Rights and Tax Avoidance	76
3.3	Research Design and Data	78
3.3.1	Bankruptcy Code Reforms	78
3.3.2	Creditor Rights Indicators	81
3.3.3	Sample Construction	83
3.3.4	Baseline Regression	83
3.3.5	Summary Statistics	86
3.4	Empirical Results	89
3.4.1	Baseline Results	89
3.4.2	Econometric concerns	92

3.4.2.1	The timing of changes in Tax Avoidance	92
3.4.2.2	The effect of unobserved time-invariant firm characteristics	94
3.4.3	Assessing the channels: Creditor Rights and Firm characteristics	96
3.4.4	Exploiting sources of cross-sectional variation in firm, and country characteristics	100
3.4.4.1	Cross-sectional variation in firm characteristics: Expected bankruptcy costs	100
3.4.4.2	Cross-sectional variation in country characteristics: Deductibility of Capital and Debt Enforcement	104
3.4.5	Additional Analyses	108
3.4.5.1	Robustness to controlling for country trends	108
3.4.5.2	Alternative definitions of Tax Avoidance	108
3.4.5.3	Alternative Estimation Strategy	109
3.5	Exploiting the Italian 2005 Bankruptcy Reform as Quasi-Natural Experiment	110
3.5.1	The 2005 Bankruptcy Reform in Italy	110
3.5.2	Research Design and Data	114
3.5.3	Baseline Results	116
3.5.4	Additional Analyses	120
3.5.4.1	The timing of changes in Tax Avoidance	120
3.5.4.2	Assessing the channels: Creditor Rights and Firm characteristics – Italian Setting	122
3.6	Conclusion	125

4	Corporate Tax Reforms and Tax-Motivated Profit Shifting: Evidence from the EU	126
4.1	Introduction	126
4.2	Literature Review and Theoretical Background	129
4.3	Empirical Setting	131
4.3.1	Variation in Corporate Tax Rates and Tax Base Elements	131
4.3.2	Sample Selection	139
4.3.3	Empirical Strategy	140
4.3.4	Summary Statistics	142
4.4	Empirical Results	145
4.4.1	Baseline Results	145
4.4.2	Joint Effect of the Tax Rate and the Tax base on Profit Shifting	159
4.4.3	Trend in Profit Shifting across EU Countries over the Past Decade	164
4.5	Conclusion	167
5	Conclusion	168
	Appendix	171
	Appendix A – Variable Definitions Chapter 2	172
	Appendix B – Additional Analyses Chapter 2	177
	Appendix C – Variable Definitions Chapter 3	185
	Appendix D – Additional Analyses Chapter 3	189
	Appendix E – Variable Definitions Chapter 4	194

References	196
Acknowledgements	211

List of Figures

Figure 2.1: Employment Protection Legislation – High variation countries	21
Figure 2.2: GAAP ETR around Employment Protection Legislation changes	34
Figure 3.1: Changes in CR Reforms and Tax Avoidance	93
Figure 3.2: Changes in CR Index and Tax Avoidance	94
Figure 3.3: Length of bankruptcy proceedings in months across Italian provinces	113
Figure 3.4: Difference in GAAP ETR between Firms in Low and High Debt Enforcement Italian provinces, 2003-2007	121
Figure 4.1: Trend in the Corporate Tax Rate in Europe, 2003-2013	132
Figure 4.2: Trend in the Tax Base Index in Europe, 2003-2013	161

List of Tables

Table 2.1: Sample Composition and Employment Protection Reforms	19
Table 2.2: Summary Statistics	28
Table 2.3: Employment Protection and Tax Avoidance	31
Table 2.4: Employment Protection and Tax Avoidance – Dynamic Analysis	35
Table 2.5: Employment Protection and Tax Avoidance – First Difference Estimation	37
Table 2.6: Employment Protection and Tax Avoidance – Country Trends, Extended Fixed Effects, and No Recession Years	41
Table 2.7: Employment Protection and Tax Avoidance – Entropy balance matching	44
Table 2.8: Employment Protection and Change in Employment, Investment, and Profit Margin	48
Table 2.9: Employment Protection and Tax Avoidance – Cross-sectional variation in Capital Intensity	53
Table 2.10: Employment Protection and Tax Avoidance – Cross-sectional variation in Employment Volatility	56
Table 2.11: Employment Protection and Tax Avoidance – Cross-sectional variation in Enforcement	59
Table 2.12: Employment Protection and Tax Avoidance – Alternative Measure of EPL	62
Table 3.1: Sample Composition and Country-specific variables	81
Table 3.2: Summary Statistics	88
Table 3.3: Creditor Rights and Tax Avoidance	91
Table 3.4: Creditor Rights and Tax Avoidance – First Difference Estimation	96
Table 3.5: Creditor Rights and Firm Characteristics	99

Table 3.6: Creditor Rights and Tax Avoidance – Expected bankruptcy costs	103
Table 3.7: Creditor Rights and Tax Avoidance – Deductibility of Capital and Debt Enforcement	107
Table 3.8: Summary Statistics – Italian Setting	116
Table 3.9: Creditor Rights, Leverage and Tax Avoidance – Italian Setting	119
Table 3.10: Creditor Rights and Firm Characteristics – Italian Setting	124
Table 4.1: Adjusted top statutory tax rate on corporate income (in percentage points) 2003- 2013	134
Table 4.2: Evolution of tax policy regulation on tax base items, 2003-2013	137
Table 4.3: Summary Statistics	144
Table 4.4: Corporate tax reforms and profit shifting I	148
Table 4.5: Corporate tax reforms and profit shifting II	153
Table 4.6: Corporate tax reforms and profit shifting – Robustness tests	157
Table 4.7: Tax Base Index in Europe, 2003-2013	160
Table 4.8: Corporate tax reforms and tax base broadening	163
Table 4.9: Profit shifting and development over time	166

“The subjects of every state ought to contribute towards the support of the government, as nearly as possible, in proportion to their respective abilities.” (A. Smith, *The Wealth of Nations*, Book V, ch. II, part II, v.ii, p. 825, para. 3)

1 Introduction

Interest in tax avoidance has gained momentum in recent years due to several tax scandals¹ that have put a spotlight on firms’ tax affairs and drawn the attention of policymakers, tax authorities, the media, as well as activist groups. In this regard, policymakers worldwide have taken coordinated actions and amended existing tax rules to avoid losing tax revenues (Organisation for Economic Co-operation and Development, or OECD, 2013a; 2013b; 2017a).² Relatedly, tax authorities have put under scrutiny group structures aimed at lowering the tax burden by shifting profits out of one country into another (e.g., Klassen and Laplante 2012; Markle 2015).³ In a similar vein, the media and activist groups have also exerted a significant influence in fueling the public’s awareness of corporate tax avoidance behavior (OECD 2014; Dyreng et al. 2016a).⁴

With the widespread interest and concern over corporate tax avoidance, the academic literature has also flourished. Starting with Shackelford and Shevlin (2001) and Weisbach (2002), earlier studies in this area focused on defining and measuring tax avoidance. For example, Hanlon (2003) and McGill and Outslay (2004) first attempted to estimate tax avoidance from financial statement information. Similarly, other studies focused on

¹ Vanessa Houlder, “Leak reveals scale of corporate tax deals with Luxembourg”, *Financial Times*, November 6, 2014. “Panama Papers yield leads for UK task force, says Hammond”, *Financial Times*, November 6, 2016.

² The Organization for Economic Co-operation and Development (OECD) “Base Erosion and Profit Shifting (BEPS) initiative” as well as the newest “Multilateral Instrument” to counteract treaty abuse constitute two prominent examples.

³ The increased demand for transparency of firms’ tax activities (see, for example, the new country-by-country reporting standards) also points to this direction (OECD 2017b).

⁴ Simon Neville and Jill Treanor, “Starbucks to pay £20m in tax over next two years after customer revolt”, *The Guardian*, December 6, 2012. *The Economist* on a special report on company taxation states: “the public outcry is forcing tax administrators to rethink their policies [...]”, *The Economist*, February 16, 2013.

measuring tax avoidance by diving into tax shelters (Wilson 2009; Lisowsky 2010; Brown 2011), or by developing aggressive book-tax differences measures (Desai and Dharmapala 2006; 2009; Frank et al. 2009). Another important study in this research area is Dyreng et al. (2008), which developed a cash-based effective tax rate measure that not only captures tax shelter transactions but all forms of tax avoidance. In validating the measure, Dyreng et al. (2008) also found considerable unexplained variation in their long-run cash effective tax rate. This subsequently triggered another line of research aimed at explaining such cross-sectional variation by adopting a firm-centric view of tax avoidance that relates firm characteristics to corporate tax outcomes (for a review, see Wilde and Wilson 2018).⁵

Only recently, research on corporate tax avoidance has started to look beyond firm attributes and has pointed out the role the legal environment plays in facilitating or discouraging tax avoidance. Nonetheless, extant work has essentially revolved around accounting (Hope et al. 2013; De Simone 2016) or tax (e.g., Atwood et al. 2012; Shevlin et al. 2017) regulations and it has entirely ignored whether other rules also have an effect on corporate tax avoidance. In an era of frequent regulatory changes aimed at tackling tax avoidance, it is fundamental to analyze all aspects of the legal environment that affect tax avoidance, which it has become a key threat to corporate tax revenues and to the fairness of the tax system (Dyreng and Maydew 2017). Therefore, evaluating other regulations – whose primary intended effects might even be unrelated to tax avoidance – can further inform policymakers about the extent of corporate tax avoidance.

⁵ Noteworthy work in this area has included, for example, financial constraints (Law and Mills 2015; Edwards et al. 2016), internal control mechanisms (Bauer 2016), corporate social responsibility activities (Hoi et al. 2013) and even political donations (Chen et al. 2018). Similarly, other studies have investigated the role of ownership structure (e.g., Chen et al. 2010; McGuire et al. 2014), managerial incentives (Dyreng et al. 2010) and, more generally, key stakeholders (e.g., unions: Chyz et al. 2013; auditors: McGuire et al. 2012) on corporate tax avoidance.

The present thesis contributes to this new line of research investigating how the regulatory environment influences corporate tax avoidance. To address this research question, the thesis adopts a novel approach of branching across disciplines such as law, accounting, finance, and economics and, thereby, it answers the call by Dyreng and Maydew (2017) for more research that draws “*connections to other disciplines, not just financial accounting, (...), because taxes interact with such a broad swath of disciplines*” (p. 5). In particular, this thesis examines the effect of three different sets of laws on corporate tax avoidance. Namely, the thesis investigates the effect of labor laws (chapter 2), bankruptcy laws (chapter 3) and tax laws (chapter 4) on corporate tax avoidance.

The thesis includes five chapters as follows: an introduction, three empirical papers, and concluding remarks. Furthermore, an overall list of references as well as appendices to each chapter are provided at the end of the thesis. Each chapter represents an empirical study that stands on its own. More specifically, the second chapter is a single authored paper and, for this end, it uses the first person singular. On the contrary, the next two chapters are working papers coauthored with Prof. Dr. Martin Jacob (chapters 3 and 4) and Junior-Prof. Dr. Anna Alexander Vincenzo (chapter 4) and, therefore, use the first person plural.

Chapter 2 is based on the unpublished working paper “Employment Protection and Tax Avoidance”. This study exploits 44 employment protection reforms across 19 OECD countries over the 1996-2013 period to examine how labor laws affect tax avoidance. The theoretical link between employment protection and tax avoidance centers on capital deepening. In general, employment protection legislation makes the labor input a quasi-fixed production factor because it imposes restrictions and costs on firms’ firing decisions. (e.g., Oi 1962; Lazear 1990). By making it costlier for firms to dismiss workers, employment protection makes physical capital relatively cheaper and more attractive than labor, predicting a shift from labor to capital (“capital-deepening”). However, the study

argues that, from a tax standpoint, labor is fully tax deductible whereas capital is only partially deductible. Thus, when employment protection increases, firms are more likely to avoid taxes because the shift from labor to capital input broadens the tax base and in turn increases the marginal benefits of tax avoidance.

To gauge the effect of changes in employment protection on tax avoidance, the paper primarily relies on the fRDB-IZA Social Reforms Database kindly provided by the Fondazione Rodolfo De Benedetti. The empirical strategy follows the so-called method of the “hierarchies of the hierarchies” to compute an overall indicator that captures variation in employment protection within a country over time (e.g., Garibaldi 2006; Simintzi et al. 2015; Dessaint et al. 2017). Consistent with the capital-deepening argument, the results suggest that labor reforms strengthening employment protection lead firms to increase tax avoidance. Moreover, the findings show that increases in tax avoidance are larger for firms and industries more reliant on labor ex-ante. These results add to the theoretical line of research investigating how labor and tax laws interact (Djajic 1997; Cuff et al. 2011; Cuff et al. 2017) by providing first empirical evidence that labor regulations, and particularly changes in employment protection, lead firms to engage in tax avoidance. Furthermore, the paper contributes to the longstanding debate among policymakers and academics on the economic consequences of employment protection reforms (e.g., Botero et al. 2004; Kugler and Saint-Paul 2004; Boeri and Garibaldi 2007).

This paper greatly benefits from helpful comments and suggestions from Dan Amiram, Daniel Ferreira, Elizer Fich, Ilan Guttman, Martin, Jacob, Christian Laux, Garen Markarian, Maximillian A. Müller, Paige Ouimet, Shivaram Rajgopal, Alfred Wagenhofer, Burcin Yurtoglu, and conference participants at the first Bolzano-Padova Emerging Researchers Consortium in Accounting, Annual Accounting Conference 2018, and seminar participants

at Erasmus University Rotterdam, IE Business School, IÉSEG School of Management, University of Mannheim and WHU – Otto Beisheim School of Management.

Chapter 3 is based on the unpublished working paper “Creditor Rights, Enforcement and Tax Avoidance”. This study exploits six bankruptcy reforms across 34 countries over the 2000-2013 period to examine how creditor rights are related to tax avoidance. Similar to Chapter 2, the empirical approach follows the methodologies by Simintzi et al. (2015), Dessaint et al. (2017) and Qi et al. (2017) to assess the relation between creditor rights and tax avoidance.

The paper uses a simplified version of the Dyreng et al. (2017a) model of tax avoidance to describe the theoretical link between creditor rights and tax avoidance, which essentially yields two ambiguous predictions. On the one hand, creditor rights mitigate moral hazard by borrowers and lower the cost of debt (Qian and Strahan 2007; Bae and Goyal 2009). This effect in turn reduces the deductible interest payments and increases a firm’s taxable income. Thus, stronger creditor rights could lead to higher tax avoidance. On the other hand, creditor rights also enhance access to finance and increase debt capacity of firms (Beck et al. 2003a, 2003b). By taking on more debt, firms can substitute costly tax avoidance with debt to create a tax shield. The substitution implies higher deductible interest payments and likewise lower taxable income (Miller 1977; DeAngelo and Masulis 1980; Graham and Tucker 2006). Hence, stronger creditor rights could lead to lower tax avoidance.

Consistent with the latter theoretical channel – i.e., the substitution between tax avoidance and debt (Miller 1977; DeAngelo and Masulis 1980; Graham and Tucker 2006) – the paper documents that firms reduce tax avoidance, take on more debt, and have higher interest payments (relative to total assets) in stronger creditor-rights regimes. Furthermore, the findings show that firms reduce tax avoidance to a lesser degree in countries with higher deductibility of capital – i.e., where debt and equity are equally or almost equally tax

deductible (e.g., Auerbach et al. 2008) – or where debt enforcement is weaker. The study also provides internal validity of the main findings by exploiting the Italian Bankruptcy reform in 2005 as a quasi-natural experiment and by taking advantage of the heterogeneous administration of bankruptcy justice across Italian provinces. In this setting, the results show that, after the law comes into force reducing creditor rights, firms operating in low debt enforcement provinces reduce debt and increase tax avoidance relative to counterfactual firms located in high debt enforcement provinces in the same industry and region. This study contributes to extant literature in several ways. First, the paper extends the literature on the impact of legal institutions on tax avoidance (e.g., Atwood et al. 2012; Hope et al. 2013; De Simone 2016; Shevlin et al. 2017) Second, the paper adds to the literature on tax avoidance and corporate debt policy (Graham and Tucker 2006). Third, the paper contributes to the law and finance literature investigating the role of the judiciary system on debt enforcement (Djankov et al. 2003; 2008).

This paper greatly benefits from helpful comments and suggestions from Daniel Ferreira, Maximilian A. Müller, and seminar participants at WHU – Otto Beisheim School of Management. A special thank also goes to Pamela Pintus and Claudio Caterino (ISTAT) for guidance on the data.

Chapter 4 is based on the FAccT Center Working Paper Nr. 23/2016 titled “Corporate Tax Reforms and Tax-Motivated Profit Shifting: Evidence from the EU”. This paper takes advantage of multiple corporate tax reforms in Europe over the 2003-2013 period to examine whether these tax measures have been effective at curbing profit shifting (i.e., a particular tax strategy that multinational companies put in place to achieve their tax avoidance targets). The novelty of this study lies in taking into account not only changes in the tax rate – as most of the previous studies (e.g., Dischinger et al. 2011; Karkinsky and Riedel 2012) – but also changes in the tax base to measure the extent of profit shifting across

countries and over time. The empirical strategy follows Goncharov and Jacob (2014) and combines the changes in the tax base into one overall index – which is increasing with the breadth of the tax base – to estimate the joint tax rate and tax base effect on profit shifting. Consistent with prior literature (Dischinger et al. 2014a), multinational subsidiaries still shift profits toward the parent company. However, the paper documents that profit shifting is significantly lower when accounting for tax laws that broad the tax base and introduce anti-avoidance regulations in the tax system (Haufler and Schjelderup 2000; OECD 2010; Dharmapala 2014). Furthermore, the study shows that the corporate tax reforms enacted over the past decade have successfully constrained and led to a downward trend in profit shifting, thereby informing the ongoing policy debate over tax avoidance in Europe.

This paper greatly benefits from helpful comments and suggestions from Mary Barth, Michael Devereux, Dhammika Dharmapala, Scott Dyreng, Jost Heckemeyer (discussant), Petr Janský (discussant), Ed Maydew, Paige Ouimet, Michael Overesch, Patrick Wittenstein (discussant), and conference participants to the 2016 ZEW Public Finance Conference, the 39th EAA Annual Congress in Maastricht, the Sixth Workshop on Current Research in Taxation, the European Accounting Symposium for Young Scholars (EASYS) 2016, the 72nd Annual Congress of the International Institute of Public Finance, and seminar participants at WHU – Otto Beisheim School of Management and the University of North Carolina at Chapel Hill.

Vallendar, May 2018

Antonio De Vito

2 Employment Protection and Tax Avoidance¹

2.1 Introduction

Firms must comply with regulations in all countries where they do business. All rules inevitably shape firms' operating activities and give rise to compliance costs, and various types of claims and contingent liabilities. However, within the regulatory framework, anecdotal evidence suggests that labor laws and tax laws are the most burdensome for companies, as they hugely increase compliance costs and adversely affect firms' profits. According to Forbes, in a recent survey U.S. business executives have stated that "*the most nettlesome rules are found in the Internal Revenue Code (...) followed by labor rules.*"² Further, among all the labor laws, those aiming at protecting employees are overly onerous, as they constrain firms' ability to adjust labor demand promptly when market conditions change (Oi 1962; Bentolila and Bertola 1990; Autor et al. 2006; Messina and Vallanti 2007).³ Yet, we know little about how labor laws and taxes interact.

Despite the heavy regulatory burden these two sets of rules put on firms, prior empirical research examining how the regulatory environment affects tax avoidance⁴ has mainly revolved

¹ This chapter is based on De Vito, A. (2017): "Employment Protection and Tax Avoidance", Unpublished Working Paper.

² Available at <https://www.forbes.com/sites/robbmandelbaum/2017/01/24/the-83000-question-how-much-do-regulations-really-cost-small-business/#39a8eb871b25>.

³ Forbes still finds that: "*(...) since 2005 the amount of wrongful termination lawsuits has increased significantly every year, with the most significant peak in 2008 when the economy crashed.*" (Available at <https://www.forbes.com/sites/brentgleeson/2014/06/27/6-big-reasons-employees-sue-and-how-to-protect-yourself/#68c8eece4857>).

⁴ In this study, I describe tax avoidance as a legal activity involving any reduction in explicit corporate income tax within the letter of the law. I use the terms *tax avoidance* and *corporate tax avoidance* interchangeably throughout the chapter.

around accounting and tax-related regulations,⁵ but it has entirely ignored whether there exist institutional complementarities between other regulations, such as labor laws, and taxes. In line with this reasoning, Dyreng and Maydew (2017) have recently called for more research that draws “*connections to other disciplines, not just financial accounting, (...), because taxes interact with such a broad swath of disciplines*” (p. 5). In this study, I examine how the interaction between labor and tax laws affects firms’ tax avoidance in a setting where firms face an additional economic burden in the form of increased labor costs (Bird and Knopf 2009). In particular, I empirically investigate the effect of employment protection legislation (hereafter ‘EPL’) on firms’ tax avoidance.

In theory, greater employment protection could plausibly lead to higher tax avoidance through capital deepening. In general, employment protection legislation makes the labor input a quasi-fixed factor because it imposes additional costs on firms when laying off employees (Lazear 1990; Dixit 1997; Kramarz and Michaud 2010). By making it costlier for firms to dismiss workers, employment protection thus makes physical capital relatively cheaper and more attractive than labor, predicting a shift from labor to capital (“capital-deepening”; e.g., Blanchard 1997; Caballero and Hammour 1998; Autor et al. 2007; Koeniger and Leonardi 2007; Cingano et al. 2016).

By changing the input mix and making capital relatively more important in the production function, employment protection alters the tax avoidance incentives due to the differential tax deductibility of labor and capital (Dyreng et al. 2017a). Contrary to labor costs, in most OECD tax systems capital is only partial tax deductible (Auerbach et al. 2008). This partial

⁵ Studies related to this line of research have examined the effect of accounting standards (De Simone 2016), disclosure regulation (Hope et al. 2013), and home-country tax system characteristics (Atwood et al. 2012; Shevlin et al. 2017) on tax avoidance.

deductibility of capital can occur for a number of reasons. First, the costs of debt financing are normally tax deductible, whereas the costs of equity financing are not (Fuest et al. 2017). Second, the tax treatment of losses is asymmetric as governments collect taxes on positive income but do not make an immediate tax refund on negative income (Altshuler and Auerbach 1990; Auerbach 2006). Third, tax depreciation allowances are generally based on historical rather than replacement costs, thereby, below the real economic depreciation (Haufler and Schjelderup 2000; Desai 2003). As a result, all these properties of corporate tax systems increase firms' taxable income. Consequently, when employment protection increases, firms are more likely to avoid taxes because the shift from labor to capital input broadens the tax base and in turn increases the marginal benefits of tax avoidance.

To test my theoretical prediction, I exploit 16 increases (28 decreases) in employment protection legislation across 19 OECD countries over the 1996-2013 period. Following previous literature (e.g., Simintzi et al. 2015; Dessaint et al. 2017; Louis and Hurcan 2017) and policy-maker practices (Organisation for Economic Co-operation and Development, or OECD, 2004), I focus on laws protecting full-time workers, those affecting temporary workers, as well as rules on layoff and collective dismissals. Moreover, to gauge the effect of changes in employment protection, I use the so-called method of the "hierarchies of the hierarchies" to compute an overall EPL indicator that captures variation in employment protection within a country over time (e.g., Garibaldi 2006). To check the validity of my measure and to test the robustness of the main findings, I additionally use the EPL indicator compiled by the OECD and extended by Allard (2005).

To test for the effect of EPL on firms' tax avoidance, I use a difference-in-differences approach in which the treatment (control) group consists of firms in countries that (do not)

experience a change in employment protection legislation. My empirical specification controls for firm and industry-year fixed effects along with firm characteristics known to correlate with tax avoidance (e.g., Rego 2003; Richardson and Lanis 2007; Chyz et al. 2013). Moreover, I control for several country-level determinants of employment protection to make sure that variation in observable political and economic conditions does not spuriously bias my results (e.g., Botero et al. 2004; Pagano and Volpin 2005; Perotti and Von Thadden 2006). I find that, following an increase in employment protection (i.e. one unit increase in the EPL indicator), the one-year effective tax rate decreases by 1.3 percentage points or 4.1% relative to its sample mean.⁶ The results also hold when using several alternative measures of tax avoidance (e.g., Markle and Shackelford 2012; Blackburne and Blouin 2016).

The causal interpretation of my results rests on the parallel trends assumption: absent changes in employment protection, the average change in tax avoidance for both treatment and control firms would have been the same. Several additional analyses suggest that the parallel trends assumption plausibly holds in my sample. First, the staggered changes in employment protection make sure that firms can be in both the treatment and the control group over time and alleviate the concern that the two groups are intrinsically different aside from the change in employment protection. Second, I examine the dynamics of tax avoidance around the passage of these reforms by including two-year leads and lags of the EPL indicator and find that tax avoidance only increases when the law comes into effect. Third, to further sharpen the analysis, I conduct a first-difference regression of the change in EPL on the change in firm-level tax avoidance. Similar to the specification with firm-fixed effects, this empirical approach removes unobserved time-invariant firm characteristics and can better accommodate repeated treatments

⁶ This finding is also consistent with Lu (2014), although the underlying theoretical channel differs from mine.

(i.e., firms experiencing several employment protection reforms over time), and treatment reversals (i.e., increases in employment protection followed by decreases in employment protection at a later point in time) (e.g., Heider and Ljungqvist 2015; Ljungqvist and Smolyansky 2016). Fourth, I implement entropy balancing to match treatment and control firms within the same industry based on both firm-level and country-level variables in the year before the change in EPL. Fifth, I rerun the baseline regressions while controlling for country-specific time trends in tax avoidance or common economic shocks among neighboring countries. Sixth, I investigate whether political and economic factors systematically affect the likelihood of passing employment protection legislation. Out of a large set of political and economic determinants, almost none of them correlate with EPLs' adoption. However, decreases in employment protection appear to come into force after recession years and in high-unionized countries. Therefore, to reduce identification concerns, I proceed in two ways. I narrow down the counterfactuals to firms from countries in the same cluster of GDP growth and level of union density and I exclude changes in employment protection that occur during and in the two years after a recession. In all the analyses, the results are qualitatively and quantitatively unchanged and support the main findings.

Furthermore, to examine whether the observed increases in tax avoidance resulting from changes in employment protection are rooted in capital deepening, I analyze three sources of cross-sectional variation in firm, industry, and country characteristics and estimate a difference-in-difference-in-differences model. These tests provide evidence on the underlying mechanisms of the results and allow me to control for country-year fixed effects and address econometric concerns that other concomitant changes may drive the results. First, when employment protection increases firms that rely more on labor and less on capital will face higher dismissal

costs upon laying-off. These firms should shift more to capital and in turn, avoid more taxes because of the differential tax deductibility of labor and capital. Second, firms operating in industries in which lay-offs occur more frequently should also have more incentives to shift to capital and engage in tax avoidance following the change in EPL because their factor input adjustment process is more affected by tighter employment protection. Third, firms operating in countries with weak institutions and lax tax enforcement (i.e., where the marginal cost of tax avoidance is lower) should find it easier, on average, to engage in tax avoidance when employment protection is more binding. While the first two tests shed light on which firms and industries are more likely to be hit by employment protection and substitute labor with capital, the last test provides evidence on the institutional complementarities between labor and tax laws. In particular, it shows how reforming one set of rules in isolation may trigger offsetting adjustments on tax avoidance if not adequately counterbalanced by credible enforcement (Carrillo et al. 2017). In line with the theoretical predictions, increases in tax avoidance following the change in EPL are larger for low capital-intensive firms, as well as for firms operating in industries and countries with higher dismissal costs or loose enforcement.

Overall, the results are consistent with higher employment protection leading firms to engage in more tax avoidance via capital deepening. In particular, I also document that firms substitute labor with capital when it becomes more expensive to dismiss employees. Specifically, I find that firms reduce employment, increase capital investment and subsequently experience increases in pre-tax margins following the change in EPL. These results suggest that employment protection induces firms to become more capital intensive and avoid more taxes because the partial tax deductibility of capital broadens the tax base and increases the benefits of tax avoidance.

This study broadly adds to the literature examining how the operating and regulatory environment shapes firms' tax avoidance (e.g., Hope et al. 2013; Mills et al. 2013; Kubick et al. 2015; De Simone 2016; Shevlin et al. 2017). More specifically, this paper closely relates to the theoretical line of research investigating how labor and tax laws interact and affect firms' tax avoidance (Djajic 1997; Cuff et al. 2011; Cuff et al. 2017) by providing first empirical evidence that labor regulations, and particularly changes in employment protection, lead firms to engage in more tax avoidance. Finally, the results contribute to the longstanding debate among policymakers and academics on the economic consequences of employment protection reforms (e.g., Hopenhayn and Rogerson 1993; Besley and Burgess 2004; Botero et al. 2004; Kugler and Saint-Paul 2004; Boeri and Garibaldi 2007; OECD 2016). Namely, the results points out the interdependence of regulation in labor markets and tax systems and, thereby, offer *“useful information as to the implications of EPL [...] and its interaction with other institutional and economic features of industrialized economies”* (Bertola et al. 1999, p. 1).

The findings also have important implications for future academic research and policy makers alike. In particular, future research may consider informing policy makers on other institutional complementarities that may arise between several sets of regulations and taxes. To the extent that other rules (e.g., product quality; environmental policies; occupational safety and health laws, etc.) impose compliance costs and induce firms to restructure their operations and change the mix of labor and capital input, tax avoidance incentives may be altered. In a similar vein, policy makers need to be aware of these interdependences and could consider trading-off the costs and benefits of potential regulatory changes within the broader tax system, as formulating policies in isolation could trigger corporate tax avoidance.

The remainder of the chapter proceeds as follows. Section 2.2 develops the theoretical link between employment protection and tax avoidance. Section 2.3 discusses the research design and the data. Section 2.4 presents the main empirical findings. Section 2.5 reports additional analyses. Section 2.6 concludes the chapter.

2.2 Theoretical link between Employment Protection and Tax Avoidance

How could employment protection laws increase firms' tax avoidance? From a theoretical perspective, greater employment protection could plausibly increase tax avoidance through capital deepening. In general, higher employment protection makes labor a quasi-fixed factor (Oi 1962), because it imposes legal restrictions on firms' firing decisions and additional compensations to be paid to workers when terminating the employment contract (Lazear 1990; Dixit 1997; Kramarz and Michaud 2010). More specifically, EPL increases labor costs (Bird and Knopf 2009) in the form of severance payments (i.e., the so-called "transfer component") and trial costs (i.e., the so-called "tax component") (e.g., Garibaldi and Violante 2005). While the transfer component represents a predictable monetary payment (i.e., established by the EPL and known *ex-ante* by the two contracting parties), the tax component is highly unpredictable, as it depends on an employee appealing against the termination and a judge ruling on the case (Jimeno et al. 2016; Gianfreda and Vallanti 2017). Because of this uncertainty, firms are thus unable to undo the EPL by contractual arrangements with employees.⁷

⁷ As Lazear (1990) observes, only under rather extreme circumstances EPL has no effects on firms and employees. Specifically, workers must be risk neutral; wages must be fully flexible and can be adjusted downward; and the EPL consists only of the transfer component (i.e., the tax component is zero). As soon as any of these three assumptions is relaxed (for example, workers are generally risk adverse due to capital markets imperfections that prevent them from smoothing consumption over time), the EPL will affect the labor market equilibrium and increase firms' labor costs.

By making it costlier for firms to dismiss workers, employment protection thus induces firms to engage in capital deepening on the margin. Firms will substitute relatively more expensive human capital with cheaper physical capital (e.g., Blanchard 1997; Caballero and Hammour 1998; Autor et al. 2007; Koeniger and Leonardi 2007; Cingano et al. 2016). The shift from labor to capital input makes capital relatively more important in the production function and likely alters the tax avoidance incentives due to the differential tax deductibility of labor and capital (Dyreng et al. 2017a). In particular, most existing corporate tax systems depart from the case of a cash flow taxation with full cost deductibility of labor and capital⁸ and only permit a partial deduction of capital (Auerbach et al. 2008). This differing tax deductibility of capital can occur for a number of reasons. First, the costs of debt financing are normally tax deductible, whereas the costs of equity financing are not (Fuest et al. 2017). Second, the tax treatment of gains and losses is asymmetric, as governments collect taxes on positive income but do not make an immediate tax refund on negative income (Altshuler and Auerbach 1990; Auerbach 2006). Third, tax depreciation allowances are generally based on historical rather than replacement costs, thereby, below the real economic depreciation (Haufler and Schjelderup 2000; Desai 2003). All of these properties of corporate tax systems increase firms' taxable income. Consequently, when employment protection increases, firms are more likely to avoid taxes because the shift from labor to capital input on the margin broadens the tax base and in turn increases the marginal benefits of tax avoidance.

⁸ Similar to labor, in a cash flow tax system capital is also immediately expensed (i.e., immediate write-off upon purchase) and a firm's tax base is equal to the difference between cash inflows (from the sale of products and services) and cash outflows (from the purchase of labor and capital). Thus, even if employment protection induced firms to substitute labor with capital, in such tax system there would be no change in a firm's tax base and tax avoidance incentives.

The theoretical channel thus predicts that firms will invest in more capital on the margin and engage in tax avoidance when employment protection increases. Yet, one might still conjecture that this mechanism is likely not at work, pointing out that stricter employment protection lowers labor demand, which also drags down capital demand (e.g., Bernanke 1983; Bertola and Caballero 1994; Bai et al. 2017). However, it is worth pointing out that, even if firms reduce both employment and investment, what matters is the different degree to which labor and capital decrease, and the new input mix that comes out following the change in EPL. To the extent that capital becomes relatively more important than labor input in the production function and capital is not fully tax deductible, when employment protection increases firms will still find it beneficial to avoid taxes (Dyregang et al. 2017a).

2.3 Research Design and Data

2.3.1 *Employment Protection Indicators*

To investigate the effect of employment protection legislation on firms' tax avoidance, I exploit 44 employment protection reforms across 19 OECD countries over the 1996-2013 period. The main source of EPL reforms comes from the fRDB-IZA Social Reforms Database provided by the Fondazione Rodolfo De Benedetti for the 1996-2009 period (see, also, Boeri et al. 2012).⁹ I additionally complement the data with the ILO EPL Database for the 2010-2013 period.¹⁰ Following previous literature (e.g., Simintzi et al. 2015; Dessaint et al. 2017; Louis and Hurcan 2017), I focus on reforms regulating full-time and temporary workers, rules on

⁹ The Fondazione Rodolfo De Benedetti “*promotes applied and policy oriented research on labour markets and welfare systems in Europe.*” (<http://www.frdb.org>).

¹⁰ The sample ends in 2013 because of the data availability. The ILO EPL database is available at <http://www.ilo.org>.

individual and collective dismissals, as well as notice periods and severance payments. Table 2.1 lists my sample countries and the employment protection reform in each sample year.

Table 2.1: Sample Composition and Employment Protection Reforms

This table provides an overview of the 19 OECD sample countries along with the 44 employment protection reforms over the 1996-2013 period.

Country	Year	Scope	Sign
Australia	2005	Individual and Collective dismissals	Decreasing
Australia	2009	Individual and Collective dismissals	Increasing
Austria	2000	Individual dismissals	Decreasing
Austria	2003	Temporary work	Decreasing
Belgium	1998	Collective dismissals	Increasing
Canada	-	-	-
Denmark	1996	Notice period	Decreasing
Finland	1997	Notice period/Fixed-term contracts	Decreasing
Finland	2001	Individual and Collective dismissals/ Notice and trial period/Fixed-term contracts	Decreasing
France	2002	Collective dismissals/Severance payments/Fixed-term contracts	Increasing
France	2003	Collective dismissals	Decreasing
France	2004	Collective dismissals	Decreasing
Germany	1996	Temporary work/Individual dismissals	Decreasing
Germany	1997	Temporary work/Individual dismissals	Decreasing
Germany	1999	Individual dismissals	Increasing
Germany	2003	Individual and Collective dismissals /Severance payments/Temporary work	Decreasing
Greece	2000	Collective dismissals	Decreasing
Greece	2003	Individual dismissals/Severance payments/Fixed-term contracts	Decreasing
Greece	2010	Collective dismissals	Increasing
Italy	1998	Individual dismissals/Temporary work/Fixed-term contracts	Decreasing
Japan	-	-	-
Netherlands	1997	Individual dismissals	Decreasing
Netherlands	1999	Individual dismissals/Trial period/Notice period	Decreasing
Norway	-	-	-
Portugal	1996	Individual dismissals/Temporary work/Fixed-term contracts	Increasing
Portugal	2008	Individual dismissals/Trial period	Decreasing
Portugal	2012	Fixed-term contracts	Decreasing
Spain	1995	Individual dismissals	Decreasing
Spain	2002	Severance payments	Decreasing
Spain	2006	Fixed-term contracts/Severance payments	Increasing
Spain	2007	Collective dismissals	Increasing
Spain	2012	Individual and Collective dismissals	Decreasing
Sweden	1995	Temporary work/Collective dismissals	Increasing
Sweden	1996	Individual dismissals	Decreasing
Sweden	1997	Individual dismissals/Notice period/Fixed-term contracts	Decreasing
Sweden	2000	Collective dismissals	Decreasing
Sweden	2001	Labor disputes	Decreasing
Sweden	2006	Individual dismissals	Increasing
Sweden	2007	Individual dismissals/Notice period/Temporary work	Increasing
Sweden	2008	Fixed-term contracts	Decreasing
Switzerland	-	-	-

United Kingdom	1995	Temporary work/Collective dismissals	Increasing
United Kingdom	1996	Notice period/Individual dismissals	Decreasing
United Kingdom	1999	Individual and Collective dismissals	Increasing
United Kingdom	2001	Individual dismissals	Decreasing
United Kingdom	2002	Individual dismissals/Fixed-term contracts	Increasing
United Kingdom	2004	Individual dismissals	Increasing
United Kingdom	2006	Individual and Collective dismissals	Increasing
United States	-	-	-

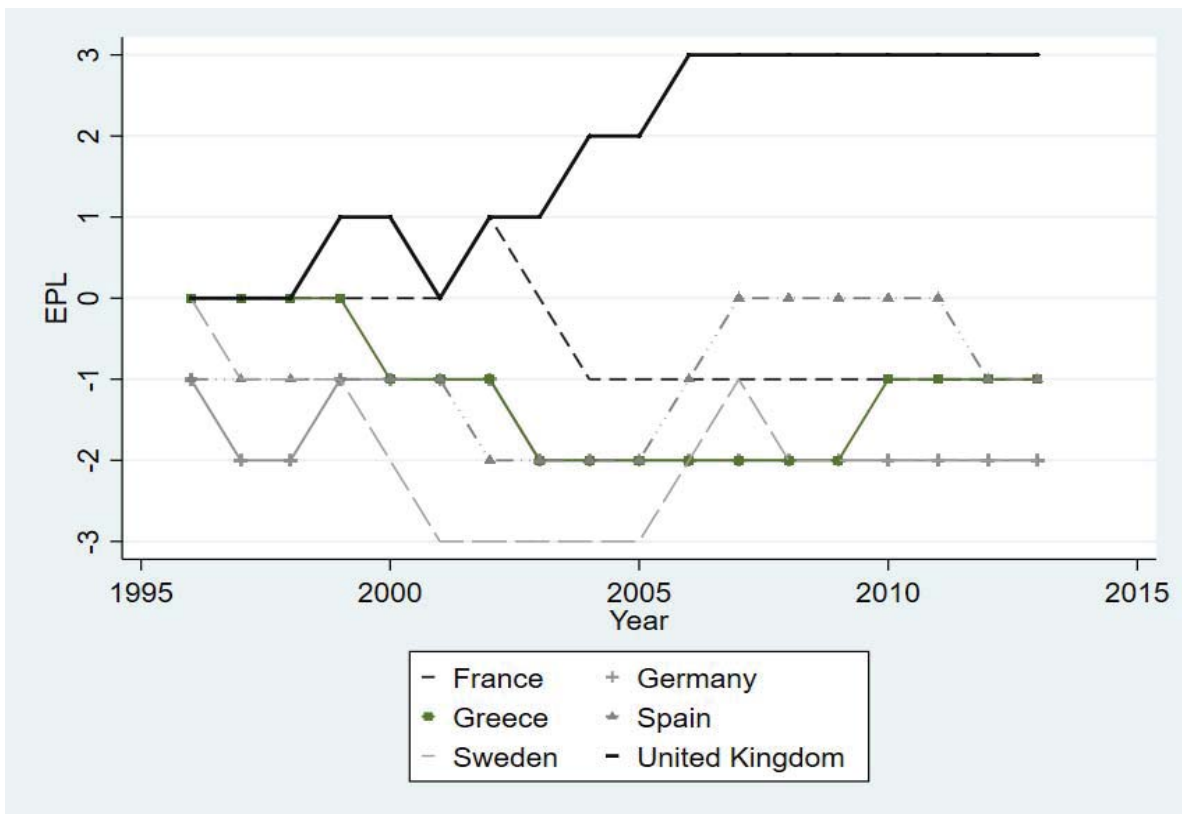
Changes in employment protection occurred in almost all countries and were staggered over time, allowing each country to be in both treatment and control group at different points in time. This further alleviates the concerns that unobservable differences across countries could be driving the results. More importantly, these changes do not cluster around a certain year and/or country. Most countries enacted labor market reforms more than once during the sample period, but only a few experienced one reform (i.e., Belgium, Denmark, and Italy). More specifically, sixteen reforms tightened employment protection, whereas twenty-eight reforms decreased employees' protection. Moreover, Canada, Japan, Norway, Switzerland, and United States did not enact any EPL reform. Consequently, these countries always appear in the control group.

To assess the effect of changes in employment protection, I employ the so-called method of the “hierarchies of the hierarchies” and compute an overall EPL indicator that captures variation in employment protection within a country over time (e.g., Garibaldi 2006). The treatment indicator $EPL_{k,t}$ is specified recursively starting one year before the sample period ($EPL_{k,1995} = 0$). For any given country k in year t , $EPL_{k,t}$ adds the value of 1 (if employment protection went up in country k in year t), or -1 (if employment protection went down in country k in year t),

and 0 otherwise. In subsequent years, the prior year's value stays constant if a country did not experience any EPL reform in that year ($EPL_{k,t} = EPL_{k,t-1}$). Figure 2.1 displays the evolution of employment protection legislation for the six countries in my sample with the largest within-country variation in the EPL indicator. Finally, to test the validity of my measure and the robustness of the main findings, I also use the EPL indicator compiled by the OECD and extended by Allard (2005).¹¹ As opposed to my discrete indicator, the OECD EPL is a continuous measure ranging between zero and six with higher scores indicating greater employment protection.

Figure 2.1: Employment Protection Legislation – High variation countries

This figure shows employment protection legislation for the six countries in my sample with the largest within-country variation in the EPL indicator over the 1996-2013.



¹¹ In the analysis, I construct the OECD EPL as an equally weighted average of the two main sub-indexes capturing the strictness of employment protection for regular and temporary workers. (Available at <http://www.oecd.org/els/emp/oecdindicatorsofemploymentprotection.htm>).

2.3.2 Firm-level data

The main data source is Compustat Global for firms incorporated and headquartered in a certain country k in year t , with non-missing data for the main variables of interest for the 1996-2013 period. In addition, I augment the data with U.S. and Canadian firms from Compustat North America. I also rely on Datastream to retrieve a firm's market capitalization. I further obtain data on country-level economic variables from World Bank and IMF, whereas the data on country-political and labor institutions are from the United Nations University and OECD, respectively.

I exclude utility firms (SIC codes 4900-4999), and financial firms (SIC codes 6000-6999). I further exclude firms whose headquarter country is different from the country of incorporation and firms with negative equity. In line with prior literature on tax avoidance (e.g., Dyreng et al. 2008), I require non-missing data for all the control variables. These restrictions result in a sample size of 11,028 (10,128) unique firms and 71,362 (65,760) observations, depending on the dependent variable used in the analyses.

2.3.3 Baseline Regression

To test for the effect of employment protection legislation on firms' tax avoidance, I adopt a difference-in-differences research design and estimate the following panel regression model:

$$\begin{aligned}
GAAP\ ETR_{i,t} = & \alpha_0 + \beta_1 EPL_{k,t} + \beta_2 Size_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 Accruals_{i,t} \\
& + \beta_5 MtB_{i,t} + \beta_6 Dividend_{i,t} + \beta_7 R\&D_{i,t} + \beta_8 Capex_{i,t} + \beta_9 Employees_{i,t} \\
& + \beta_{10} Intangibles_{i,t} + \beta_{11} ROA_{i,t} + \beta_{12} ROA\ Vol_{i,t} + \beta_{13} Cash\ Flow_{i,t} \\
& + \beta_{14} Loss_{i,t} + \beta_{15} Corporate\ Tax\ Rate_{k,t} + \beta_{16} GDP\ Growth_{k,t} \\
& + \beta_{17} GDP\ per\ capita_{k,t} + \beta_{18} Inflation_{k,t} + \beta_{19} Recession_{k,t} \\
& + \beta_{20} Unemployment\ Rate_{k,t} + \beta_{21} Population_{k,t} + \beta_{22} Gini_{k,t} \\
& + \beta_{23} Left - wing\ Government_{k,t} + \beta_{24} Rule\ of\ Law_{k,t} \\
& + \beta_{25} Union\ Density_{k,t} + v_i + \eta_j * \omega_t + \varepsilon_{k,j,t}
\end{aligned} \tag{1}$$

where *GAAP ETR* is the dependent variable. I use a three-year *GAAP ETR* as an alternative dependent variable proxying for tax avoidance over a longer period of time (Dyreng et al. 2008). Ideally, one would also like to have the actual corporate income taxes paid in the numerator to approximate the extent of a firm's tax avoidance. With the noteworthy exception of the United States, unfortunately the sample countries do not mandate firms to disclose the taxes paid during a certain year in their financial statements. Thus, to overcome potential measurement errors when using accrual-based measures, I refer to Markle and Shackelford (2012) and Blackburne and Blouin (2016) and document the robustness of the main findings to using the *CURRENT ETR*, an adjusted version of the *GAAP ETR*, and two total book-tax difference measures in Section 2.5. I define *GAAP ETR* as income taxes dividend by pre-tax income less special items, whereas the three-year *GAAP ETR* is the sum of income taxes during $t-1$ and $t+1$ divided by the sum of pre-tax income less special items over the same period. In line with prior literature (Dyreng et al. 2017a), I winsorize the *GAAP ETR* at zero and one and additionally test the robustness of the results to truncating the winsorized observations.

With regard to control variables, I include the $EPL_{k,t}$ indicator as defined above. Consistent with greater employment protection leading firms to engage in more tax avoidance, I expect firms in countries with higher EPL scores to have lower ETRs ($\beta_1 < 0$). Moreover, I follow prior studies on the determinants of tax avoidance and include several firm-level variables usually correlated with a firm's tax avoidance decisions (e.g., Rego 2003; Graham and Tucker 2006; Richardson and Lanis 2007; Armstrong et al. 2012; Chyz et al. 2013). Namely, I control for *Size*, defined as the natural logarithm of the firm's total assets; *Leverage*, defined as the total debt scaled by lagged total assets; *Accruals*, defined as the sum of the change in net non-cash working capital, the change in net noncurrent operating assets, and the change in net financial assets (Richardson et al. 2005; Atwood et al. 2012); the firm's market-to-book-ratio (*MtB*), defined as common shares outstanding multiplied by the stock price at the fiscal year-end divided by total common equity. I also add several profitability proxies: *ROA*, defined as the firm's pre-tax income scaled by lagged total assets; *ROA Vol*, defined as the three-year volatility of *ROA* (from $t-2$ to t); *Cash flow*, defined as the firm's earnings before interest, taxes, depreciation, and amortization (EBITDA) scaled by lagged total assets. Moreover, I control for the ratio of research and development to lagged total assets (*R&D*), the ratio of capital expenditure to lagged property, plant, and equipment (*Capex*), the ratio of intangible assets to lagged total assets (*Intangibles*), and the natural logarithm of the number of employees (*Employees*).¹² Finally, I include dummy variables whether the firm pays dividends (*Dividend*) and has a loss (*Loss*).¹³

¹² Following the approach by Louis and Urcan (2017), I use the average industry-year (3 digit-SIC code) when the number of employees is missing for a firm.

¹³ In Table B.4 of the Appendix B, I also show that the results are not sensitive to excluding loss-making firms from the sample.

Furthermore, I add several country-level determinants of employment protection to ensure that political and economic conditions do not spuriously drive the results. In line with Botero et al. (2004), who suggest that economic development is one of the most important determinants of labor laws, I control for the natural logarithm of GDP per capita (*GDP per capita*). I also include the annual percentage growth rate of GDP (*GDP Growth*), the inflation rate (*Inflation*), and an indicator variable (*Recession*) capturing business cycles which takes the value of one if a country k in year t has two consecutive quarters of negative GDP growth. Moreover, I control for the Gini index (*Gini*) because greater employment protection likely emerges in countries with higher income inequality (Perotti and Von Thadden 2006). To account for changes in corporate income tax that could affect tax avoidance, I also include the *Corporate Tax Rate* (e.g., Faccio and Xu 2015). As proxies for labor market features, I add the *Unemployment Rate*, the natural logarithm of the number of people living in a country (*Population*), as well as *Union Density* to control for employees' bargaining power (Saint-Paul 2002). Also, I include a dummy variable (*Left-wing Government*) taking the value of one if a left-wing government is in power and a proxy for the country level of enforcement (*Rule of Law*). Finally, I winsorize all the non-indicator variables, except country-level variables, at the 1st and 99th percentiles.¹⁴

All models include firm-fixed effects (v_i) and industry-year fixed effects defined at the 2-digit SIC level ($\eta_j * \omega_t$). As in previous tax avoidance studies (e.g., Dyreng et al. 2010), the firm-fixed effects control for time-invariant omitted firm characteristics that could correlate with a firm's tax avoidance strategy (e.g., Desai and Dharmapala 2006 on the agency costs of tax avoidance). In addition, the industry-year fixed effects absorb transitory industry shocks

¹⁴ Appendix A also provides an overview of variables definitions.

that could contemporaneously affect firms' tax avoidance as well as the likelihood for a country to enact employment protection laws in a given year. I correct standard errors for clustering at the country-industry 2-digit SIC level.¹⁵ This clustering method accounts for autocorrelation of residuals within a firm and across firms within the same country-industry.

2.3.4 Summary Statistics

Table 2.2 presents summary statistics for the main variables. On average, the sample firms have a *GAAP ETR* of 31.80% and a three-year *GAAP ETR* of 32.80%. Further, the mean value of the EPL indicator is negative (-0.068), whereas the (lowest) highest EPL score is equal to (-3) 3. On the contrary, the OECD EPL ranges between 0.255 and 3.980 with a mean value of 0.885.

The average firm has log of total assets (*Size*) of 6.851 and a market-to-book-ratio (*MtB*) of 2.269. Moreover, the average firm has a total debt-to-assets ratio of 21.4%, has capital expenditures of 29% of property, plant, and equipment, spends about 2.3% of total assets in R&D, and has an EBITDA-to-assets ratio (*Cash flow*) of 15.6%. In addition, about 67.3% of firms pay dividends and only 4% of sample firms have a loss. Furthermore, about 14.5% of total assets are intangibles.

The average corporate tax rate among the sample countries amounts to 37.3%. On average, the countries have a GDP Growth of 2.2%, an inflation rate of 1.6%, and an unemployment rate of 6%. Further, about 12.4% of countries have experienced a recession over the sample years

¹⁵ In the Appendix B, I further test the robustness of the results to different clustering methods. In particular, in Table B.2, I correct standard errors for clustering at the country-industry level and narrowing down the counterfactual to the 48 Fama-French industries. In addition, in Table B.3, I document unchanged results when employing the most conservative clustering method (i.e., at the country-level).

and about 48.8% of countries have a left-wing government in power. As for the income inequality measure, the average country has a Gini Index of 37.3%, with the (lowest) highest score being equal to (21.6) 43.3%. Finally, about 21.1% of the work force is affiliated to trade unions.

Table 2.2: Summary Statistics

This table reports summary statistics for the main variables in the regression models. The sample consists of Compustat North America and Compustat Global industrial firms (excluding financials and utilities) over the 1996 to 2013 period and includes 71,362 (65,760) firm-year observations when using *GAAP ETR* (*GAAP ETR 3*) as the dependent variable. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Appendix A provides variable definitions.

Variables	Obs.	Mean	Std. Dev.	Min.	Max
Dependent Variables					
GAAP ETR	71,362	0.318	0.188	0	1
GAAP ETR 3	65,760	0.328	0.192	0	1
EPL Indicators					
EPL	71,362	-0.068	0.916	-3	3
EPL (OECD Index)	71,362	0.885	0.761	0.255	3.980
Firm-level Controls					
Size	71,362	6.851	2.720	-0.289	14.413
Leverage	71,362	0.214	0.205	0.000	1.252
Accruals	71,362	-0.001	0.127	-0.586	0.591
MtB	71,362	2.269	3.069	0.000	33.569
Dividend	71,362	0.673	0.469	0	1
R&D	71,362	0.023	0.051	0.000	0.547
Capex	71,362	0.290	0.422	0.000	5.661
Employees	71,362	0.704	1.805	-5.521	4.418
Intangibles	71,362	0.145	0.210	0.000	1.191
ROA	71,362	0.099	0.098	-1.441	0.515
ROA Vol	71,362	0.055	0.079	0.002	0.970
Cash Flow	71,362	0.156	0.101	-1.249	0.582
Loss	71,362	0.040	0.195	0	1
Country-level Controls					
Corporate Tax Rate	71,362	0.373	0.056	0.200	0.578
GDP Growth	71,362	0.022	0.021	-0.089	0.066
GDP per capita	71,362	10.535	0.181	9.357	11.124
Inflation	71,362	0.016	0.015	-0.054	0.157
Recession	71,362	0.124	0.330	0	1
Unemployment Rate	71,362	0.060	0.021	0.019	0.275
Population	71,362	18.488	1.172	15.293	19.573
Gini	71,362	0.372	0.049	0.216	0.433
Left-wing Government	71,362	0.488	0.500	0	1
Rule of Law	71,362	1.541	0.208	0.350	2.000
Union Density	71,362	0.211	0.142	0.075	0.827

2.4 Empirical Results

2.4.1 Baseline Results

I first investigate whether greater employment protection affects firms' corporate tax avoidance, measured by the *GAAP ETR*. Table 2.3 reports the regression results from estimating Eq. (1). Column (1) includes the EPL indicator, country-level variables, as well as firm, and industry-year fixed effects. The coefficient of EPL is negative and statistically different from zero at the 1% level. In terms of economic significance, one unit increase in the EPL indicator reduces the *GAAP ETR* of 1.3%. Given that the sample mean of the *GAAP ETR* is 31.80%, this result corresponds to a reduction in the effective tax rate of 4.10% ($=0.013/0.318$).

Column (2) further controls for firm-level variables. The findings are the same to those in column (1). Moreover, the coefficients of the control variables are mostly in line with prior tax avoidance literature. More specifically, I find that larger firms exhibit higher *GAAP ETR* in line with the political view of the firm (Zimmerman 1983). The coefficients of *Accruals*, *Dividend*, and *R&D* are negative and mostly significant (e.g., Richardson and Lanis 2007). Further, loss-making firms show lower ETRs (e.g., Erickson et al. 2013; De Simone et al. 2017), whereas firms in high-tax countries and those operating in countries with a left-wing government in power appear to have higher effective tax rates. In line with Chyz et al. (2013), labor unions seem to prevent firms from engaging in tax avoidance. It is also worth pointing out that, the coefficient of interest (i.e., the EPL indicator) is identical across the two specifications in columns (1) and (2). Consistent with previous studies (Simintzi et al. 2015), I interpret this result as an indication that changes in EPL do not systematically correlate with firm-level variables; therefore, these laws should be considered random from a firm standpoint. Finally, to mitigate concerns that the results could be driven by the overrepresentation of the United

States (about 45% of the sample firms), column (3) excludes the U.S. from the analysis. Nevertheless, the EPL indicator is still negative and statistically significant at the 1% level.

Next, I test whether an increase in employment protection legislation affects firms' tax avoidance over a longer period by substituting the dependent variable with the three-year *GAAP ETR*. Following the previous analyses, column (4) includes the EPL indicator, country-level variables, as well as firm, and industry-year fixed effects. The coefficient of EPL is consistently negative and statistically different from zero at the 1% level, with an economic magnitude of 1.6% or 4.88% relative to the sample mean ($=0.016/0.328$). Column (5) additionally controls for firm-level variables. The findings resemble those in column (4). Moreover, the coefficients of the control variables are mostly in line with all previous specifications. Finally, in column (6) I repeat the analysis while excluding the United States from the sample and find that the EPL indicator is still negative and statistically significant at the 1% level. Collectively, the results across all specifications are consistent with greater employment protection leading firms to reduce effective tax rates between 1.3% and 1.6%.

Table 2.3: Employment Protection and Tax Avoidance

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. Columns (3) and (6) exclude the USA from the sample. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0130*** (-6.150)	-0.0131*** (-6.256)	-0.0118*** (-5.424)	-0.0160*** (-6.214)	-0.0162*** (-6.327)	-0.0133*** (-5.149)
Size		0.00831*** (3.817)	0.00300 (1.222)		0.00648*** (2.922)	0.00120 (0.481)
Leverage		0.0169*** (2.901)	0.0275*** (3.211)		0.0342*** (3.898)	0.0540*** (4.825)
Accruals		-0.0258*** (-4.306)	-0.0162** (-2.128)		-0.00561 (-1.108)	0.00554 (0.831)
MtB		0.000757* (1.856)	0.00153*** (2.677)		0.000961** (2.182)	0.00103* (1.703)
Dividend		-0.0116** (-2.053)	-0.0388*** (-3.685)		-0.00482 (-0.821)	-0.0213** (-2.122)
R&D		-0.0673 (-0.860)	-0.184*** (-2.792)		-0.0991** (-2.127)	-0.139* (-1.894)
Capex		0.00732*** (3.114)	0.00646** (2.012)		0.00470** (2.012)	-0.000382 (-0.142)
Employees		0.00432*** (3.482)	0.00320** (2.208)		0.00386*** (2.780)	0.00333** (2.221)
Intangibles		0.0147 (1.402)	0.0109 (1.004)		0.00890 (0.951)	-0.00564 (-0.433)
ROA		0.348*** (6.767)	0.0101 (0.206)		0.270*** (10.30)	0.124*** (4.207)
ROA Vol		-0.0884*** (-5.060)	-0.0479* (-1.948)		-0.0773*** (-4.024)	-0.0451 (-1.583)

Cash Flow	-0.353***	-0.195***	-0.256***	-0.213***
Loss	(-8.375)	(-5.539)	(-9.870)	(-6.802)
	-0.0756***	-0.0694***	0.0579***	0.0920***
	(-6.099)	(-5.097)	(7.373)	(7.712)
Corporate Tax Rate	0.296***	0.264***	0.291***	0.189***
	(5.293)	(4.554)	(4.602)	(3.382)
GDP Growth	-0.446***	-0.549***	-0.0960	-0.141
	(-5.105)	(-5.108)	(-1.144)	(-1.471)
GDP per capita	0.0750***	0.0769***	0.0400	0.0336
	(3.012)	(3.223)	(1.606)	(1.429)
Inflation	0.255***	0.0244	0.312***	0.177**
	(3.032)	(0.309)	(3.875)	(2.325)
Recession	0.0194***	0.0190***	0.0174***	0.0192***
	(3.864)	(3.506)	(4.772)	(4.777)
Unemployment Rate	-0.149	-0.163	-0.262***	-0.220*
	(-1.608)	(-1.585)	(-2.645)	(-1.795)
Population	-0.0414	-0.0823	-0.0554	-0.153
	(-0.565)	(-0.967)	(-0.477)	(-1.519)
Gini	-0.0886***	-0.0142	-0.110***	-0.0572
	(-2.642)	(-0.347)	(-3.869)	(-1.557)
Left-wing Government	0.00749***	0.0103***	0.00726***	0.0169***
	(3.346)	(2.955)	(3.069)	(4.651)
Rule of Law	-0.0101	0.0127	-0.00463	0.0323
	(-0.588)	(0.630)	(-0.246)	(1.500)
Union Density	0.116	0.0938	0.304***	0.103
	(1.314)	(0.972)	(3.184)	(1.016)
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
#Observations	71,362	39,206	65,760	37,038
Adjusted-R ²	0.343	0.403	0.433	0.519

2.4.2 *Econometric concerns*

2.4.2.1 *The timing of changes in Tax Avoidance*

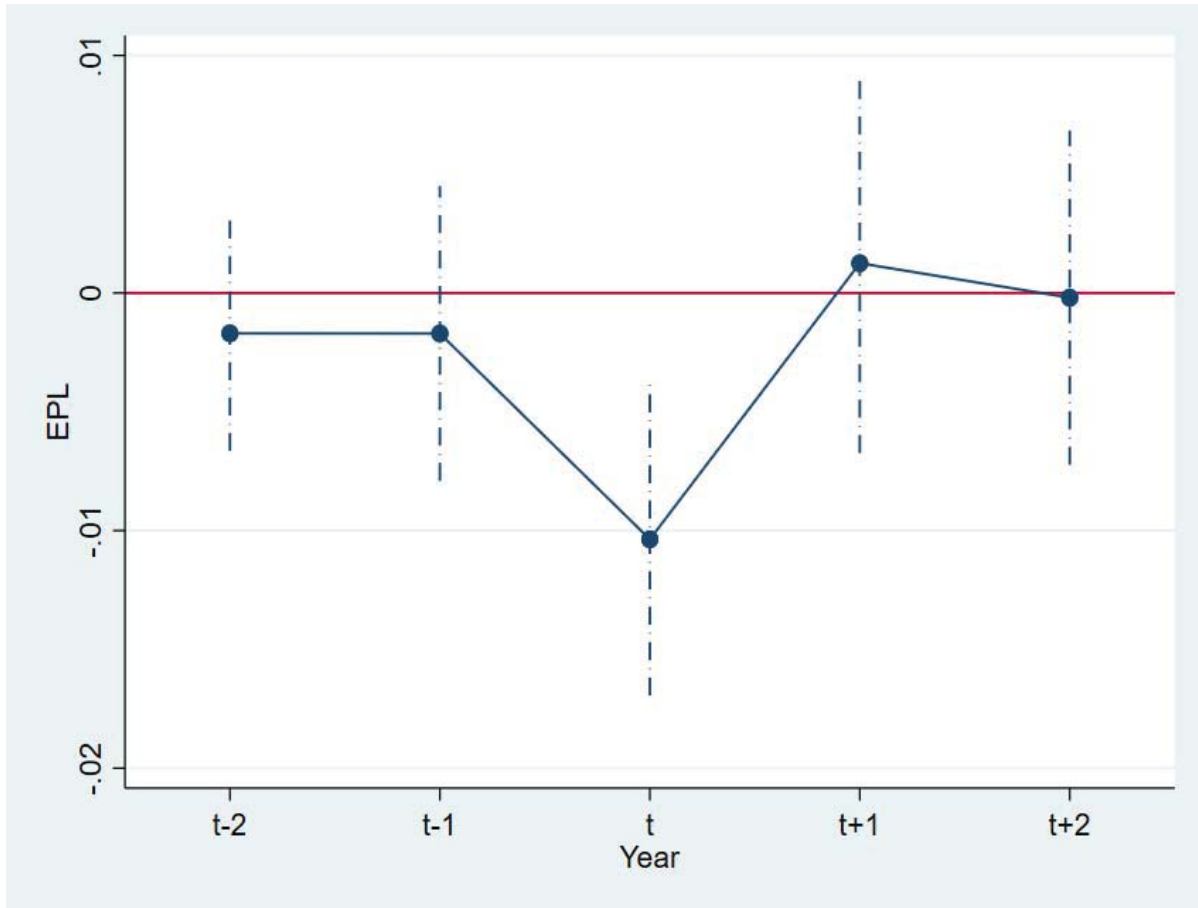
The causal interpretation of the results presented in Table 2.3 rests on the parallel trends assumption: absent changes in employment protection, the average change in tax avoidance for both treatment and control firms would have been the same. However, if a pretreatment trend existed before the adoption of EPL, the findings would cast doubt on the validity of employing a difference-in-differences research design. Thus, to evaluate whether there exists a pretreatment trend, I examine the dynamics of tax avoidance around the passage of these reforms in Table 2.4 and estimate Eq. (1) while additionally including two-year leads and lags of the EPL indicator. More specifically, the EPL_{kt+2} proxies for the 2-year forward value of EPL, whereas the EPL_{kt+1} corresponds to the 1-year forward value of EPL. The two-year leads coefficients control for potential pretreatment trends and/or reverse causality. In a similar way, I add the two-year lagged values of EPL (EPL_{kt-2} ; EPL_{kt-1}), which assess whether firms delay the tax avoidance response to changes in employment protection. Moreover, the estimation equation always controls for the current value of EPL (EPL_{kt}).

Columns (1) and (2) include the EPL indicators, country-level variables, as well as firm, and industry-year fixed effects. In the two specifications, I find that the estimated lead and lag coefficients are economically and statistically insignificant, whereas the contemporaneous value of EPL is statistically significant at the 1% level, with an economic magnitude close to the main results (i.e., following an increase in employment protection the *GAAP ETR* decreases by 1% or 3.3% relative to the sample mean). Figure 2 further corroborates graphically these results. It plots the within-firm variation in the *GAAP ETR*, as a function of changes in

employment protection legislation in years $t-2$ to $t+2$, country-level variables, as well as firm, and industry-year fixed effects and it shows that no significant pre-trend exists in the sample.

Figure 2.2: GAAP ETR around Employment Protection Legislation changes

This figure plots the within-firm variation in the GAAP ETR, as a function of changes in employment protection legislation in years $t-2$ to $t+2$, country-level variables, as well as firm, and industry-year fixed effects across 19 OECD countries over the 1996-2013. The dashed dotted line indicates the 95% confidence interval.



Finally, columns (3) and (4) of Table 2.4 additionally control for the effect of firm-level variables on the EPL coefficients. The results resemble those in columns (1) and (2). Overall, these findings address concerns related to pretreatment trends or reverse causation and support the causal interpretation of the main findings in Table 2.3.

Table 2.4: Employment Protection and Tax Avoidance – Dynamic Analysis

This table reports the results of regressions of tax avoidance on the two-year lagged, one-year lagged, the contemporaneous and the one-year and two-year forward values of the EPL indicator (*EPL*). The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* as the dependent variable in all specifications. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			
	(1)	(2)	(3)	(4)
EPL_{kt+2}		-0.0002 (-0.0547)		-0.0002 (-0.0616)
EPL_{kt+1}	-0.0007 (-0.208)	0.0013 (0.308)	-0.0009 (-0.293)	0.0007 (0.170)
EPL_{kt}	-0.0092*** (-2.978)	-0.0104*** (-3.094)	-0.0087*** (-2.724)	-0.0094*** (-2.684)
EPL_{kt-1}	-0.0028 (-0.913)	-0.0017 (-0.539)	-0.0046 (-1.471)	-0.0037 (-1.146)
EPL_{kt-2}	-0.0008 (-0.339)	-0.0017 (-0.674)	0.0001 (0.0566)	-0.0008 (-0.333)
Firm-level controls	-	-	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
#Observations	62,139	56,194	62,139	56,194
Adjusted-R ²	0.352	0.355	0.372	0.375

2.4.2.2 *The effect of unobserved time-invariant firm characteristics*

To further sharpen the analysis and remove omitted time-invariant firm characteristics which could affect a firm's tax avoidance, I follow Heider and Ljungqvist (2015) and Ljungqvist and Smolyansky (2016) and conduct a regression in first-differences of the change in EPL on the change in firm-level tax avoidance. Despite conceptually being similar to the main specification with firm-fixed effects,¹⁶ this empirical approach can also better accommodate repeated treatments (i.e., firms experiencing several employment protection reforms over time), and treatment reversals (i.e., increases in employment protection followed by decreases in employment protection at a later point in time).

Table 2.5 presents the results from estimating Eq. (1) in first-differences. Column (1) includes the EPL indicator, country-level variables, and industry-year fixed effects. In line with the previous analyses, the estimated EPL coefficient is statistically significant at the 1% level, with an economic magnitude slightly below the main results of Table 3 (i.e., one unit increase in the EPL indicator corresponds to a reduction in the effective tax rate of about 0.9% or 2.83% relative to the sample mean of the *GAAP ETR*). Column (2) further controls for observable firm-level variables. The results are similar to those presented in column (1), albeit now statistically significant at the 5% level. Overall, these analyses indicate that the results are not driven by unobserved time-invariant firm characteristics and/or do not depend on the model specification.

¹⁶ For a more detailed discussion on the differences and similarities of estimating equations with firm-fixed effects and in first-differences, see Angrist and Pischke (2009).

Table 2.5: Employment Protection and Tax Avoidance – First Difference Estimation

This table reports the results of the first difference regression of the change in employment protection legislation (*EPL*) on the change in firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use the change in *GAAP ETR* as the dependent variable in all specifications. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS in first-differences with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	Δ GAAP ETR	
	(1)	(2)
EPL	-0.0088*** (-2.738)	-0.0079** (-2.529)
Change in Firm-level controls	-	✓
Change in Country-level controls	✓	✓
Firm FE	-	-
Industry-Year FE	✓	✓
#Observations	47,815	47,815
Adjusted-R ²	0.003	0.057

2.4.2.3 Robustness to controlling for country trends and extended fixed effects, and to excluding recession years

The results so far indicate that greater employment protection lead firms to increase tax avoidance. All the analyses control for several observable political and economic country-level determinants of employment protection (e.g., Botero et al. 2004; Pagano and Volpin 2005; Perotti and Von Thadden 2006). However, to ensure that the observed effect is not driven by omitted time-varying country-level variables, I follow previous literature (e.g., Simintzi et al. 2015; Louis and Hurcan 2017; Jacob et al. 2017) and conduct a series of robustness tests.

First, in panel A of Table 2.6, I augment Eq. (1) with country-specific time trends to allow countries to follow different trends in tax avoidance. In particular, I create a trend variable, which is equal to the current year – 1995 (i.e. one year before the sample period), and interact it with a dummy variable for each sample country. This way, the identification of the effect of changes in employment protection on firms' tax avoidance stems from deviations from pretreatment country-specific trends in tax avoidance. Across all specifications (columns (1)-(2) and (4)-(5)), the results remain statistically significant at the 1% (5% or 10%) level when using the (three-year) *GAAP ETR* as the dependent variable, despite a slightly lower economic magnitude.

Second, I rerun Eq. (1) and additionally include a set of time-varying fixed effects to absorb common economic shocks among neighboring countries that could also spuriously drive the results. Namely, I define fourteen regions consisting of countries sharing the border. This empirical approach further narrows down the counterfactuals to firms from bordering countries (e.g., Belgium, France, Germany, and The Netherlands is one region). Columns (3) and (6) in panel A of Table 2.6 present the results. As expected, the EPL indicator is still negative and

statistically significant at the 10% level (1% level) when using the (three-year) *GAAP ETR* as the dependent variable.

Third, I examine the economic and political conditions around the adoption of employment protection laws. Namely, I investigate whether country-level variables systematically affect the likelihood of passing employment protection legislation, since political economy considerations could make countries more likely to increase (decrease) employment protection when the economy is experiencing upturns (downturns). Thus, I estimate a linear probability model including all the economic predictors used in the regression analyses along with country and year-fixed effects.¹⁷ All country-level variables are measured in the year before the EPL comes into effect.

Table B.1 presents the results. Out of a large set of political and economic determinants, almost none of them correlate with EPLs' adoption. However, decreases in employment protection appear to come into force after recession years and in high-unionized countries. Therefore, to reduce identification concerns, I proceed in two ways. In panel B of Table 2.6, I narrow down the counterfactuals to firms from countries with similar GDP growth and level of union density. I find that the coefficient of interest (i.e., the EPL indicator) is statistically significant at the 1% level across all specifications. Moreover, I also note that the findings remain economically significant and in line with the baseline results (i.e., one unit increase in the EPL indicator decreases the *GAAP ETR* by 1.3% or 4.08% relative to the sample mean). Furthermore, in panel C of Table 2.6, I exclude changes in employment protection that occur

¹⁷ In particular, I add the natural logarithm of GDP per capita, the GDP growth rate, the inflation rate, an indicator variable for recession years, the Gini index, the corporate tax rate, the unemployment rate, the number of people living in the country (population), as well as union density, enforcement (rule of law) and political party in power (left-wing government).

during and in the two years after a recession. Nevertheless, the results are still statistically significant at the 1% and 5% levels across all specifications.

Table 2.6: Employment Protection and Tax Avoidance – Country Trends, Extended Fixed Effects, and No Recession Years

This table reports the robustness results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. In Panel A, columns (1) to (2) ((4) to (5)) allow each country to have different trends in tax avoidance. The time trend variable is the interaction term between the current year minus 1995 and an indicator variable for each country. Columns (3) and (6) control for time-varying neighborhood-fixed effects, following Simintzi et al. (2015), Louis and Urcan (2017). I define 14 neighboring regions, where each group consists of countries sharing the border. In Panel B, all specifications control for time-varying cluster fixed effects. Countries are clustered following similar GDP growth paths and union density. Columns (3) and (6) exclude the USA from the sample. In Panel C, all specifications exclude changes in employment protection that occur during and in the subsequent two years after a recession. Columns (3) and (6) exclude the USA from the sample. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Panel A:	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0086*** (-2.770)	-0.0103*** (-3.315)	-0.0062* (-1.767)	-0.0056* (-1.816)	-0.0071** (-2.251)	-0.0126*** (-3.332)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Country-Trends	✓	✓	-	✓	✓	-
Neighborhood-Year FE	-	-	✓	-	-	✓
#Observations	71,362	71,362	71,362	65,760	65,760	65,760
Adjusted-R ²	0.344	0.365	0.367	0.435	0.443	0.443

Panel B:	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0107*** (-3.167)	-0.0139*** (-4.045)	-0.0150*** (-5.003)	-0.0127*** (-3.524)	-0.0147*** (-4.073)	-0.0150*** (-4.482)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
GDP Growth-Union	✓	✓	✓	✓	✓	✓
Density-Cluster-Year FE	-	-	-	-	-	-
#Observations	71,362	71,362	39,206	65,760	65,760	37,038
Adjusted-R ²	0.345	0.367	0.407	0.436	0.444	0.523

Table 2.6: Employment Protection and Tax Avoidance – Country Trends, Extended Fixed Effects, and No Recession Years (Continued)

Panel C:	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0085*** (-4.054)	-0.0090*** (-4.191)	-0.0050** (-2.150)	-0.0110*** (-4.365)	-0.0119*** (-4.670)	-0.0070*** (-2.829)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	48,814	48,814	21,870	43,836	43,836	20,165
Adjusted-R ²	0.290	0.325	0.347	0.376	0.382	0.471

2.4.2.4 Entropy balance matching

A further concern with my analysis is that treatment and control firms are intrinsically different in terms of firm and country characteristics alike. To address this concern, in Table 2.7 I employ the entropy balance matching method to pair treatment and control firms within the same industry (2-digit SIC level) based on the full set of firm-level controls as well as country-level controls in the year before the change in employment protection.¹⁸ Columns (1) and (3) include the EPL indicator, country-level variables, as well as firm, and industry-year fixed effects, whereas columns (2) and (4) further control for firm-level variables. Across all specifications, the coefficient of EPL is negative and statistically different from zero at the 1% level. These findings alleviate concerns that intrinsic differences between treated and control groups aside from the change in employment protection are responsible for the observed reduction in the effective tax rates.

¹⁸ More specifically, the control firms are reweighted to satisfy the balance constraints that the 1st moments (means) of the full list of firm, and country-level variables match the corresponding moments of the treatment firms (for a discussion on the entropy balance matching method, see Hainmueller (2012)).

Table 2.7: Employment Protection and Tax Avoidance – Entropy balance matching

This table reports the robustness results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (2)) and *GAAP ETR 3* (columns (3) to (4)) as the dependent variable. I match treated and control firms in the same industry (two-digit SIC code) in the year before the change in EPL using the entropy balance matching. The entropy balance matching includes all firm-level controls and all country-level controls from the baseline regression. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t-statistics* are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR		GAAP ETR 3	
	(1)	(2)	(3)	(4)
EPL	-0.0074*** (-3.034)	-0.0090*** (-3.632)	-0.0112*** (-5.373)	-0.0129*** (-5.953)
Firm-level controls	-	✓	-	✓
Country-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
#Observations	71,362	71,362	65,760	65,760
Adjusted-R ²	0.452	0.462	0.547	0.556

2.4.3 Assessing the Capital Deepening channel

In the next step, I assess whether the theoretical channel, substituting labor with capital, is at work following changes in EPL. This theoretical channel predicts that greater employment protection induces firms to substitute human capital with relatively cheaper physical capital on the margin. Thus, I examine the effect of EPL on the change in employment and investment using the following estimation equation:

$$\begin{aligned} \text{Change in Employment}_{i,t} = & \alpha_0 + \beta_1 \text{EPL}_{k,t} + \text{Firm - level Controls}_{i,t} \\ & + \text{Country - level Controls}_{k,t} + v_i + \eta_j * \omega_t + \varepsilon_{k,j,t} \end{aligned} \quad (2)$$

where *Change in Employment* is the dependent variable. I define *Change in Employment* as the one-year percentage change in a firm's number of employees. In addition, I include the $EPL_{k,t}$ indicator as defined above. Consistent with greater employment protection leading firms to substitute labor with capital input on the margin, I expect firms in countries with higher EPL scores to reduce employment ($\beta_1 < 0$) (e.g., Messina and Vallanti 2007). Moreover, I follow the baseline analysis and include the entire set of firm-level and country-level variables,¹⁹ firm-fixed effects (v_i), and industry-year fixed effects defined at the 2-digit SIC level ($\eta_j * \omega_t$). Standard errors are clustered at the country-industry 2-digit SIC level. Column 1 of Table 2.8 presents the results. The coefficient of EPL is negative and statistically significant at the 1% level. In terms of economic significance, one unit increase in the EPL indicator corresponds to an employment reduction of 5.52%.

¹⁹ Contrary to the baseline regression, I do not control for the number of employees in the right-hand side of the equation because the dependent variable is based upon a firm's number of employees.

To further shed light on the capital-deepening channel, I rerun the estimation equation (2) and now use *Capex* as the dependent variable to proxy for the change in investment. I define *Capex* as the capital expenditure divided by lagged property, plant, and equipment. In line with the substitution effect between human capital and physical capital (e.g., Blanchard 1997; Caballero and Hammour 1998; Autor et al. 2007; Koeniger and Leonardi 2007; Cingano et al. 2016), I expect firms in countries with higher employment protection to become more capital intensive ($\beta_1 > 0$). Again, I add all the control variables,²⁰ firm-fixed effects (v_i), and industry-year fixed effects defined at the 2-digit SIC level ($\eta_j * \omega_t$). I correct standard errors for clustering at the country-industry 2-digit SIC level. The results are presented in column (2) of Table 2.8. The EPL indicator is positive and statistically different from zero at the 1% level. In economic terms, I find that greater employment protection (i.e., one unit increase in the EPL indicator) leads firms to increase capital investment by 1.78% relative to their property, plant, and equipment, which translates to a 6.14% ($=0.0178/0.290$) increase in capital expenditure for the average firm in my sample.²¹

Thus, to analyze whether capital deepening increases firms' pre-tax margins following changes in EPL, I refer to Louis and Urcan (2017) and run the following difference-in-differences model:

$$\begin{aligned}
 \text{Gross Margin}_{i,t+1} = & \alpha_0 + \beta_1 \text{EPL}_{k,t} + \text{Firm - level Controls}_{i,t} \\
 & + \text{Country - level Controls}_{k,t} + v_i + \eta_j * \omega_t + \varepsilon_{k,j,t}
 \end{aligned} \tag{3}$$

²⁰ Following the investment literature (e.g. Eberly et al. 2012), I additionally control for the one-year lagged *Capex* in the right-hand side of the estimation equation.

²¹ In untabulated tests, I follow Bai et al. (2017) and additionally use the capital-to-labor ratio as an alternative dependent variable for capital deepening (i.e., the natural logarithm of a firm's property, plant, and equipment scaled by the number of employees). I find that, following a change in employment protection, the capital-to-labor ratio is positive and statistically significant at the 1% level.

where *Gross Margin* is the dependent variable. I use *Gross Profit to Assets Ratio* as an alternative dependent variable proxying for a firm's pre-tax margin. I define *Gross Margin* as sales minus costs of goods sold scaled by sales, whereas *Gross Profit to Assets Ratio* corresponds to gross profit (i.e., sales minus costs of goods sold) divided by average total assets. To the extent that capital deepening increases a firm's pre-tax margin, I expect firms in countries with greater employment protection to experience significant increases in gross margin ($\beta_1 > 0$). As above, I include all the control variables, firm-fixed effects (u_i), and industry-year fixed effects defined at the 2-digit SIC level ($\eta_j * \omega_t$). I cluster standard errors at the country-industry 2-digit SIC level. Column (3) ((4)) of Table 2.8 presents the results when using the *Gross Margin* (*Gross Profit to Assets Ratio*) as the dependent variable. As predicted, the coefficient of EPL is positive and statistically significant at the 1% across the two specifications. The findings are also economically meaningful. Following an increase in employment protection (i.e., one unit increase in the EPL indicator) firms experience increases in *Gross Margin* (*Gross Profit to Assets Ratio*) by 2.39% (3.39%) or 5.83% (7.23%) relative to the sample mean. Taken together, the analyses in this section indicate that the capital-deepening channel is at work.

Table 2.8: Employment Protection and Change in Employment, Investment, and Profit Margin

This table reports the results of the effect of employment protection legislation on firm-level employment, investment, and profit margin. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. The dependent variables in columns (1) to (4) are as follows: *Change in Employment* from $t-1$ to t (column (1)); *Capex* in time t (column (2)); *Gross Margin* in time $t+1$ (column (3)); *Gross Profit to Assets Ratio* in time $t+1$ (Column 4). All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	Change in Employment_t (1)	Capex (2)	Gross Margin_{t+1} (3)	Gross Profit To Assets Ratio_{t+1} (4)
EPL	-0.0552*** (-3.436)	0.0178*** (2.911)	0.0239*** (4.537)	0.0339*** (5.226)
Size	-0.0617*** (-4.167)	-0.000127 (-0.0266)	0.0319*** (9.210)	-0.0423*** (-7.337)
Leverage	0.573*** (8.380)	0.231*** (6.511)	-0.0657*** (-7.865)	-0.103*** (-9.436)
Accruals	-0.0509 (-0.747)	0.134*** (7.066)	-0.00757 (-0.697)	-0.0103** (-2.033)
MtB	0.00235 (0.834)	0.00318* (1.738)	0.000954 (1.456)	0.00352*** (5.244)
Dividend	0.0476 (1.571)	0.00272 (0.305)	0.00224 (0.518)	0.00489 (0.853)
R&D	-1.124** (-1.996)	0.489*** (3.903)	-0.0251 (-0.499)	0.189** (2.566)
Intangibles	0.537*** (7.869)	0.114*** (4.225)	0.00192 (0.212)	-0.0800*** (-6.900)
ROA	-0.343** (-2.200)	0.432*** (5.498)	-0.0923* (-1.798)	-0.151*** (-5.056)
ROA Vol	0.258* (1.836)	0.258*** (3.708)	0.0676* (1.919)	-0.00185 (-0.0859)
Cash Flow	1.036*** (5.080)	0.424*** (4.747)	0.274*** (4.716)	0.509*** (12.49)
Loss	-0.0599* (-1.919)	0.0581*** (7.837)	-0.0152** (-2.139)	-0.0142*** (-3.254)

Corporate Tax Rate	0.122	0.736***	1.065***
	(1.267)	(6.246)	(5.767)
GDP Growth	0.405*	0.330**	0.464**
	(1.894)	(2.245)	(2.444)
GDP per capita	-0.380***	-0.366***	-0.614***
	(-9.010)	(-9.417)	(-9.882)
Inflation	0.124	0.528***	0.718***
	(0.469)	(3.297)	(2.987)
Recession	-0.212***	0.0216***	0.0302***
	(-3.469)	(3.774)	(3.728)
Unemployment Rate	5.049***	-0.584***	-0.786***
	(4.250)	(-3.074)	(-3.019)
Population	-2.568***	0.617***	1.254***
	(-4.873)	(3.715)	(5.377)
Gini	-1.967***	-0.260***	-0.234***
	(-4.784)	(-5.264)	(-3.856)
Left-wing Government	0.151***	0.0210***	0.0207***
	(6.180)	(5.031)	(3.610)
Rule of Law	-0.959***	0.213***	0.244***
	(-3.836)	(5.442)	(4.939)
Union Density	-4.153***	0.689***	1.129***
	(-4.750)	(2.965)	(3.841)
Capex	0.169***	-0.0130**	-0.0119***
	(4.764)	(-2.565)	(-3.345)
Capex _{t-1}		0.0465***	
		(2.725)	
Employees	-0.00561	-0.0255***	-0.0130***
	(-1.449)	(-8.459)	(-4.089)
Firm FE	✓	✓	✓
Industry-Year FE	✓	✓	✓
#Observations	71,348	64,347	64,452
Adjusted-R ²	0.0727	0.712	0.769

2.4.4 Exploiting sources of cross-sectional variation in firm, industry, and country characteristics

2.4.4.1 Cross-sectional variation in Capital Intensity

In the cross-country analysis, a fundamental problem is that changes in EPL and tax avoidance could spuriously correlate with omitted variables. Although I conduct a series of robustness tests in Section 2.4.2 to ensure that unobserved variation in economic and political factors does not drive the results, here I more directly address such econometric concerns by adopting a triple differences research design. This way, I can control for potential omitted time-varying country-level variables while at the same time analyzing three sources of cross-sectional variation in firm, industry, and country characteristics. First, I exploit variation in firm characteristics and examine the effect of EPL on firms' tax avoidance conditional on a firm's capital intensity using the following estimation equation:

$$\begin{aligned} GAAP\ ETR_{i,t} = & \alpha_0 + \beta_1 EPL_{k,t} * Low\ Capital\ Intensity_{i,t-2;t-1} + \beta_2 EPL_{k,t} \\ & + \beta_3 Low\ Capital\ Intensity_{i,t-2;t-1} + Firm - level\ Controls_{i,t} \\ & + Country - level\ Controls_{k,t} + v_i + \eta_j * \omega_t + \delta_k * \omega_t + \varepsilon_{k,j,t} \end{aligned} \quad (4)$$

Eq. (4) is the same as Eq. (1) except that I additionally interact the EPL indicator with a dummy variable indicating which firms are more likely to face higher dismissal costs upon laying-off when employment protection increases.²² In particular, low capital-intensive firms should have more incentives to substitute labor with capital on the margin and consequently avoid more tax when the law comes into force. To proxy for low capital-intensive firms, I first compute the

²² In all cross-sectional analyses, I additionally employ a three-year *GAAP ETR* as an alternative dependent variable.

variable *Capital Intensity* (i.e., property, plant, and equipment divided by lagged total assets) for each firm i in the two years preceding the adoption of EPL. I then create an indicator variable (*Low Capital Intensity*) that is set to one if the value of *Capital Intensity* is below the industry-adjusted median distribution j (3-digit SIC level) in year $t-2$ and $t-1$ and zero otherwise. Thus, I define treatment and control groups based on observable firm characteristics before the EPL is signed into law to prevent changes in employment protection legislation from affecting the probability for a firm to be treated.

Consistent with low capital-intensive firms having more incentives to shift to capital and engage in tax avoidance when employment protection increases, I expect the interaction between the EPL indicator and *Low Capital Intensity* to be negative ($\beta_1 < 0$). In line with the previous analyses, I include all the control variables, firm-fixed effects (v_i), and industry-year fixed effects defined at the 2-digit SIC level ($\eta_j * \omega_t$). Moreover, I include country-year fixed effects ($\delta_k * \omega_t$) which allow me to compare treated firms within the same country and remove time-varying omitted variables that could potentially bias the results. Hence, these cross-sectional results should not be affected by omitted country-level variables. Standard errors are clustered at the country-industry 2-digit SIC level.

Table 2.9 presents the results for this cross-sectional analysis. While firms, on average, still engage in tax avoidance following the change in employment protection (i.e., the EPL indicator remains statistically significant at the 1% level across all specifications), columns (1)-(2) and (4)-(5) show that low-capital intensive firms additionally decrease their (three-year) *GAAP ETR* by 0.5% (0.6%). In support of this result, I also document that the coefficient of EPL and its interaction with the *Low Capital Intensity* indicator are *jointly significant* at the 1% level across

all specifications. Furthermore, the results hold after controlling for country-year fixed effects (columns (3) and (6)).

Table 2.9: Employment Protection and Tax Avoidance - Cross-sectional variation in Capital Intensity

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance, conditional on the firm's capital intensity. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. To proxy for *Low Capital Intensity*, I first compute the variable *Capital Intensity* (i.e., property, plant, and equipment divided by lagged total assets) for each firm *i* in year *t-2* and *t-1*. I then create an indicator variable (*Low Capital Intensity*) that is set to one if the value of *Capital Intensity* is below the industry-adjusted median distribution *j* (three-digit SIC code) in year *t-2* and *t-1* and zero otherwise. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL*Low Capital Intensity	-0.00578** (-2.269)	-0.00523** (-2.069)	-0.00613** (-2.499)	-0.00677** (-2.558)	-0.00662** (-2.549)	-0.00514** (-2.060)
EPL	-0.00985*** (-4.024)	-0.0101*** (-4.297)	-	-0.0124*** (-4.472)	-0.0127*** (-4.601)	-
Low Capital Intensity	-0.00271 (-0.955)	-0.00504 (-1.640)	-0.00515 (-1.644)	-0.00374 (-1.375)	-0.00516* (-1.924)	-0.00525* (-1.958)
<i>Joint Significance</i> (EPL* Low Capital Intensity + EPL)	-0.0156*** (-6.52)	-0.0153*** (-6.32)	-	-0.0191*** (-6.73)	-0.0192*** (-6.80)	-
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Country-Year FE	-	-	✓	-	-	✓
#Observations	71,356	71,356	71,356	65,753	65,753	65,753
Adjusted-R ²	0.343	0.364	0.369	0.433	0.440	0.445

2.4.4.2 Cross-sectional variation in Employment Volatility

In the second cross-sectional test, I focus on which industries are more likely to incur in firing costs when employment protection becomes more binding. More specifically, I estimate the effect of EPL on firms' tax avoidance conditional on an industry's employment volatility using the following estimation equation:

$$\begin{aligned}
 GAAP\ ETR_{i,t} = & \alpha_0 + \beta_1 EPL_{k,t} * High\ Ind.\ Employment\ Vol_{j,t-2;t-1} + \beta_2 EPL_{k,t} & (5) \\
 & + \beta_3 High\ Ind.\ Employment\ Vol_{j,t-2;t-1} + Firm - level\ Controls_{i,t} \\
 & + Country - level\ Controls_{k,t} + v_i + \eta_j * \omega_t + \delta_k * \omega_t + \varepsilon_{k,j,t}
 \end{aligned}$$

Eq. (5) resembles Eq. (4) except that now the EPL indicator is interacted with a dummy variable capturing which industries are more likely to face higher discharge costs following the change in EPL. In particular, firms operating in industries with more volatile employment (i.e., where lay-offs occur more frequently) should have more incentives to shift to capital and engage in tax avoidance when expected dismissal costs increase. Following Serfling's approach (2016), I first compute each firm's employment volatility as the standard deviation of the ratio of the number of employees to property, plant, and equipment over the two years preceding the change in EPL, and average this variable across all firms in the same 3-digit SIC industry (*Ind. Employment Vol*). I then create an indicator variable (*High Ind. Employment Vol*) which takes the value of one if an industry's employment volatility (*Ind. Employment Vol*) is above the sample median and zero otherwise. As above, I define treatment and control groups based on observable industry characteristics before the EPL comes into effect.

In line with firms operating in industries with more volatile employment having more incentives to engage in capital deepening and subsequent tax avoidance, I expect the interaction

between the EPL indicator and *High Ind. Employment Vol* to be negative ($\beta_1 < 0$). Again, I add all the control variables, firm-fixed effects (v_i), and industry-year fixed effects defined at the 2-digit SIC level ($\eta_j * \omega_t$). I also note that the industry-year fixed effects completely absorb the coefficient β_3 (*High Ind. Employment Vol*) given that the variable varies at the industry-year level as well. In addition, I add a set of country-year fixed effects ($\delta_k * \omega_t$) to further benchmark treated firms with control firms in the same country in some specifications. The inclusion of the country-year fixed effects also controls for potential concurrent economic and political factors in a given country and year which could be correlated with changes in EPL and firms' tax avoidance alike. I correct standard errors for clustering at the country-industry 2-digit SIC level.

Table 2.10 presents the results for this cross-sectional analysis. As predicted, I find that firms operating in industries with higher discharge rates increase tax avoidance relatively more the average firm in my sample when it becomes more expensive to dismiss employees. In particular, columns (1)-(2) and (4)-(5) show that these firms additionally reduce their (three-year) *GAAP ETR* by 0.8% (1.1%). Consistent with this argument, I also find the coefficient of EPL and its interaction with the *High Ind. Employment Vol* indicator (β_1) to be *jointly significant* at the 1% level across all specifications. Furthermore, the results are unchanged when including a set of country-year fixed effects (columns (3) and (6)).

Table 2.10: Employment Protection and Tax Avoidance – Cross-sectional variation in Employment Volatility

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance, conditional on the industry's employment volatility. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. To proxy for *High Ind. Employment Vol*, I first compute the mean employment volatility across all firms in the same 3-digit SIC industry (*Ind. Employment Vol*), where employment volatility is the standard deviation of the ratio of the number of employees to property, plant, and equipment over years $t-2$ to $t-1$. I then create an indicator variable (*High Ind. Employment Vol*) that is set to one if the *Ind. Employment Vol* is above the sample median and zero otherwise. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL*High Ind. Employment Vol	-0.00846* (-1.927)	-0.00813** (-1.989)	-0.00856** (-2.165)	-0.0110** (-2.087)	-0.0109** (-2.125)	-0.0110** (-2.392)
EPL	-0.0101*** (-4.179)	-0.0102*** (-4.338)	-	-0.0123*** (-4.485)	-0.0125*** (-4.518)	-
<i>Joint Significance (EPL*High Ind. Employment Vol + EPL)</i>	-0.0185*** (-5.06)	-0.0183*** (-5.26)	-	-0.0232*** (-4.99)	-0.0233*** (-5.17)	-
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Country-Year FE	-	-	✓	-	-	✓
#Observations	71,362	71,362	71,362	65,760	65,760	65,760
Adjusted-R ²	0.343	0.364	0.369	0.433	0.440	0.445

2.4.4.3 Cross-sectional variation in Enforcement

While the first two tests provide evidence on which firms and industries are more likely to be harmed by greater employment protection and shift from labor to capital input on the margin, the last cross-sectional analysis aims at shedding light on the interdependence between labor and tax laws. More specifically, it shows how reforming employment protection in isolation could trigger offsetting adjustments on firms' tax avoidance if not backed by credible enforcement (Carrillo et al. 2017). Thus, I test for the effect of EPL on firms' tax avoidance conditional on a country's level of enforcement using the following estimation equation:

$$\begin{aligned} GAAP\ ETR_{i,t} = & \alpha_0 + \beta_1 EPL_{k,t} * Low\ Enforcement_{k,t-1} + \beta_2 EPL_{k,t} \\ & + \beta_3 Low\ Enforcement_{k,t-1} + Firm - level\ Controls_{i,t} \\ & + Country - level\ Controls_{k,t} + v_i + \eta_j * \omega_t + \partial_l * \omega_t + \varepsilon_{k,j,t} \end{aligned} \quad (6)$$

Eq. (6) is the same as Eq. (4) and (5) except that the EPL indicator is interacted with a dummy variable proxying for countries with weak institutional environments and lax enforcement (i.e., where the marginal cost of engaging in tax avoidance is lower). Johnson et al. (1998) argue that firms' tax avoidance not only depends on the regulatory burden, but also on whether the government can effectively enforce the law and operate without corruption. To identify low enforcement countries, I follow their argument and create an indicator variable (*Low Enforcement*) that is set to one if the value of a country's control of corruption (*Control of Corruption*)²³ is below the sample median in year $t-1$. In line with previous analyses, treatment and control groups are thus defined in the year before the EPL is signed into law.

²³ It is worth highlighting that the correlation between the control of corruption variable and the other individual governance indicators from World Bank lies between 0.77 (*Rule of Law*) and 0.71 (*Regulatory quality*); thus, it captures most of the variation in a country's quality of governance and enforcement.

Consistent with Johnson et al. (1998) and Carrillo et al. (2017), I expect firms operating in countries with weak institutions and lax tax enforcement to find it easier, on average, to take advantage of the new tax avoidance opportunity created by the change in employment regulation ($\beta_1 < 0$). Again, the estimation equation includes all the control variables, firm-fixed effects (v_i), and industry-year fixed effects defined at the 2-digit SIC level ($\eta_j * \omega_t$). I also note that the inclusion of country-year fixed effects would completely absorb the interaction term β_1 given that both the EPL indicator and the *Low Enforcement* variable vary at the country-year level. To overcome this issue and still ensure that potential concomitant economic and political shocks in a given region and year do not bias the results, I add a set of region-year fixed effects ($\partial_l * \omega_t$) following the World Bank regional classification. Finally, I cluster standard errors at the country-industry 2-digit SIC level.

Table 2.11 presents the results for the last cross-sectional test. As expected, I find that firms located in countries with weak institutions and lax tax enforcement engage in relatively more tax avoidance following an increase in employment protection. Namely, columns (1)-(2) and (4)-(5) show that these firms additionally decrease their (three-year) *GAAP ETR* by 0.9% (0.8%) relative to the average firm in the sample. Further, the coefficient of EPL and its interaction with the *Low Enforcement* variable (β_1) are *jointly significant* at the 1% level across all specifications. Finally, the results also hold after controlling for region-year fixed effects (columns (3) and (6)).

Table 2.11: Employment Protection and Tax Avoidance - Cross-sectional variation in Enforcement

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance, conditional on the country's enforcement. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. To proxy for *Low Enforcement*, I create an indicator variable (*Low Enforcement*) that is set to one if the value of *Control of Corruption* in a certain country *k* is below the yearly sample median in year *t-1* and zero otherwise. Columns (3) and (6) control for time-varying region-fixed effects, following the World Bank regional classification. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL*Low Enforcement	-0.00488* (-1.824)	-0.00515* (-1.960)	-0.00926*** (-3.237)	-0.00332* (-1.733)	-0.00369* (-1.920)	-0.00865*** (-3.850)
EPL	-0.0123*** (-5.540)	-0.0123*** (-5.618)	-0.00694*** (-2.645)	-0.0165*** (-6.152)	-0.0167*** (-6.276)	-0.0100*** (-3.527)
Low Enforcement	0.00126 (0.396)	0.000717 (0.235)	-0.00754 (-1.459)	-0.00646** (-2.210)	-0.00688** (-2.322)	-0.00598 (-1.328)
<i>Joint Significance</i> (EPL* Low Enforcement + EPL)	-0.0171*** (-5.61)	-0.0174*** (-5.76)	-0.0161*** (-4.58)	-0.0198*** (-6.64)	-0.0204*** (-6.88)	-0.0186*** (-5.55)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
World Bank Region-Year FE	-	-	✓	-	-	✓
#Observations	67,952	67,952	67,952	62,605	62,605	62,605
Adjusted-R ²	0.344	0.364	0.367	0.437	0.445	0.447

2.5 Additional analyses

In this section, I document the robustness of the results to using an alternative indicator of employment protection, to imposing additional sample restrictions, as well as to using other tax avoidance measures. Furthermore, I discuss a potential alternative explanation for the observed results.

2.5.1 Alternative indicator of EPL

In Table 2.12, I test the robustness of the main findings to using the EPL indicator compiled by the OECD and developed by Allard (2005). In columns (1) and (2), I replicate the baseline specification (Eq. 1) using the *GAAP ETR* as the dependent variable. In particular, column (1) includes the OECD EPL indicator, country-level variables, as well as firm, and industry-year fixed effects. The coefficient of interest (i.e., the OECD EPL indicator) is negative and statistically different from zero at the 1% level. The economic magnitude is larger than that in Table 2.3: one unit increase in the OECD EPL indicator corresponds to a reduction in the *GAAP ETR* of 4.57%. Column (2) further controls for firm-level variables. The findings resemble those in column (1). Moreover, column (3) excludes the U.S. from the analysis. Nevertheless, the EPL indicator is still negative and statistically significant at the 1% level.

Next, I rerun Eq. (1) but substitute the dependent variable with the three-year *GAAP ETR*. Following the previous analyses, column (4) includes the OECD EPL indicator, country-level variables, as well as firm- and industry-year fixed effects. The coefficient of OECD EPL is consistently negative and statistically different from zero at the 1% level, with a larger economic magnitude of 7.14%. Column (5) additionally controls for firm-level variables. The findings are similar to those in column (4). Finally, in column (6) I replicate the analysis in column (5) but

exclude the United States from the sample. I find that the OECD EPL indicator is still negative and statistically significant at the 1% level. Overall, the results across all specifications are consistent with greater employment protection leading firms to reduce effective tax rates between 4.57% and 7.4%. Given their magnitude, these findings further indicate that the baseline results could even underestimate the true effect of EPL on firms' tax avoidance.

Table 2.12: Employment Protection and Tax Avoidance – Alternative Measure of EPL

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*OECD EPL*) is retrieved from the OECD Employment Statistics website for the 19 sample countries over the 1996-2013 period. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. Columns (3) and (6) exclude the USA from the sample. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t-statistics* are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
OECD EPL	-0.0457*** (-3.561)	-0.0549*** (-4.077)	-0.0374*** (-2.811)	-0.0714*** (-5.056)	-0.0804*** (-5.362)	-0.0529*** (-3.620)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	71,362	71,362	39,206	65,760	65,760	37,038
Adjusted-R ²	0.342	0.364	0.403	0.432	0.440	0.519

2.5.2 Additional Sample Restrictions

In this set of analyses, I check the robustness of the main findings to imposing additional sample restrictions. In the first test, I replicate Eq. (1) while clustering at the country-industry but using the 48 Fama-French industry codes instead of the 2-digit SIC code, and narrowing down the counterfactual to firms from the same Fama-French industry/year. The results presented in Table B.2 of the Appendix B remain strongly significant and virtually unchanged across all specifications.

In the second robustness test, I follow Bertrand and Mullainathan (2003) and Bertrand et al. (2004) and rerun Eq. (1) while clustering standard errors at the country-level. Since the adoption of labor protection laws varies at the country-level, this clustering method addresses the concern that the estimated residuals are serially correlated not only within a firm but also across firms within the same country. Table B.3 of the Appendix B presents the results. Across all six specifications, the EPL indicator is still negative and statistically significant at the 1% level, suggesting that the main findings are not sensitive to the clustering method.

The third robustness analysis deals with loss-making firms, which could have different incentives to engage in tax avoidance. In particular, previous literature finds that firms with tax losses to carry forward have no incentive to engage in tax avoidance, because these firms can compensate losses with future tax payments (e.g. Dyreng et al. 2016b). Thus, having loss-making firms in the sample would lead to an opposition prediction (i.e., lower tax avoidance incentives) and actually work against finding results. Therefore, I follow prior literature and further exclude loss-making firms from the sample to test the robustness of the main findings. As expected, the results in Table B.4 of the Appendix B resemble those reported in Table 2.3.

Finally, in Table B.5 I further require firms to be at least three consecutive years in the sample to avoid potential sample attrition. Despite this additional sample requirement, the coefficient of EPL is negative and statistically different from zero at the 1% level across all the analyses. It is also worth pointing out that, the results remain economically significant with a reduction in the effective tax rates ranging between 1.2% (*GAAP ETR*) and 1.5% (three-year *GAAP ETR*) and close to the main results reported in Table 2.3.

2.5.3 Alternative definitions of Tax Avoidance

In the final set of robustness tests, I address concerns related to the construction and use of the *GAAP ETR* as a proxy for tax avoidance. As a first step, I assess whether the results depend on the construction of the dependent variable. Instead of winsorizing the (three-year) *GAAP ETR* at zero and one, I replicate the baseline specification (Eq. 1) while truncating observations with effective tax rates higher (lower) than one (zero). Table B.6 of the Appendix B documents unchanged results across all specifications.

In the second test, I check whether the results hold when using alternative dependent variables. As argued earlier, ideally one would also like to have the actual cash taxes paid to evaluate the extent of a firm's tax avoidance. However, with the exception of United States, not all countries mandate firms to disclose the taxes paid in their financial statements, making difficult to compute a cash-based effective tax rate for a reliable number of firms (i.e., commonly referred as *CASH ETR*). Therefore, to overcome potential measurement errors when using the (three-year) *GAAP ETR* and still test the robustness of the main findings, I follow Markle and Shackelford (2012) and Blackburne and Blouin (2016) and estimate Eq. (1) while replacing the dependent variable with the *CURRENT ETR*, an adjusted version of the *GAAP ETR*, and two total book-tax difference

measures. Similar to a cash-based effective tax rate, the *CURRENT ETR* also reflects deferral strategies (Hanlon and Heitzman 2010). Moreover, while the *GAAP ETR* only captures permanent differences between book and taxable incomes, the two total book-tax difference measures (*BTD1* and *BTD2*) by definition include both temporary and permanent book-tax differences (e.g., Badertscher et al. 2016).

I define the *CURRENT ETR* as current taxes divided by pre-tax income less special items, whereas the three-year *CURRENT ETR* is the sum of current taxes during $t-1$ and $t+1$ divided by the sum of pre-tax income minus special items over the same period. In a similar way, I define the *adjusted GAAP ETR* as income taxes divided by pre-tax income less special items plus R&D and depreciation and amortization, as the accounting rules for these two key expenses vary across countries and could potentially affect the computation of the denominator of the effective tax rate. Furthermore, I define the first (second) total book-tax difference measure *BTD1* (*BTD2*) as pre-tax income less non-controlling interest minus current (total) taxes divided by the corporate tax rate, and then scaled by lagged total assets.

Table B.7 reports the results for these alternative dependent variables. Panel A presents the findings for the (three-year) *CURRENT ETR*. In line with the previous analyses, the coefficient of EPL is still negative and statistically different from zero at the 1% level across all six specifications. In terms of economic significance, one unit increase in the EPL indicator corresponds to a reduction in the (three-year) *CURRENT ETR* of 3.7% (4%). Panel B presents the results for the (three-year) *adjusted GAAP ETR*. As expected, the findings are also statistically significant at the 1%, with an economic magnitude ranging between 0.4% and 0.6%.²⁴ Finally, panel C also documents the robustness of the results to using both book-tax difference measures.

²⁴ It is worth pointing out that, the lower economic magnitude can be the result of the higher denominator in the *adjusted GAAP ETR*.

2.5.4 An alternative explanation: value transfer amongst stakeholders

The results so far are consistent with tighter employment protection leading firms to engage in tax avoidance via capital deepening. However, an alternative explanation could depart from the substitution effect of labor and capital input and argue that, when expected dismissal costs increase, firms will simply retain employees and rely on other types of actions over which they have more discretion to compensate for the increase in labor costs (e.g., cutting discretionary expenses, engaging in tax avoidance, etc.). In line with this reasoning, Roychowdhury (2006) claims that managers engage in these real activities manipulation because they act “*as agents in value-transfers amongst stakeholders*” (p. 337). This is particularly true given that the government, due to its tax claims on cash flows, is *de facto* the largest minority shareholder in all firms (Desai et al. 2007). Thus, when employment protection becomes more binding, firms will engage in several actions to reallocate resources among internal and external stakeholders, including tax avoidance.

To test this alternative theoretical channel, I follow Roychowdhury (2006) and Zang (2012) and estimate Eq. (1) while replacing the dependent variable with four discretionary expenses measures.²⁵ Specifically, I define *DISC EXP1* (*DISC EXP2*) as selling, general, and administrative expenses plus R&D divided by lagged total assets (sales). Moreover, I define *DISC EXP3* (*DISC EXP4*) as the residuals of the corresponding normal level of discretionary expenses regression estimated for each 3-digit SIC (48 Fama-French) industry-year with at least ten observations. Table B.8 of the Appendix B presents the results. Across all specifications, almost all discretionary expenses measures are statistically insignificant, the only exception being *DISC EXP2*. These results provide some evidence that firms also cut discretionary costs following an increase in

²⁵ I acknowledge that discretionary expenses also contains some labor costs. However, compared to other production costs (e.g., COGS) these cost items are plausibly less labor intensive.

employment protection, but these findings are not robust across all discretionary expenses measures. Overall, I conclude that the results in my sample provide convincing support for the capital-deepening channel, but minimal evidence supporting the alternative value transfer channel.

2.6 Conclusion

Over the last two decades, a number of countries have enacted employment protection laws in the OECD area. In most cases, these reforms have resulted in employees enjoying more protection and firms bearing additional labor costs. These increased dismissal costs, combined with burdensome tax laws, adversely affect firms' profits. Consequently, firms have taken steps to cope with more binding employment protection. This paper analyzes the effect of EPL on firms' tax avoidance.

Using firm-level data across 19 OECD countries over the 1996-2013 period, I exploit 44 employment protection reforms to examine how such rules affect firms' incentives to engage in tax avoidance. I find that, following a change in employment protection, the one-year effective tax rate decreases by 1.3 percentage points. The results also hold when using alternative measures of EPL and/or tax avoidance and do not seem to be due to pretreatment differences between treated and control firms, omitted variables, and reverse causality. In addition, low capital-intensive firms, as well as firms operating in industries and countries with higher discharge rates or weak enforcement experience larger increases in tax avoidance. Supporting the capital-deepening channel, I further document that, after the law comes into force, firms reduce employment, invest in capital assets, and subsequently exhibit higher pre-tax margins. Collectively, these results are consistent with theories predicting that greater employment protection results in firms substituting

labor with capital and avoiding taxes because the shift from labor to capital input broadens the tax base and increases the benefits of tax avoidance.

Overall, this study points out the interdependence of corporate tax avoidance with labor market regulation and in particular, employment protection laws. Hence, this study provides insights into how employment protection laws incentivizes firms' tax avoidance behavior and contributes to the public debate on the economic consequences of EPL. Namely, it provides policy makers and academics with novel empirical evidence on how labor-friendly laws may induce firms' tax avoidance.

3 Creditor Rights, Enforcement and Tax Avoidance¹

3.1 Introduction

A growing literature dating back to Atwood et al. (2012) points to the important role that legal institutions play in facilitating or discouraging tax avoidance (Wilde and Wilson 2018). Following the Scholes-Wolfson framework (1992), prior work has examined how key insider and outsider stakeholders – and their legal institutions – affect corporate tax avoidance. These studies have ranged from accounting regulations (Hope et al. 2013; De Simone 2016) and financial regulators (Kubick et al. 2016), to tax laws and tax enforcement (Hoopes et al. 2012; Shevlin et al. 2017), to product market competition (Dyrenge et al. 2017a) and, more recently, to employees (Wilde 2017) and labor laws (De Vito 2017). Surprisingly, very little is known on how creditors – and their protection mandated by law – relate to tax avoidance,² even though they represent an important and large stakeholder group. In this paper, we fill this gap and examine how creditor rights and tax avoidance relate to each other.

Analyzing how firms alter their tax avoidance strategies in response to changes in creditor rights is important for academics and policy makers alike. In an ever-changing era of regulatory changes aimed at tackling tax avoidance,³ it is fundamental to understand how the legal environment influences tax avoidance, because tax avoidance has become a key threat to corporate tax revenues and to the fairness of the tax system (Dyrenge and Maydew 2017). More importantly,

¹ This chapter is based on De Vito, A., and Jacob, M. (2018): “Creditor Rights, Enforcement and Tax Avoidance”. Unpublished Working Paper.

² A related work on the topic would be Beck et al. (2014). However, as the authors explicitly state, their focus is on credit information sharing and tax evasion, which represent two different concepts compared to our paper.

³ See, for example, the new disclosure rules “country-by-country reporting” aimed at increasing tax transparency. Julia-Ambra Verlaine, “EU Backs New Tax Transparency Rules for Multinationals”, *The Wall Street Journal*, July 4, 2017.

tax avoidance has even gained momentum over the last months as policymakers worldwide have taken coordinated actions and amended existing tax rules to prevent losing tax revenues.⁴ Evaluating other capital market regulations, such as creditor rights, whose primary intended effects are clearly unrelated to tax avoidance can further inform policy makers about curbing the phenomenon.

From a theoretical perspective, the effect of creditor rights on tax avoidance is ambiguous. On the one hand, La Porta et al. (1998) and subsequent studies (e.g., Demircuc-Kunt and Maksimovic 1998; Levine 1998; 1999) show that strengthening creditor rights mitigates moral hazard by borrowers and lowers the cost of debt (Qian and Strahan 2007; Bae and Goyal 2009). This effect would reduce the interest payments deducted from the tax base, leading to higher taxable income. Thus stronger creditor rights could lead to *higher* tax avoidance,⁵ because firms have more incentives to shield the additional taxable income from the tax authority and lower the tax burden.

On the other hand, improvements in creditor rights also enhance access to finance and can increase debt capacity of firms (Beck et al. 2003a, 2003b). In line with this reasoning, Giannetti (2003) shows that firms in stronger creditor rights exhibit higher level of leverage. By taking on more debt, firms can substitute costly tax avoidance with debt to create a tax shield. The substitution would then imply paying higher deductible interest payments and likewise reduce the taxable income (Miller 1977; DeAngelo and Masulis 1980; Graham and Tucker 2006). Hence, stronger creditor rights could lead to *lower* tax avoidance, because firms forgo to engage in tax avoidance and substitute it with financial leverage.

⁴ Vanessa Houlder, “Nations agree corporate tax avoidance crackdown”, *Financial Times*, June 7, 2017.

⁵ Previous studies have also examined the association between tax avoidance and the cost of debt, leading to two opposing views. On the one hand, Hasan et al. (2014) have found that firms with higher tax avoidance bear a higher cost of debt. On the other hand, Isin (2018) has recently revisited these findings and has shown that firms can actually mitigate the non-tax costs associated with tax avoidance, thereby questioning whether higher tax avoidance is associated with higher or, rather, *lower* cost of debt. This novel argument further supports our theoretical prediction that a lower cost of debt could lead to *higher* tax avoidance.

To assess which of these two opposing views dominates, we exploit six bankruptcy reforms that led to changes in the strength of creditor rights (3 increases and 3 decreases in creditor rights) across 34 countries over the 2000-2013 period. We follow the methodology by Simintzi et al. (2015) and Dessaint et al. (2017) and compute an overall creditor rights indicator that captures variation in creditor rights within a country over time. To confirm the validity of our measure and strengthen the interpretation of our findings, we additionally show that the results hold when we use a time-varying index of creditor rights as in Qi et al. (2017).

To test for the effect of creditor rights on firms' tax avoidance, we use a generalized difference-in-differences model in which the treatment (control) group consists of firms in countries that (do not) experience a change in creditor rights. To reduce identification concerns, we narrow down the counterfactuals to firms from countries with a similar rule of law (Kaufman et al. 2009). Our regression specifications further control for firm and industry-year fixed effects along with firm characteristics known to correlate with tax avoidance (e.g., Rego 2003; Richardson and Lanis 2007; Dyreng et al. 2010; Dyreng et al. 2017a). Following the literature in finance and economics (e.g., La Porta et al. 1997; 1998; Levine 1999; Djankov et al. 2007; 2008; Acharya et al. 2011), we control for several country-level determinants of creditor rights and make sure that variation in economic conditions does not spuriously bias the results. We find that, in response to stronger creditor rights (i.e., one unit increase in the creditor rights indicator), the one-year effective tax rate increases by 1.9 percentage points or 6.48% relative to its sample mean. The results also hold when using alternative measures of tax avoidance (e.g., Atwood et al. 2012). Overall, these findings support the view that stronger creditor rights reduce tax avoidance.

Subsequently, to interpret the results as evidence of the effect of creditor rights on tax avoidance, we test whether the parallel trends assumption holds in our sample. We thus examine

the dynamics of tax avoidance around the passage of the bankruptcy reforms by including two-year leads and lags of the creditor rights indicator. We find that there is no anticipation effect since the decrease in tax avoidance occurs in the same year when the new creditor rights regime becomes law. We repeat the same analysis using the time-varying creditor rights index and continue to find that the decrease in tax avoidance takes place only in the year when the creditor rights index changes. Further, we test the robustness of our main findings to several alternative approaches that deal with potential identification concerns. Similar to Heider and Ljungqvist (2015), we conduct a regression in first-differences of the change in either our creditor rights indicator or the time-varying creditor rights index on the change in firm-level tax avoidance and find that the results are still in line with our theoretical predictions and inferences. Moreover, we rerun the main specification and augment it with country-specific time trends, which allow the identification of the effect of creditor rights on tax avoidance to come from pre-treatment country-specific trends. Finally, we also test the robustness of our findings to using an alternative estimation strategy (John et al. 2017). Throughout all the analyses, the results are qualitatively and quantitatively unchanged and support the main findings.

Next, motivated by the robust evidence that creditor rights reduce tax avoidance we study the channel through which stronger creditor rights decrease tax avoidance. For our main results to hold, theory predicts that firms take on more debt and have higher interest payments (relative to total assets) when creditor rights increase (e.g., Giannetti 2003; Beck et al. 2003a, 2003b). We find evidence for exactly this. We show that leverage increases as creditor rights become stronger. We also find that firms have higher interest payments but bear the same cost of debt. Meanwhile, we do not find empirical support for the channel predicting the opposite results – stricter creditor rights leading to higher tax avoidance because of lower cost of debt. In sum, these results support our

interpretation of the baseline finding that stronger creditor rights enhance access to finance and firms substitute tax avoidance with debt.

To provide additional evidence on the underlying mechanisms of the results and shed light on the casual relationship between creditor rights and tax avoidance (Wooldridge 2009), we then estimate triple-difference models and analyze three sources of cross-sectional variation in firm and country characteristics. These tests also allow us to control for confounding time-varying factors by including country-year fixed effects, which alleviate the concern that other changes within countries are driving the results. First, in stronger creditor rights regimes firms with lower levels of debt and intangible assets (e.g., Colla et al. 2013), for which the expected bankruptcy costs are lower, should have more opportunities to substitute tax avoidance with leverage. We predict and find exactly this. Decreases in tax avoidance following changes in creditor rights are larger for firms that use less debt as well as for firms with lower level of intangible assets.

Second, firms operating in countries with higher deductibility of capital, i.e. where debt and equity are equally or almost equally tax deductible (e.g., Auerbach et al. 2008), should have fewer incentives to take advantage of the tax benefits of debt, compared to similar firms in countries with lower deductibility of capital. To measure the deductibility of capital, we follow Goncharov and Jacob (2014) and construct a time-varying deductibility index that ranges from zero (very low deductibility of capital) to three (very high deductibility of capital) for each sample country. Supporting our prediction, we find evidence that firms reduce tax avoidance to a lesser extent in countries with higher deductibility of capital.

In the last cross-sectional test, we provide evidence on the role of debt enforcement in discouraging (facilitating) the substitution between tax avoidance and debt in weaker (stronger) creditor rights regimes. More specifically, we predict and find that firms operating in countries

with weaker debt enforcement, i.e. where the judicial enforcement of debt contracts is imperfect and thereby reduces creditors' willingness to lend, decrease tax avoidance to a lesser degree, thus revealing a novel channel linking creditor rights and tax avoidance.

In the final set of analyses, we provide internal validity of our main results by examining the Italian Bankruptcy reform in 2005. This law, in the spirit of the U.S. Chapter 11, made debt renegotiations easier for debtors and led to a decrease in creditor rights (Favara et al. 2017). We exploit this setting in a difference-in-differences design. Following previous theoretical (Gennaioli and Rossi 2010) and empirical literature (e.g., Jappelli et al. 2005; Ponticelli 2013) on the efficiency of bankruptcy courts and financial contracts, we study the effect of the reform on tax avoidance and leverage by exploiting the heterogeneous administration of bankruptcy justice across Italian provinces. We rely on the bankruptcy proceedings durations in the pre-reform years to differentiate between firms operating in low debt enforcement (treatment group) and high debt enforcement (control group) provinces. We use the efficiency of bankruptcy courts because it varies a great deal across provinces and over time in Italy, affecting the availability of credit and firms' opportunities to substitute tax avoidance with debt. There are two important assumptions in this test. First, debt enforcement might change around the law. However, we show that debt enforcement does not change around the reform, ensuring that the observed effect comes only from the law. Second, the assignment to treatment and control groups should be random to satisfy the parallel trend in tax avoidance prior to 2005. Our analyses confirm that the parallel trends assumption holds in our sample since treatment and control firms exhibit the same tax avoidance pattern before the 2005 reform.

We find that firms located in low debt enforcement provinces decrease leverage and engage in more tax avoidance relative to counterfactual firms located in neighboring high debt enforcement

provinces in the same industry and region. In economic terms, the one-year effective tax rate decreases by 1.67% percentage points or 2.75% relative to the sample mean. Relatedly, we find that leverage decreases by 1.46% or 2.16% relative to its sample mean. We obtain similar results when matching treatment and control firms before the reform to account for unbalanced covariates (Atanasov and Black 2016). Overall, this evidence further sheds light on the role of debt enforcement in shaping the relationship between creditor rights and tax avoidance.

Taken together, the analysis of the international setting coupled with the analysis around the 2005 Bankruptcy reform in Italy provide evidence of the effect of creditor rights on tax avoidance. Consistent with the theoretical prediction that firms substitute tax avoidance with debt in stronger creditor rights countries, we find that tax avoidance decreases (increases) when creditor protection increases (decreases). However, we acknowledge that we cannot fully account for the exact cause of the change in tax avoidance. Nevertheless, given that the main findings, the cross-sectional analyses as well as a battery of robustness tests all point to an effect of creditor rights on tax avoidance, we cautiously interpret the results in our settings as a causal relationship between creditor rights and tax avoidance.

This study thus bridges and connects several literatures. First, we extend the literature on the impact of legal institutions on tax avoidance (e.g. Atwood et al. 2012; Hope et al. 2013; De Simone 2016; Shevlin et al. 2017; De Vito 2017) by examining the effect of creditor rights on tax avoidance. We propose that firms forgo to engage in tax avoidance and substitute it with debt when creditor rights increase. Second, we contribute to the literature on tax avoidance and corporate debt policy. We are able for the first time to “*directly generalize to the population of firms*” Graham and Tucker’s work (2006, p. 566) using multiple settings. Third, we add to the law and finance literature investigating the role of the judiciary system on debt enforcement (Djankov et al. 2003;

2008). We show that the enforcement of bankruptcy law can facilitate (discourage) the substitution between financial leverage and tax avoidance in stronger (weaker) creditor rights countries, thereby revealing a novel channel through which debt alters the incentives for tax avoidance.

The remainder of the chapter proceeds as follows. Section 3.2 develops the theoretical link between creditor rights and tax avoidance. Section 3.3 discusses the research design and the data. Section 3.4 presents the main empirical findings and the robustness tests. Section 3.5 analyzes the Italian Bankruptcy reform. Section 3.6 concludes the chapter.

3.2 Theoretical link between Creditor Rights and Tax Avoidance

To illustrate how creditor rights relate to tax avoidance, we use a simplified version of the Dyreng et al. (2017a) model of tax avoidance. In particular, we model a profit-maximizing firm that optimizes its choice of capital input K , labor input L , and tax avoidance A . The output of the firm is a function of capital and labor input ($F(K,L)$). Following Dyreng et al. (2017a), the production function satisfies the following four standard assumptions: $F_K > 0$, $F_L > 0$, $F_{KK} < 0$, $F_{LL} < 0$, and $F_{KL} > 0$. The realized output is sold at the price p . We further assume that cost of capital (cost of labor) per unit is r (w). Both, r and w are exogenously determined. Further, as Dyreng et al. (2017), we assume that wages are fully deductible whereas capital is only partially deductible. The partial deductibility is captured by the parameter $\eta \in [0,1]$.⁶ Further, the firm's profit is subject to taxation at rate τ . This tax rate can be reduced by tax avoidance, denoted A . Following Dyreng et al. (2017a), we assume that tax avoidance is a costly activity with a strictly

⁶ As argued in Dyreng et al. (2017a), there are several reasons why deductibility of capital is limited ($\eta < 1$). For example, cost of equity financing is typically not deductible, loss offset is restricted, and tax depreciation could be below economic depreciation. Empirical evidence of a significant negative effect of corporate taxes on investment lend empirical support for the tax deductibility of capital being limited.

convex cost function $C(A)$, where $C'(A) > 0$, $C''(A) > 0$, and $C(A) = 0$ for $A = 0$. This results in the following after-tax profit:

$$\Pi(K, L, A) = [1 - (\tau - A)](pF(K, L) - wL - \eta rK) - (1 - \eta)rK - C(A) \quad (1)$$

We then obtain the same first order conditions with respect to L , K , and A as Dyreng et al. (2017):

$$pF_L(K^*, L^*) = w \quad (2)$$

$$[1 - (\tau - A^*)]pF_K(K^*, L^*) = [1 - \eta(\tau - A^*)]r \quad (3)$$

$$pF(K^*, L^*) - wL^* - \eta rK^* = C'(A^*). \quad (4)$$

These first order conditions have the standard interpretations as we equate marginal benefit of capital, labor, and tax avoidance with the respective costs. Equation (4) helps us to understand how stronger creditor rights relate to the profit-maximizing level of tax avoidance A^* .

This simple model yields ambiguous predictions. On the one hand, stronger creditor rights mitigate moral hazard by borrowers and lowers the cost of debt (Qian and Strahan 2007; Bae and Goyal 2009). A reduction in r can have two effects. First, the firm increases its capital input K^* , thereby increasing taxable income as output increases ($F_K > 0$). Second, taxable income also increases because the deducted interest expenses decrease. Overall, the right-hand side of equation (4) increases. Hence, firms have a higher incentive to avoid taxes. If this view holds, the increase in tax avoidance should be associated with a higher capital input, higher output, and lower cost of debt.

On the other hand, improvements in creditor rights also enhance access to finance and can increase debt capacity of firms (Beck et al. 2003a, 2003b). Hence, firms increase their leverage

ratio while keeping optimal capital constant. In other words, firms can take a higher amount of debt at the same interest rate. By taking on more debt, firms increase the part of cost of capital that is tax deductible (higher η). If r and K^* remain constant, firms would now have less incentives to avoid taxes as the right-hand side of equation (4) decreases. If this view holds, the decrease in tax avoidance should be associated with higher leverage ratios, constant cost of debt r , constant capital input, constant output, and higher total interest expenses on debt.

Overall, the effect will be a mix of both views since they can occur at the same time. Which of these two views dominates is an empirical question that we examine in the following. One advantage of the simple model illustration is that the channels through which tax avoidance increases or decreases differ from each other. In our empirical tests, we first aim at measuring the main effect—decrease or increase in tax avoidance following an improvement in creditor protection—and then provide empirical evidence for the change in firm characteristics (leverage ratio, capital, output, interest rates, and interest expenses) associated with either average tax avoidance effect.

3.3 Research Design and Data

3.3.1 Bankruptcy Code Reforms

To investigate the relationship between creditor rights and firms' tax avoidance, we exploit the staggered changes in six bankruptcy codes across 34 countries over the 2000-2013 period. As a general rule, creditor rights are considered strong (weak) when creditors (do not) have control over a debtor's reorganization phase as well as when the bankruptcy code provides creditors with priority claim rules over the liquidation process (John et al. 2017). Following this approach, we

identify three increases in creditor rights (Spain in 2004, United States in 2005, and Germany in 2012) and three decreases in creditor rights (Brazil in 2005, France in 2005, and Italy in 2005).

Starting with increases in creditor rights, Spain in 2004 amended its bankruptcy code (“Ley Concursal”) and introduced a priority rule such that secured creditors are paid first from the proceeds of liquidation. According to Djankov et al. (2007) and John et al. (2017), this reform resulted in stronger creditor rights. In 2005, the United States enacted the Bankruptcy Abuse Prevention and Consumer Protection Act (“BAPCPA”). Although the aim of the law was to reform consumer bankruptcy, it also improved creditor rights in Chapter 11 (Sautner and Vladimirov 2017). More specifically, the reform brought in two mandatory caps: one of 18 months for borrowers to file a reorganization plan, and one of 20 months for the plan’s acceptance by creditors. These caps widely limited a debtor’s ability to protract the duration of bankruptcy proceedings and gave a leeway to creditors over the renegotiability of debt. Relatedly, the BAPCPA reform introduced an additional cap of 7 months for debtors to assume or reject a lease.⁷ Overall, the introduction of these caps significantly redistributed the bargain power from debtors to creditors. In 2012, Germany also reformed its bankruptcy code (“Law on Corporate Reorganization ESUG”). In this case, the law increased creditor rights by giving them more control on the bankruptcy proceedings and on the appointment of the insolvency administrator. Furthermore, the reform limited a debtor’s ability to appeal a restructuring plan approved by the majority of creditors (Sautner and Vladimirov 2017).

In 2005, three countries in our sample decreased creditor rights: Brazil, France, and Italy. The Brazilian bankruptcy reform (“Law on Insolvency”) became law in the spirit of the U.S. Chapter 7 and 11 (Alencar and Ponticelli 2016). More specifically, it introduced an automatic stay rule on

⁷ According to Eisfeldt and Rampini (2009), if the debtor assumes the lease, the lessor acquires the status of first-priority claim, which represents an additional protection granted to the lessor.

all litigations against the debtor and facilitated a debtor's ability to renegotiate with creditors (Favara et al. 2017). Although the aim of the reform was broader, according to Djankov et al. (2007) and John et al. (2017), it arguably weakened creditor rights. Similarly, France amended the provisions of automatic stay inspired by the U.S. Chapter 11 ("Loi de sauvegarde des entreprises"). The aim was twofold: first, it allowed the management to retain control over the bankruptcy proceeding; second, it increased a debtor's ability to renegotiate its distress debt. Overall, the French reform led to a decrease in creditor rights (Weber 2005). Finally, in an act similar in nature to France, Italy in 2005 amended its 1942 bankruptcy code prompted by the Parmalat's collapse in 2003. The reform introduced an array of provisions aimed at facilitating the renegotiability of outstanding debt and at protecting debtors. After the reform, the debtor is allowed to start the reorganization phase without creditor consent. Thus, the reform decreased creditor rights (Rodano et al. 2016). Table 3.1 lists our sample countries and the bankruptcy reform in each sample year.

Table 3.1: Sample Composition and Country-specific variables

This table provides an overview of the 34 sample countries over the period 2000-2013. The variables reported are the mean of the *GAAP ETR* of firms located in each country, the mean of the country-level *CR Index* and the bankruptcy reforms upon which the *CR Reforms* is constructed.

Country	GAAP ETR	CR Index	Bankruptcy Reform
Argentina	0.360	1.885	
Australia	0.266	3.487	
Austria	0.247	2.564	
Belgium	0.254	2	
Brazil	0.264	1.183	“Law on insolvency” in 2005
Canada	0.256	2.368	
Chile	0.169	1.785	
China	0.201	1.820	
Denmark	0.276	3.308	
Finland	0.268	2.646	
France	0.303	1.506	“Loi de sauvegarde des entreprises” in 2005 “Law on corporate reorganization (ESUG)” in 2012
Germany	0.323	2.989	
Greece	0.329	1.465	
Hong Kong	0.184	4	
Israel	0.234	3.569	
Italy	0.388	1.415	“Legislative Decree N. 35 and Law N. 80” in 2005
Japan	0.429	2.528	
Korea	0.271	2.496	
Malaysia	0.238	3.786	
Mexico	0.254	1.693	
Netherlands	0.247	2.295	
Norway	0.260	2.296	
Peru	0.308	1.710	
Philippines	0.227	1.492	
Poland	0.210	3.173	
Portugal	0.239	1.151	
Singapore	0.202	3.868	
Spain	0.229	2.324	“Ley Concursal” in 2004
Sweden	0.264	2.535	
Switzerland	0.228	2.553	
Thailand	0.207	2	
Turkey	0.185	1.665	
United Kingdom	0.269	4	
United States	0.293	2.912	“Bankruptcy Act (BAPCPA)” in 2005

3.3.2 Creditor Rights Indicators

To assess how changes in creditor rights relate to tax avoidance, we follow the methodology by Simintzi et al. (2015) and Dessaint et al. (2017) and compute an overall creditor rights indicator

that captures variation in creditor rights within a country over time. We specify the treatment indicator $CR\ Reforms_{k,t}$ recursively starting one year before the sample period ($CR\ Reforms_{k,1999} = 0$). For any given country k in year t , $CR\ Reforms_{k,t}$ takes the value of 1 (if creditor rights became stronger in country k in year t), or -1 (if creditor rights became weaker in country k in year t), and 0 otherwise. In subsequent years, we assign the prior year's value if a country did not experience any bankruptcy reform in that year ($CR\ Reforms_{k,t} = CR\ Reforms_{k,t-1}$). Following this approach, we obtain a discrete creditor rights indicator $CR\ Reforms_{k,t}$ over the period 2000-2013, ranging between -1 and 1 with higher scores pointing to stronger creditor rights.

Furthermore, to test the validity of our measure and strengthen the interpretation of our findings, we additionally use a time-varying index of creditor rights. We start from the creditor rights index compiled by La Porta et al. (1997; 1998) and updated by Djankov et al. (2007), which is available up to 2002. This index ranges from zero (poor creditor rights) to four (strong creditor rights), as the number of dummy variables proxying for each of its four creditor protection components. The index adds the value of 1 whenever one of the following provisions becomes law. First, the debtor needs the creditors' consent to file for reorganization. Second, there is no automatic stay rule preventing secured creditors from taking actions against the debtor. Third, secured creditors have the right to be paid first from the proceeds of the bankrupt firm. Fourth, the management does not retain control of the bankrupt firm.

For the subsequent years, we follow the methodology of John et al. (2017) and Qi et al. (2017). We replace the 2003 with the 2002 value of the Djankov et al.'s (2007) index (for a similar approach, see Miller and Reisel (2011) and Cho et al. (2014)). From 2004 onwards, we employ the World Bank's legal rights index since it also captures the extent to which the bankruptcy code protects creditors in a given country k in year t . However, the World Bank's legal rights index

ranges between zero and ten. Therefore, we normalize the measurement scale by dividing each country-year value by 2.5. Based on this method, we are able to produce a continuous creditor rights index $CR Index_{k,t}$ over the period 2000-2013, ranging between zero and four with higher scores indicating stronger creditor rights.⁸

3.3.3 Sample Construction

The main data source is Compustat Global for firms incorporated and headquartered in a certain country k in year t , with non-missing data for the main variables of interest over the period 2000-2013. In addition, we supplement the data with U.S. and Canadian firms from Compustat North America. We retrieve the firm's market capitalization and the national exchange rates in USD from Datastream. We deflate the exchange rates into 2014 constant USD by the yearly inflation deflators (CPI based) for each country k in year t . The data on country-level economic variables are from IMF, OECD and World Bank.

Following prior studies on tax avoidance (e.g., Dyreng et al. 2008), we exclude utility firms (SIC codes 4900-4999), financial firms (SIC codes 6000-6999), and firms with negative equity or negative pre-tax income. Throughout all the analyses, we keep in our sample only those firms whose headquarter country coincides with the country of incorporation. In concert, these criteria result in a sample size of 13,447 unique firms and 85,205 firm-year observations.

3.3.4 Baseline Regression

To test for the relationship between creditor rights and firms' tax avoidance, we employ a difference-in-differences research design and estimate the following panel regression model:

⁸ It is worth noting that the *CR Reforms* has a correlation of 0.487 with the *CR Index* (statistically significant at the 1% level). We take this finding as evidence that both indexes essentially capture the same concept.

$$GAAP ETR_{i,t} = \alpha_0 + \beta_1 CR Reforms_{k,t} + \beta_2 X_{i,t} + \beta_3 C_{k,t} + v_i + \eta_j * \omega_t + \varphi_l * \omega_t + \varepsilon_{k,t} \quad (5)$$

where *GAAP ETR* is the dependent variable. Additionally, we use a three-year *GAAP ETR* to proxy for tax avoidance over a longer period. In line with prior literature (e.g., Dyreng et al. 2008; 2010; 2017a), we define the *GAAP ETR* as income taxes dividend by pre-tax income less special items, whereas the three-year *GAAP ETR* is the sum of income taxes during *t-2* and *t* divided by the sum of pre-tax income less special items over the same period. We winsorize both the *GAAP ETR* and the three-year *GAAP ETR* at zero and one.⁹ In addition, we test the robustness of the main findings to using the Atwood et al. (2012) measure of tax avoidance and the total book-tax difference measure according to Blackburne and Blouin (2016) in Section 3.4.5.

With respect to control variables, we include the *CR Reforms* indicator and, alternatively, the *CR Index* as defined above. Our model yields two ambiguous predictions on how creditor rights and tax avoidance relate to each other, we therefore do not have a clear ex-ante expectation for the sign of β_1 since firms in countries with higher *CR Reforms* (*CR Index*) scores could have either lower ($\beta_1 < 0$) or higher ($\beta_1 > 0$) ETRs. Moreover, we follow prior studies on the determinants of tax avoidance and include a vector (*X*) of firm-level variables known to correlate with a firm's tax avoidance (e.g., Rego 2003; Richardson and Lanis 2007; Dyreng et al. 2010; Dyreng et al. 2017a). In particular, we control for *Size*, defined as the natural logarithm of the firm's total assets; *Leverage*, defined as the total debt scaled by total assets; *Accruals*, defined as the sum of the change in net non-cash working capital, the change in net noncurrent operating assets, and the change in net financial assets (Atwood et al. 2012); the firm's market-to-book-ratio (*MtB*), defined as common shares outstanding multiplied by the stock price at the fiscal year-end divided by total

⁹ In the Appendix D, we also assess the robustness of the results to truncating observations with effective tax rates higher (lower) than one (zero).

common equity. In addition, we also add two profitability proxies: *Income*, defined as the firm's earnings before interest, taxes, depreciation, and amortization (EBITDA) scaled by lagged total assets, and *Profit Margin*, defined as the firm's pre-tax income scaled by sales. Further, we control for the ratio of research and development to sales (*R&D*), the ratio of capital expenditure to lagged total assets (*Investment*), the ratio of intangible assets to total assets (*Intangibles*), as well as cash holdings to lagged total assets (*Cash*) and the Altman's Z-score (*Z-score*) as proxies for financial constraints. Finally, we include a dummy variable whether the firm pays dividends (*Dividend*).

To make sure that the economic conditions of a country do not spuriously drive the results, we include in our specifications a vector (C) of country-level variables (e.g., Acharya et al. 2011). In particular, we control for the natural logarithm of GDP per capita (*GDP per capita*) to proxy for country development. We also include the annual percentage growth rate of GDP (*GDP Growth*), the inflation rate (*Inflation*), and a proxy for the country level of enforcement (*Rule of Law*). Moreover, we account for changes in corporate income tax that might affect tax avoidance by including the *Corporate Tax Rate* (e.g., Faccio and Xu 2015). Finally, we winsorize all the non-indicator variables, except country-level variables, at the 1st and 99th percentiles.¹⁰

All models include firm-fixed effects (v_i), industry-year fixed effects defined at the 1-digit SIC level ($\eta_j * \omega_t$) and group-year fixed effects ($\varphi_l * \omega_t$). Following previous tax avoidance studies (e.g., Dyreng et al. 2010), the firm-fixed effects account for unobserved time-invariant firm characteristics that could correlate with a firm's tax avoidance strategy (e.g., Desai and Dharmapala 2006 on the agency costs of tax avoidance). Moreover, the industry-year fixed effects absorb transitory industry shocks that could contemporaneously affect firms' tax avoidance as well as the likelihood for a country k to change creditor rights in a given year t . Furthermore, to make

¹⁰ Appendix C also provides an overview of variables definitions.

sure that the effect does not reflect (unobserved) variation in the enforcement of creditor rights, throughout all the analyses, we narrow down the counterfactuals to comparable countries with similar rule of law by means of group-year effects. Finally, we correct standard errors for clustering at the country level¹¹. This clustering method accounts for autocorrelation of residuals within a firm and across firms within the same country (Petersen 2009).

3.3.5 Summary Statistics

Table 3.2 presents summary statistics for the main variables. On average, the sample firms have effective tax rates of 29.80% (one-year and three-year *GAAP ETR*), despite the high variation across countries as illustrated in Table 3.1. Moreover, the Atwood et al.'s effective tax rate (*Tax Avoid 3*) averages 18.3%, whereas the total book-tax differences measure (*BTD*) for the average firm amounts to 0.016.

The *CR Index* ranges from an average of 4 in Hong Kong and United Kingdom to less than 1.2 in Brazil and Portugal, with an average across countries of 2.661. The variation in the *CR Index* is large both across and within countries in our sample, with a cross-country standard deviation of 0.933 and the highest (lowest) within-country standard deviation of 1.179 (0) in Peru (Belgium, Hong Kong, Thailand, and United Kingdom). This suggests that there is meaningful variation across and within countries to gauge how creditor rights relate to tax avoidance. Furthermore, the *CR Reforms* has a mean value of 0.157 with the highest (lowest) value of 1 (-1).

The average firm has log of total assets (*Size*) of 5.894, has a market-to-book ratio (*MtB*) of 2.719 and appears to be relatively underleveraged (the average total debt-to-assets ratio is 18.2%).

¹¹ In untabulated analyses, we also address the robustness of the findings to using a different clustering method. In particular, we compute cluster-bootstrap standard errors and repeat the study 1000 times (for a discussion on cluster-bootstrap standard errors, see Bertrand et al. 2004; Cameron and Miller 2015). We find that the results are largely unchanged.

Further, the average firm has an EBITDA-to-assets ratio (*Income*) of 14.8%, has capital expenditures of 6.4% of (lagged) total assets (*Investment*) and spends about 1.6% of sales in R&D (*R&D*). Moreover, about 21.4 of (lagged) total assets is in cash and short-term investments (*Cash*), whereas 9.6% of total assets are intangibles (*Intangibles*). In addition, about 70.7% of firms pay dividends (*Dividend*).

The average corporate tax rate across all countries amounts to 33.8% (*Corporate Tax Rate*). On average, the countries grow at 3.3% (*GDP Growth*) and have an inflation rate of 1.9% (*Inflation*). The average level of economic development is 10.188 (*GDP per capita*), as most of the countries in our sample are high-income economies. Finally, across all countries the average enforcement level (*Rule of Law*) is 1.09 (ranging from -2.5 to +2.5).

Table 3.2: Summary Statistics

This table reports summary statistics for the main variables in the regression models. The sample consists of Compustat North America and Compustat Global industrial firms (excluding financials and utilities) over the period 2000 to 2013 and includes 85,205 (65,709 and 82,425) firm-year observations when using *GAAP ETR* and *GAAP ETR 3* (*Tax Avoid 3* and *BTD*) as the (alternative) dependent variable. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Appendix C provides variable definitions.

Variables	Obs.	Mean	Std. Dev.	25th Perc.	Median	75th Perc
Dependent Variables						
GAAP ETR	85,205	0.298	0.174	0.187	0.296	0.385
GAAP ETR 3	85,205	0.298	0.175	0.186	0.293	0.384
Tax Avoid 3	65,709	0.183	0.201	0.044	0.184	0.314
BTD	82,425	0.016	0.063	-0.006	0.004	0.024
Creditor Rights						
CR Reforms	85,205	0.157	0.427	0	0	0
CR Index	85,205	2.661	0.933	2	2.8	3.6
Firm-level Controls						
Size	85,205	5.894	1.748	4.717	5.757	6.976
Leverage	85,205	0.182	0.167	0.032	0.158	0.288
Income	85,205	0.148	0.102	0.080	0.126	0.189
Investment	85,205	0.064	0.085	0.018	0.039	0.076
Cash	85,205	0.214	0.263	0.064	0.143	0.274
Accruals	85,205	0.000	0.145	-0.058	0.002	0.060
Intangibles	85,205	0.096	0.154	0.003	0.019	0.120
Profit Margin	85,205	0.103	0.103	0.037	0.072	0.131
R&D	85,205	0.016	0.043	0.000	0.000	0.011
Z-score	85,205	1.919	1.363	1.306	1.867	2.495
MtB	85,205	2.719	3.655	1.027	1.878	3.291
Dividend	85,205	0.707	0.455	0	1	1
Country-level Controls						
Corporate Tax Rate	85,205	0.338	0.068	0.280	0.361	0.393
GDP Growth	85,205	0.033	0.038	0.015	0.025	0.043
GDP per capita	85,205	10.188	0.972	10.003	10.703	10.775
Inflation	85,205	0.019	0.018	0.002	0.020	0.029
Rule of Law	85,205	1.090	0.770	0.910	1.350	1.610

3.4 Empirical Results

3.4.1 Baseline Results

We first analyze how stronger creditor rights relate to corporate tax avoidance, measured by the *GAAP ETR*. Table 3.3 reports the regression results from estimating Eq. (5). Column (1) includes the CR Reforms, firm and country-level variables, as well as firm-, industry- and group-year fixed effects. The coefficient of CR Reforms is positive and statistically different from zero at the 1% level. In terms of economic significance, one unit increase in the CR Reforms rises the *GAAP ETR* by 1.9%. Given that the sample mean of the *GAAP ETR* is 29.80%, this result corresponds to an increment in the effective tax rate of 6.48% ($=0.0193/0.298$).

The coefficients of the control variables are mostly in line with prior tax avoidance literature. More specifically, we find that larger firms exhibit higher *GAAP ETR* in line with the political view of the firm (Zimmerman 1983). The coefficient of *Income* is negative and statistically significant at the 1% level (Dyreng et al. 2017a), whereas the coefficient of *Leverage* is positive and statistically different from zero at the 5% level (Lin et al. 2014). Further, firms in high-tax countries and those operating in countries with a higher GDP per capita appear to have higher effective tax rates. On the contrary, firms in high-growth countries as well as firms in countries with a higher rule of law show lower effective tax rates.

In column (2), we estimate Eq. (5) with the alternative creditor rights indicator (CR Index). Similarly, we also control for firm and country-level variables, as well as firm-, industry- and group-year fixed effects. The findings resemble those in column (1). More specifically, we find that the CR Index is positive and statistically significant at the 1% level. The economic magnitude is smaller than that of column (1): one unit increase in the CR Index translates to an increase in

the *GAAP ETR* of about 1% or 2.62% relative to the sample mean ($=0.0078/0.298$). Moreover, the coefficients of the control variables are all in line with the previous specification.

Next, we test whether stronger creditor rights also relate to firms' tax avoidance over a longer period by substituting the dependent variable with the three-year *GAAP ETR*. Following the previous analyses, column (3) includes the CR Reforms, firm and country-level variables, as well as firm-, industry- and group-year fixed effects. The coefficient of CR Reforms is consistently positive and statistically different from zero at the 5% level, with a higher economic magnitude of 2.45% or 8.22% relative to the sample mean ($=0.0245/0.298$). Most control variables are also in line with previous specifications. Finally, in column (4) we repeat the analysis of column (3) with the alternative creditor rights indicator (CR Index). We find that the CR Index is still positive and statistically significant at the 1% level. Economically, one unit increase in the CR Index increases the three-year *GAAP ETR* by 1.15 or 3.86% relative to the sample mean. Collectively, the results across all specifications are consistent with stronger creditor rights reducing tax avoidance between 1% and 2.45%.

Table 3.3: Creditor Rights and Tax Avoidance

This table reports the results of the relationship between creditor rights and firm-level tax avoidance. The *CR Reforms* is based on 6 bankruptcy reforms across 34 sample countries over the period 2000-2013, whereas the *CR Index* is a time-varying creditor rights index as in Qi et al. (2017). We use *GAAP ETR* (columns (1) to (2)) and *GAAP ETR 3* (columns (3) to (4)) as the dependent variable. All variables are described in Appendix C. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	GAAP ETR		GAAP ETR 3	
	(1)	(2)	(3)	(4)
CR Reforms	0.0193*** (0.0043)		0.0245** (0.0090)	
CR Index		0.0078*** (0.0021)		0.0115*** (0.0026)
Size	0.0140** (0.0053)	0.0136** (0.0052)	-0.0005 (0.0084)	-0.0012 (0.0083)
Leverage	0.0233** (0.0101)	0.0238** (0.0101)	0.0572* (0.0308)	0.0578* (0.0308)
Income	-0.1507*** (0.0510)	-0.1507*** (0.0510)	-0.0507* (0.0286)	-0.0509* (0.0284)
Investment	0.0087 (0.0308)	0.0088 (0.0309)	-0.0309** (0.0124)	-0.0309** (0.0127)
Cash	0.0007 (0.0110)	0.0007 (0.0110)	-0.0016 (0.0069)	-0.0015 (0.0069)
Accruals	-0.0075 (0.0065)	-0.0074 (0.0065)	-0.0096* (0.0048)	-0.0095* (0.0048)
Intangibles	-0.0060 (0.0137)	-0.0053 (0.0132)	0.0201 (0.0205)	0.0209 (0.0202)
Profit Margin	-0.0531 (0.1649)	-0.0527 (0.1649)	0.0012 (0.0744)	0.0019 (0.0744)
R&D	-0.0339 (0.0523)	-0.0336 (0.0516)	-0.0303 (0.0613)	-0.0296 (0.0603)
Z-score	0.0063 (0.0055)	0.0063 (0.0055)	0.0004 (0.0052)	0.0004 (0.0052)
MtB	0.0002 (0.0004)	0.0002 (0.0004)	-0.0000 (0.0001)	-0.0000 (0.0001)
Dividend	0.0019 (0.0046)	0.0015 (0.0047)	-0.0088** (0.0035)	-0.0095** (0.0037)
Corporate Tax Rate	0.2915** (0.1318)	0.2851** (0.1210)	0.3207* (0.1620)	0.3027** (0.1428)
GDP Growth	-0.2590*** (0.0551)	-0.2681*** (0.0593)	-0.0495 (0.0628)	-0.0570 (0.0673)
GDP per capita	0.0919** (0.0353)	0.0970*** (0.0339)	0.0801** (0.0350)	0.0858** (0.0340)
Inflation	-0.0501 (0.0924)	-0.0335 (0.0920)	0.1256 (0.1756)	0.1465 (0.1674)
Rule of Law	-0.0812*** (0.0218)	-0.0838*** (0.0225)	-0.0445*** (0.0156)	-0.0494** (0.0181)

Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓
#Observations	85,205	85,205	85,205	85,205
Adjusted-R ²	0.432	0.432	0.539	0.539

3.4.2 Econometric concerns

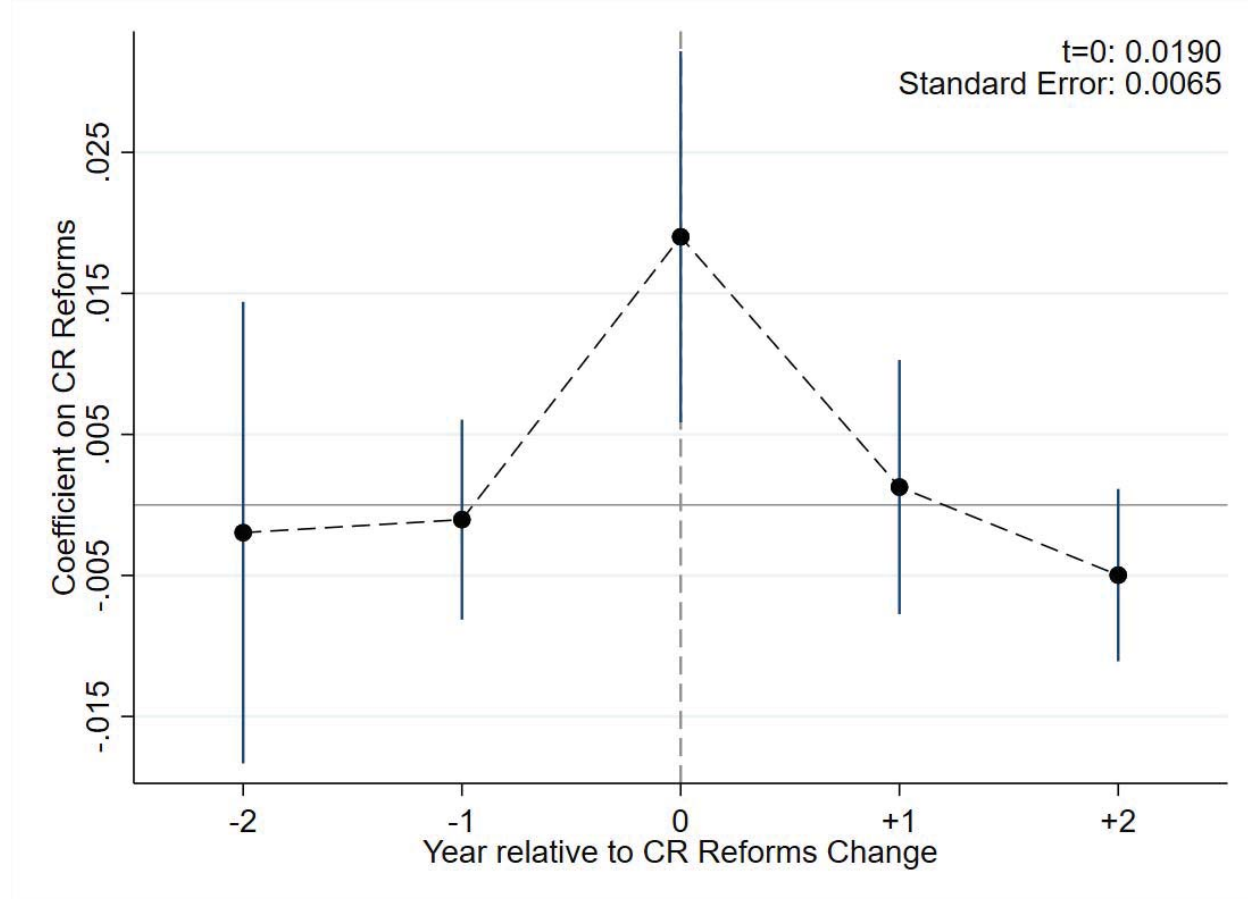
3.4.2.1 The timing of changes in Tax Avoidance

To interpret the results in Table 3.3 as evidence of the effect of creditor rights on tax avoidance, we test whether the parallel trends assumption holds in our sample. This analysis ensures that firms do not anticipate future changes in creditor rights. We thus examine the dynamics of tax avoidance around the passage of the creditor rights reforms by estimating Eq. (5) while additionally including two-year leads and lags of the CR Reforms. The two-year lead coefficients control for potential pretreatment trends and/or anticipation effect. On the contrary, the two-year lagged terms of CR Reforms assess whether there is a reversal, which would indicate that the effect of creditor rights on tax avoidance is not persistent over time. Further, the estimation equation always controls for the current value of CR Reforms, the country-level variables as well as firm- and industry-year fixed effects.

We report the lead and lag coefficients in Figure 3.1 with the 95% confidence interval of the coefficient estimates. We find that all lead and lag coefficients are economically and statistically insignificant. By contrast, the contemporaneous value of CR Reforms is positive and statistically significant at the 1% level with the economic magnitude resembling that in column 1 of Table 3.3 (i.e., one unit increase in the CR Reforms corresponds to an increase in the *GAAP ETR* of 1.9%). These results indicate (1) that firms do not anticipate future changes in creditor rights, (2) that the change in tax avoidance occurs in the year when the new creditor rights regime becomes law and (3) that the effect of creditor rights on tax avoidance is persistent over time.

Figure 3.1: Changes in CR Reforms and Tax Avoidance

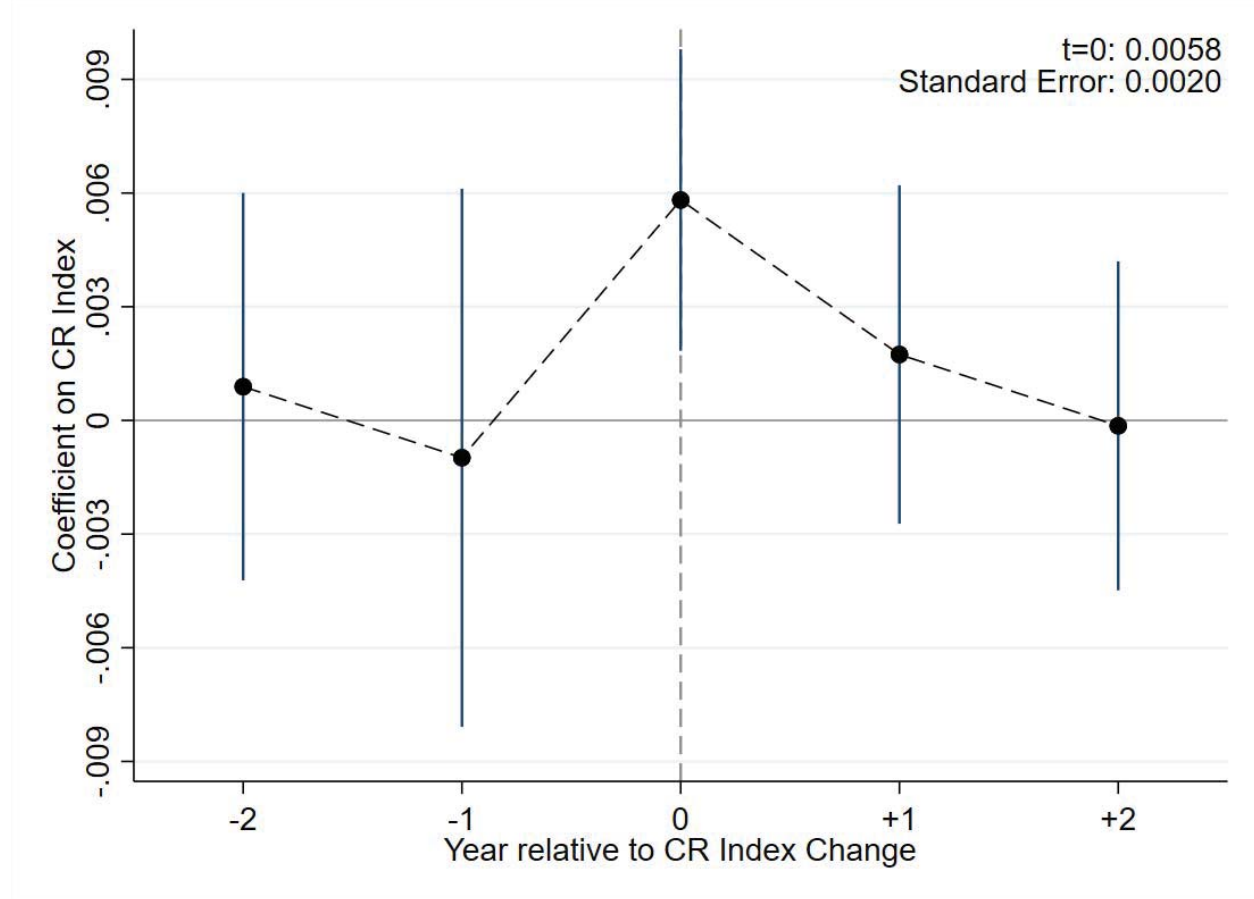
This figure plots the difference in the *GAAP ETR* of treated firms relative to counterfactual firms. Treated firms are located in countries with a creditor rights reform in t_0 across the 34 sample countries over the 2000-2013. Counterfactual firms are from countries in the same industry and year. We include country controls for economic and political conditions, and firm fixed effects when estimating the difference between treated and counterfactual firms. We also present the difference-in-differences estimate in t_0 (DD estimate) and the standard error, which is clustered at the country level. The connected line indicates the 95% confidence interval.



Similarly, we repeat the analysis using the continuous CR Index and display the results in Figure 3.2. We continue to observe that all lead and lag coefficients are economically and statistically insignificant, whereas the contemporaneous value of CR Index is positive and statistically significant at the 1% level. As above, these findings suggest that (1) there is no anticipation effect, (2) that there is an immediate tax avoidance response to changes in creditor rights, and (3) that the effect does not reverse in subsequent years. Overall, these analyses support a plausible parallel trends assumption in our sample.

Figure 3.2: Changes in CR Index and Tax Avoidance

This figure plots the difference in the *GAAP ETR* of treated firms relative to counterfactual firms. Treated firms are located in countries with a *CR Index* change in t_0 across the 34 sample countries over the 2000-2013. Counterfactual firms are from countries in the same industry and year. We include country controls for economic and political conditions, and firm fixed effects when estimating the difference between treated and counterfactual firms. We also present the difference-in-differences estimate in t_0 (DD estimate) and the standard error, which is clustered at the country level. The connected line indicates the 95% confidence interval.



3.4.2.2 The effect of unobserved time-invariant firm characteristics

To further sharpen the analysis and address potential identification concerns, we follow Heider and Ljungqvist (2015) and conduct a regression in first-differences of the change in either the CR Reforms or the CR Index on the change in firm-level tax avoidance. Similar to the main specification with firm-fixed effects, this empirical approach removes latent time-invariant firm- or country- characteristics that could be responsible for the change in tax avoidance.

Table 3.4 presents the results from estimating Eq. (5) in first-differences. Column (1) includes the CR Reforms, along with all control variables, industry- and group-year fixed effects. We find that the CR Reforms coefficient is positive and statistically significant at the 5% level, with an economic magnitude slightly below the main results of Table 3.3 (i.e., one unit increase in the CR Reforms translates to an increase in the effective tax rate of about 1% or 3.19% relative to the sample mean of the *GAAP ETR*). Column (2) repeats the same analysis using the CR Index as an alternative proxy for creditor rights. The results resemble those presented in column (1), albeit now statistically significant at the 1% level.

Furthermore, in columns (3) and (4) we estimate Eq. (5) in first-differences using the three-year *GAAP ETR* as the dependent variable. We find that the CR Reforms (column (3)) and the CR Index (column (4)) are both positive and significantly different from zero at the 1% level, with the economic magnitudes being close to the main results of Table 3.3. Overall, these analyses indicate that the change in tax avoidance is not driven by unobserved time-invariant firm- or country-characteristics.

Table 3.4: Creditor Rights and Tax Avoidance – First Difference Estimation

This table reports the results of the first difference regression of the change in creditor rights on the change in firm-level tax avoidance. The *CR Reforms* is based on 6 bankruptcy reforms across 34 sample countries over the period 2000-2013, whereas the *CR Index* is a time-varying creditor rights index as in Qi et al. (2017). We use the change in *GAAP ETR* (columns (1) to (2)) and the change in *GAAP ETR 3* (columns (3) to (4)) as the dependent variable. The change in *GAAP ETR 3* is defined as the difference between *GAAP ETR 3* at t (i.e., computed over t to $t+2$) and *GAAP ETR 3* at $t-3$ (i.e., computed over $t-3$ to $t-1$). All variables are described in Appendix C. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS in first-differences with standard errors adjusted for heteroskedasticity and clustered at the country-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	Δ GAAP ETR		Δ GAAP ETR 3	
	(1)	(2)	(3)	(4)
CR Reforms	0.0095** (0.0044)		0.0280*** (0.0039)	
CR Index		0.0052*** (0.0016)		0.0095*** (0.0021)
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	-	-	-	-
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓
#Observations	74,490	74,490	48,737	48,737
Adjusted-R ²	0.0131	0.0131	0.0260	0.0260

3.4.3 Assessing the channels: Creditor Rights and Firm characteristics

Motivated by the robust evidence that creditor rights reduce tax avoidance, in this section, we analyze the channel through which stronger creditor rights decrease tax avoidance. For the main results to hold, our model predicts that stronger creditor rights enhance access to finance and firms take on a higher amount of debt at the same interest rate (e.g., Giannetti 2003; Beck et al. 2003a, 2003b). We thus examine how creditor rights relate to leverage ratio and total interest expenses using the following estimation equation:

$$Leverage_{i,t+1} = \alpha_0 + \beta_1 CR\ Reforms_{k,t} + \beta_2 X_{i,t} + \beta_3 C_{k,t} + v_i + \eta_j * \omega_t + \varphi_l * \omega_t + \varepsilon_{k,t} \quad (6)$$

where *Leverage* is the dependent variable. In line with the baseline specification (Eq. 5), we define *Leverage* as total debt scaled by total assets and we measure it for any given firm i in year $t+1$. In

addition, we include the *CR Reforms* indicator and, alternatively, the *CR Index* as defined above. Consistent with firms taking on more debt in countries with stronger creditor rights, we expect higher *CR Reforms* (*CR Index*) scores to be associated with higher leverage ratios ($\beta_1 > 0$). Moreover, we include the entire set of control-variables as well as of fixed effects from Eq. (5). We cluster standard errors at the country level.

Columns (1) to (4) of Table 3.5 (Panel A) present the results. As expected, the coefficient of *CR Reforms* is positive and statistically significant at the 1% level (column (1)). In terms of economic significance, one unit increase in the *CR Reforms* indicator rises the leverage ratio by 1.35%. Similarly, in column (2) we find that the *CR Index* is also positively associated with leverage and statistically different from zero at the 1%. Economically, one unit increase in the *CR Index* corresponds to an increase in the leverage ratio of about 0.5%. In columns (3) and (4), we repeat the analysis in first differences. Consistently, we still find that the two creditor rights indicators are positively associated with a firm's leverage ratio and are statistically significant at the 1% and 10% levels.

Further, to shed light on the theoretical channel predicting that firms also have higher deductible interest expenses in countries with stronger creditor rights, we rerun the estimation equation (6) and now use *Interest/Total Assets* as the dependent variable to proxy for the total interest expenses. We define *Interest/Total Assets* as total interest expenses divided by total assets. Similar to the previous analysis, we measure *Interest/Total Assets* for any given firm i in year $t+1$. We expect firms in countries with stronger creditor rights to have higher total interest expenses relative to total assets and thereby reduce taxable income ($\beta_1 > 0$). Consistent with the baseline model (Eq. 5), we add all firm- and country-level variables, coupled with firm-, industry-, and group-year fixed-effects. We correct standard errors for clustering at the country level. The results

are presented in columns (5) and (6) of Table 3.5 (Panel A). In column (5), the CR Reform is positive and statistically different from zero at the 1% level. In economic terms, one unit increase in the CR Reforms increases the total interest expenses relative to total assets by 0.16%. Similarly, in column (6) we find that CR Index is also positive and statistically significant at the 1%.

The results so far are consistent with stronger creditor rights enhancing access to finance and firms substituting tax avoidance with debt. However, our model also yields an alternative prediction, i.e. that stronger creditor rights lower the cost of debt and, in turn, lead to higher tax avoidance, higher capital input and higher output. To rule this channel out, we now estimate Eq. (6) using proxies for capital input, output, and cost of debt as dependent variables. Starting with capital input, we follow the baseline regression and define *Investment* as capital expenditure divided by lagged total assets. We use *Total Sales* as a proxy for output, which corresponds to the natural logarithm of a firm's total sales. Relatedly, the proxy for a firm's cost of debt (*Interest/Total Debt*) is the total interest expenses divided by total debt. For any given firm i , we measure *Investment* in year t , whereas *Total Sales* and *Interest/Total Debt* are measured at $t+1$. For our main findings to hold, this alternative theoretical channel must not be at work. Therefore, both creditor rights indicators should be statistically insignificant across all analyses. As above, we add all control variables, firm-fixed effects (v_i), industry-year fixed effects defined at the 1-digit SIC level ($\eta_j * \omega_t$), and group-year fixed effects ($\varphi_l * \omega_t$). We cluster standard errors at the country level.

Panel B of Table 3.5 presents the results. As expected, throughout all specifications, we do not find any significant correlation between either the CR Reforms or the CR Index and the proxies for capital input, output, and cost of debt. Taken together, these non-findings, coupled with the previous results for leverage ratio and total interest expenses over total assets, confirm our

interpretation of the baseline results that firms substitute tax avoidance with debt in countries with stronger creditor rights.

Table 3.5: Creditor Rights and Firm Characteristics

This table reports the results of the relationship between creditor rights and firm characteristics. The *CR Reforms* is based on 6 bankruptcy reforms across 34 sample countries over the period 2000-2013, whereas the *CR Index* is a time-varying creditor rights index as in Qi et al. (2017). In Panel A, we use *Leverage* at $t+1$ (columns (1) to (2)), the change in *Leverage* (i.e., computed over t to $t+1$) (columns (3) to (4)) and *Interest/Total Assets* at $t+1$ (columns (5) to (6)) as the dependent variable. In Panel B, we use *Investment* at t (columns (1) to (2)), *Total Sales* at $t+1$ (columns (3) to (4)), and *Interest/Total Debt* at $t+1$ (columns (5) to (6)) as the dependent variable. All variables are described in Appendix C. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions (OLS in first-differences in columns (3) to (4) of Panel A) with standard errors adjusted for heteroskedasticity and clustered at the country-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	Leverage_{t+1}		ΔLeverage_{t,t+1}		Interest/Total Assets_{t+1}	
Panel A	(1)	(2)	(3)	(4)	(5)	(6)
CR Reforms	0.0135*** (0.0030)		0.0078*** (0.0025)		0.0016*** (0.0006)	
CR Index		0.0049*** (0.0015)		0.0023* (0.0014)		0.0004*** (0.0001)
Firm-level controls	✓	✓	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	-	-	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓	✓	✓
#Observations	62,630	62,630	55,514	55,514	62,638	62,638
Adjusted-R ²	0.794	0.794	0.0312	0.0311	0.717	0.717
Dep. Var.	Investment_t		Total Sales_{t+1}		Interest/Total Debt_{t+1}	
Panel B	(1)	(2)	(3)	(4)	(5)	(6)
CR Reforms	0.0027 (0.0021)		-0.0140 (0.0500)		0.0146 (0.0121)	
CR Index		0.0012 (0.0008)		0.0257 (0.0214)		-0.0003 (0.0027)
Firm-level controls	✓	✓	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓	✓	✓
#Observations	76,614	76,614	76,614	76,614	62,638	62,638
Adjusted-R ²	0.606	0.606	0.969	0.969	0.376	0.376

3.4.4 Exploiting sources of cross-sectional variation in firm, and country characteristics

To provide additional evidence on the mechanisms of the results and further shed light on the causal relationship between creditor rights and tax avoidance (Wooldridge 2009), in this section, we analyze three sources of cross-sectional variation in firm and country characteristics. We adopt a triple differences research design and control for country-year fixed effects as well. This additional set of fixed effects (1) narrows down the counterfactuals to firms from the same country and (2) ensures that omitted time-varying economic and/or political factors do not spuriously drive the results.

3.4.4.1 Cross-sectional variation in firm characteristics: Expected bankruptcy costs

We first investigate the relationship between creditor rights and tax avoidance on the cross-section of firms with various expected bankruptcy costs. If stronger creditor rights, on average, enhance access to finance such that firms substitute tax avoidance with debt, we would expect firms with lower expected bankruptcy costs to find it even easier to substitute costly tax avoidance with debt (e.g., Hart and Moore 1998). We follow Colla et al. (2013) and use two different proxies for expected bankruptcy costs: leverage and asset intangibility. We predict that firms with lower levels of debt and intangible assets to have more opportunities to substitute tax avoidance with debt. We identify underleveraged firms using an indicator variable (*Low Leverage*) that takes the value of 1 if a firm's leverage ratio is equal to or below the bottom quartile of the yearly industry distribution (one-digit SIC code) in that country, and zero otherwise. In similar manner, we identify low-intangibles firms using a dummy variable (*Low Intangibles*) that is equal to 1 if a firm's level of intangible assets is equal to or below the bottom quartile of the yearly industry distribution (one-digit SIC code) in that country, and zero otherwise. The variables of interest are thus the interaction

terms between the CR index and these indicator variables,¹² for which we expect a positive sign($\beta_1 > 0$) in the following panel regression model:

$$GAAP ETR_{i,t} = \alpha_0 + \beta_1 CR Index_{k,t} * Low Leverage_{i,t} + \beta_2 CR Index_{k,t} + \beta_3 Low Leverage_{i,t} + \beta_4 X_{i,t} + \beta_5 C_{k,t} + v_i + \eta_j * \omega_t + \varphi_l * \omega_t + \varepsilon_{k,t} \quad (7)$$

In line with the baseline regression (Eq. 5), we include the entire set of firm- and country-level variables as well as of fixed effects. We cluster standard errors at the country-level. Table 3.6 (Panel A) presents the results for underleveraged firms. As predicted, across all specifications, we find the coefficient estimate for the interaction term to be positive and statistically significant at conventional levels. In economic terms, the results indicate that underleveraged firms additionally increase their (three-year) *GAAP ETR* by about 0.33% (0.44%) compared to similar firms with higher leverage ratios. In further support of these results, we also find the CR Index and its interaction with the *Low Leverage* variable to be jointly significant at the 1% level across all specifications (columns (1) and (3)). Moreover, the findings also hold after controlling for country-year fixed effects (columns (2) and (4)).

In panel B of Table 3.6, we repeat the same analysis for low-intangibles firms by replacing the interaction term with the *Low Intangibles* variable. Similarly, we show that firms with a lower level of intangible assets reduce tax avoidance more compared to similar firms with higher levels of intangibles. In particular, we find that the interaction term is mostly significant at conventional levels. Economically, these firms additionally increase their effective tax rates by about 0.31% to 0.34%. Furthermore, we find that the main coefficient of interest (i.e., the CR Index) and its

¹² Throughout all cross-sectional analyses, we employ the CR index as the main proxy for the strength of creditor rights. As argued in section 3.3.5, this index varies a great deal across and within countries and over time, allowing us to exploit meaningful variation when gauging the relationship between creditor rights and tax avoidance.

interaction with *Low Intangibles* are jointly statistically different from zero at the 1% level (columns (1) and (3)). The results are also robust when controlling for country-year fixed effects (columns (2) and (4)). Overall, this evidence confirms our prediction that, in countries with stronger creditor rights, firms with lower expected bankruptcy costs reduce tax avoidance more compared to similar firms with higher expected bankruptcy costs.

Table 3.6: Creditor Rights and Tax Avoidance – Expected bankruptcy costs

This table reports the results of the relationship between creditor rights and firm-level tax avoidance, conditional on the firm's expected bankruptcy costs. The *CR Reforms* is based on 6 bankruptcy reforms across 34 sample countries over the period 2000-2013, whereas the *CR Index* is a time-varying creditor rights index as in Qi et al. (2017). We use *GAAP ETR* (columns (1) to (2)) and *GAAP ETR3* (columns (3) to (4)) as the dependent variable. The proxies for low bankruptcy costs are *Low Leverage* and *Low Intangibles*. All variables are described in Appendix C. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	GAAP ETR		GAAP ETR3	
	(1)	(2)	(3)	(4)
Panel A				
CR Index*Low Leverage	0.0033* (0.0018)	0.0036** (0.0017)	0.0044* (0.0022)	0.0050** (0.0019)
CR Index	0.0070*** (0.0019)		0.0105*** (0.0024)	
Low Leverage	-0.0048 (0.0052)	-0.0058 (0.0049)	-0.0063 (0.0059)	-0.0085 (0.0055)
<i>Joint Significance</i> (CR Index*Low Leverage + CR Index)	0.0103*** (0.0029)		0.0149*** (0.0037)	
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓
Country-Year FE	-	✓	-	✓
#Observations	85,205	85,198	85,205	85,198
Adjusted-R ²	0.432	0.434	0.539	0.541
Panel B				
CR Index*Low Intangibles	0.0031* (0.0016)	0.0034** (0.0016)	0.0032 (0.0023)	0.0043* (0.0022)
CR Index	0.0071*** (0.0021)		0.0109*** (0.0026)	
Low Intangibles	-0.0172** (0.0082)	-0.0174** (0.0081)	-0.0116 (0.0092)	-0.0142 (0.0091)
<i>Joint Significance</i> (CR Index*Low Intangibles + CR Index)	0.0102*** (0.0024)		0.0141*** (0.0034)	
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓
Country-Year FE	-	✓	-	✓
#Observations	85,205	85,198	85,205	85,198
Adjusted-R ²	0.432	0.434	0.539	0.541

3.4.4.2 Cross-sectional variation in country characteristics: *Deductibility of Capital and Debt Enforcement*

In this set of tests, we study the relationship between creditor rights and tax avoidance conditional on the cross-section of countries with different tax codes and enforcement of debt contracts. To start, we examine whether the relationship between creditor rights and tax avoidance depends on the degree of deductibility of capital allowed by a country's tax code. In particular, firms located in countries with higher deductibility of capital, i.e. where debt and equity are equally or almost equally tax deductible (e.g., Auerbach et al. 2008), should have fewer incentives to substitute costly tax avoidance with debt to create a tax shield (e.g., Miller 1977; DeAngelo and Masulis 1980). Thus, based on this reasoning, we would expect these firms to reduce tax avoidance to a lesser extent, compared to similar firms in countries with lower deductibility of capital.

To measure the deductibility of capital, we gather information on several tax base items from Alexander et al. (2016) and Bethmann et al. (2018) and add the missing data for our sample countries. Specifically, we focus on restrictions on interest payments deductibility (i.e., “thin capitalization rules”), loss carryback and loss carryforward, and allowance for corporate equity. Subsequently, we employ the methodology of Goncharov and Jacob (2014) and combine all the tax base items into an overall index (*Deductibility Index*), ranging theoretically from zero (very low deductibility) to three (very high deductibility with no restrictions on interests deductibility, loss carryback rule and loss carryforward from a minimum of 6 years to unlimited, and allowance for corporate equity).¹³ The variable of interest is thus the interaction between the CR index and the *Deductibility Index*, for which we expect a negative sign ($\beta_1 < 0$) in the following panel regression model:

¹³ It is worth pointing out that, in our sample, the actual empirical distribution of *Deductibility Index* lies between zero and two.

$$\begin{aligned}
GAAP\ ETR_{i,t} = & \alpha_0 + \beta_1 CR\ Index_{k,t} * Deductibility\ Index_{k,t} + \beta_2 CR\ Index_{k,t} & (8) \\
& + \beta_3 Deductibility\ Index_{k,t} + \beta_4 X_{i,t} + \beta_5 C_{k,t} + v_i + \eta_j * \omega_t + \varphi_l * \omega_t + \varepsilon_{k,t}
\end{aligned}$$

Consistent with the previous cross-sectional specification (Eq. 7), we add the entire set of firm- and country-level variables as well as of fixed effects. We cluster standard errors at the country-level. Table 3.7 (columns (1) and (3)) presents the results. As expected, in both specifications we find the interaction between the CR Index and *Deductibility Index* to be negative and statistically significant at the 1% and 10% levels. In economic terms, one unit increase in *Deductibility Index* reduces the (three-year) *GAAP ETR* by about 0.71% (1%). Furthermore, we find that the CR Index and its interaction with *Deductibility Index* are jointly significant at the 5% and 10% levels.

In the final set of cross-sectional analyses, we focus on the role of debt enforcement in shaping the relationship between creditor rights and tax avoidance. Prior theoretical (Gennaioli and Rossi 2010) and empirical literature (Bae and Goyal 2009) on the efficiency of bankruptcy courts and financial contracts finds that creditors' willingness to lend not only depends on the mere existence of laws, but also on whether creditor rights are properly enforced in a country. Thus, based on this argument, we would expect firms operating in countries with weaker debt enforcement to have fewer opportunities to substitute tax avoidance with debt and, in turn, to reduce tax avoidance to a lesser degree, compared to similar firms located in countries with stronger debt enforcement.

To proxy for debt enforcement, we use the contract-enforcement index (*Debt Enforcement*) from the World Bank Doing Business database. This index is based on the number of days required for a creditor to enforce a debt contract before the court. Therefore, this index also represents a measure of the efficiency of bankruptcy institutions in a given country and year.

To provide evidence on the relationship between creditor rights and tax avoidance conditional on the level of debt enforcement, we re-estimate Eq. (8) and now interact the CR Index with *Debt Enforcement*. The coefficient of interest is β_1 , for which we expect a negative sign ($\beta_1 < 0$). Table 3.7 (columns (2) and (4)) reports the results. As predicted, in both specifications we find the interaction between the CR Index and *Debt Enforcement* to be negative and statistically significant at the 1% (columns (4)) and 10% (columns (2)) levels. Furthermore, we find the CR Index and its interaction with *Debt Enforcement* to be jointly significant at the 1% and 5% levels.

Table 3.7: Creditor Rights and Tax Avoidance – Deductibility of Capital and Debt Enforcement

This table reports the results of the relationship between creditor rights and firm-level tax avoidance, conditional on the country's debt enforcement as well as on the deductibility of capital allowed by the country's tax code. The *CR Reforms* is based on 6 bankruptcy reforms across 34 sample countries over the period 2000-2013, whereas the *CR Index* is a time-varying creditor rights index as in Qi et al. (2017). We use *GAAP ETR* (columns (1) to (2)) and *GAAP ETR 3* (columns (3) to (4)) as the dependent variable. The proxies for deductibility of capital and debt enforcement and are *Deductibility Index* and *Debt Enforcement*. All variables are described in Appendix C. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	GAAP ETR		GAAP ETR3	
	(1)	(2)	(3)	(4)
CR Index*Deductibility Index	-0.0071*		-0.0100***	
	(0.0035)		(0.0029)	
CR Index	0.0119***		0.0166***	
	(0.0032)		(0.0031)	
Deductibility Index	0.0137		0.0085	
	(0.0112)		(0.0103)	
<i>Joint Significance</i> (CR Index*Deduct. Index + CR Index)	0.0048*		0.0067**	
	(0.0024)		(0.0030)	
CR Index*Debt Enforcement		-0.0045*		-0.0113***
		(0.0026)		(0.0036)
CR Index		0.0318**		0.0735***
		(0.0145)		(0.0195)
Debt Enforcement		0.0031		0.0201**
		(0.0090)		(0.0083)
<i>Joint Significance</i> (CR Index*Debt Enforcement + CR Index)		0.0274**		0.0622***
		(0.0119)		(0.0160)
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓
#Observations	85,205	85,205	85,205	85,205
Adjusted-R ²	0.432	0.432	0.539	0.539

3.4.5 Additional Analyses

Before moving on to assess the internal validity of our findings in the Italian setting, in this section we document the robustness of the results to augmenting the baseline specification with country-specific time trends, to using other tax avoidance measures as well as to adopting an alternative estimation strategy.

3.4.5.1 Robustness to controlling for country trends

First, in Table D.1 (Panel A) of Appendix D, we augment Eq. (5) with country-specific time trends, which allow the identification of the effect of creditor rights on corporate tax avoidance to come from pre-treatment country-specific tax avoidance trends. Similar to Simintzi et al. (2015) and De Vito (2017), we create a trend variable equal to the current year – 1999 (i.e., one year before the sample period starts), and interact it with an indicator variable for each country. We find that most coefficient estimates of the creditor rights indicators are still robust and statistically significant at conventional levels. The results are also economically significant and close to the main findings of Table 3.3.

3.4.5.2 Alternative definitions of Tax Avoidance

In the second set of robustness analyses, we address concerns related to the construction and the use of the *GAAP ETR* as a proxy for tax avoidance. In all previous analyses, we used a winsorized version of the (three-year) *GAAP ETR*. In Table D.1 (Panel B) of Appendix D, we truncate observations with effective tax rates higher (lower) than one (zero) and rerun the main regression model (Eq. 5). Across all specifications, we find that the results are statistically different

from zero at 1% and 5% levels. We also note that the economic magnitude is similar the main findings of Table 3.3.

Next, we assess whether the results hold to using alternative dependent variables. With the exception of United States, our sample countries do not mandate firms to disclose the taxes paid in the financial statements, making difficult to compute a cash-based effective tax rate for a reliable number of firms. Therefore, to overcome this issue and still test the robustness of our findings, we refer to Atwood et al. (2012) to approximate the amount of taxes paid over a three-year period. Relatedly, we also use a total book-tax difference measure, which proxies for temporary and permanent differences between book and taxable income (e.g., Blackburne and Blouin 2016).

Conceptually, the two tax avoidance measures capture the difference in reported profits for accounting and tax purposes. Hence, a lower (higher) discrepancy between book and taxable income would indicate less (more) tax avoidance. Following this construction and our previous analyses that stronger creditor rights reduce tax avoidance, we therefore expect the sign of the CR Reforms (CR Index) to be negative ($\beta_1 < 0$) in these analyses. Table A.2 (Panel A) reports the results. Consistently, we find that the results are robust and in line with our main inferences. Similarly, in Panel B of Table A.2, we repeat the analysis in first-differences and continue to find that the results are statistically significant at conventional levels.

3.4.5.3 Alternative Estimation Strategy

Finally, to strengthen the interpretation of our findings, we adopt an alternative estimation strategy. In particular, we follow Blundell and Powell (2003), Altonji and Matzkin (2005) and John et al. (2017) and implement a correlated random effect model, which represents a combination of fixed- and random-effects regression to estimate coefficients of time-variant and

time-invariant variables simultaneously (Wooldridge 2009). By employing this model, we can further test the robustness of the main finding to using a third creditor rights indicator, i.e. the Djankov et al.'s creditor rights index (2007), which is time-invariant in our sample period. In this specification, we additionally include the country's legal origin and religion to ensure that other time-invariant country-level variables do not spuriously drive the results (e.g., La Porta et al. 1998; Stulz and Williamson 2003).¹⁴

Table D.3 of Appendix D reports the results. Throughout all specifications, we find the creditor rights index by Djankov et al. (2007) to be positive and statistically different from zero at the 1% and 5% levels. In economic terms, one unit increase in the creditor rights index corresponds to an increase in the (three-year) *GAAP ETR* of about 0.95% (1.53%). Overall, the results of these additional analyses are qualitatively and quantitatively unchanged and support the main findings.

3.5 Exploiting the Italian 2005 Bankruptcy Reform as Quasi-Natural Experiment

3.5.1 The 2005 Bankruptcy Reform in Italy

While the international setting allows us to draw general inferences about the relationship between creditor rights and tax avoidance, it also bears the cost of a less clear causal relationship between creditor rights and tax avoidance due to potential concerns over endogeneity. To overcome this issue, in this section we provide internal validity of our main findings by exploiting the 2005 Bankruptcy Reform in Italy. This law, in the spirit of the U.S. Chapter 11, made debt renegotiations easier for debtors and led to a decrease in creditor rights (Favara et al. 2017).

¹⁴ In our previous analyses, we implicitly control for these two time-invariant variables by including firm-fixed effects.

This event plausibly alleviates identification concerns stemming from the endogeneity of creditor rights laws for the following reasons. First, as also argued by Rodano et al. (2016), this law was motivated by the Parmalat scandal in December 2003 and was, thus, unrelated to general trends in firm performance.¹⁵ Before the change, Italy had already been exhorted repeatedly by the European Court of Justice to reform the 1942 bankruptcy code since it was violating European law (Lo Cascio 1999), but no legislative action had been taken until then. Second, the new bankruptcy law proved to be fast and largely unanticipated by banks, firms, and the media. In December 2004, the Italian government presented a draft of the reform to the Parliament, which was approved just 4 months later in April 2005. A third feature that also makes Italy an interesting setting for our analyses relates to the enforcement of bankruptcy law. Although the bankruptcy code gives all creditors the same rights to resort to a bankruptcy court against a defaulting debtor, the enforcement of a debt contract varies significantly within the country. In this regard, Jappelli et al. (2005) show that there are large differences across Italian regions in the efficiency of bankruptcy courts that affects debt enforcement and ultimately the availability of credit for firms. Based on this finding, it is plausible to expect the effect of the 2005 Bankruptcy reform on tax avoidance and debt to also vary greatly among firms in our sample due to within-country variations in the enforceability of debt contracts.

To shed further light on the differences in debt enforcement in Italy, in Figure 3.3 we display the length of bankruptcy proceedings across 103 provinces in 2004 (i.e., the year before the reform was passed) using bankruptcy data from the Italian National Institute of Statistics (ISTAT). Similar to Jappelli et al. (2005), we observe that there is meaningful variation across provinces in the

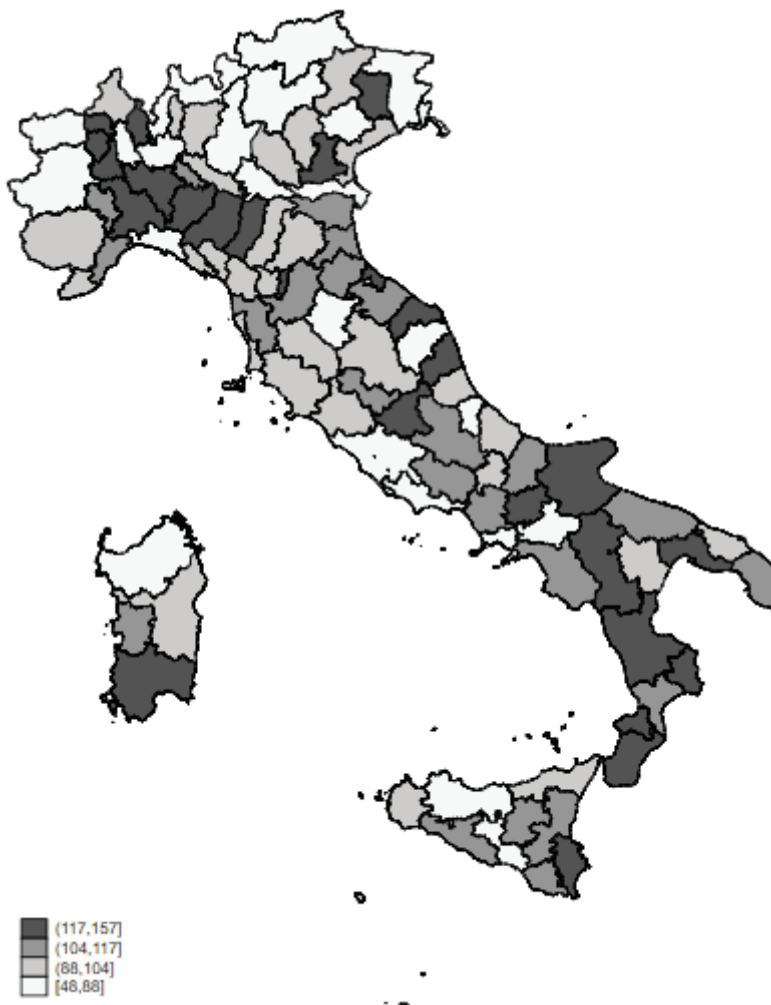
¹⁵ For a discussion on the topic, see also the Italian financial newspaper *Il Sole 24 Ore*: <http://www.ilsole24ore.com/art/SoleOnLine4/Finanza%20e%20Mercati/2008/12/scheda-crac-parmalat.shtml?uuid=29bd3c50-cd3a-11dd-8f0b-bdce7f887965> (last accessed, May 15, 2018).

administration of bankruptcy law. The average duration for bankruptcy procedures to close is 68 (137) months in the most (least) efficient provinces. This heterogeneity does not reflect the north-south division that is typical of Italy. Rather, it is due to organizational and administrative procedures that ultimately create a quasi-random distribution of judges' ability and effort within the country (Rodano et al. 2016). Finally, it is also worth pointing out that the Italian bankruptcy code prevents firms from strategically relocating for judicial reasons (i.e., the so-called "forum shopping"; Gennaioli and Rossi 2010).¹⁶

¹⁶ In particular, article 9 of the bankruptcy code states that firms must file for bankruptcy in the closest court where the headquarters are located. Relatedly, any relocation during the year that precedes the bankruptcy proceedings does not apply.

Figure 3.3: Length of bankruptcy proceedings in months across Italian provinces

This figure shows the distribution of length of bankruptcy proceedings across 103 Italian provinces. The bankruptcy proceedings, expressed in months, are based on court data aggregated at the province-level and closed in 2004. Darker provinces correspond to longer durations.



Overall, this setting provides us with an unanticipated decrease in creditor rights, with within-country differences in debt enforcement, and with two potential groups of firms. On the one hand, firms that are more affected by the change, because they are located in provinces where debt enforcement is lower and, in turn, have fewer opportunities to substitute tax avoidance with debt. On the other hand, firms that are less affected by the reform, because they are located in provinces where debt enforcement is higher and, thereby, have more opportunities to substitute tax avoidance

with debt. Hence, we identify the effect of creditor rights in this setting by comparing the change in tax avoidance and debt around the Bankruptcy reform in 2005 (first difference) across firms in more versus less affected provinces (second difference).

3.5.2 Research Design and Data

To differentiate between firms operating in low and high debt enforcement provinces, we require information on the precise location of a firm. We follow the approach of Jacob et al. (2017) and use unconsolidated financial statements. As opposed to consolidated balance sheets, the unconsolidated balance sheet data allow us to identify precisely the location and the activity of a single firm. We use all available firm-level data from the commercial database Amadeus, compiled by Bureau van Dijk, over the period 2003-2007. The Amadeus database comprises financial information of public and private firms along with the exact address of each firm. Moreover, we require firms to exist before and after the reform and to report information on all control variables. In concert, these sample requirements result in 4,166 unique firms and 15,504 observations. Table 3.8 presents summary statistics for this setting.

Using the postal code of each firm, we first match unconsolidated balance sheet data with the bankruptcy proceeding durations of each Italian province. Subsequently, we construct treatment and control groups based on the length of bankruptcy proceedings in 2004 (i.e., the year before the reform became law). In particular, we define the treatment group (*Low Debt Enforcement Prov.* = 1) as those firms located in a low debt enforcement province whose number of bankruptcy proceedings days is above the median of days across 103 provinces, and zero otherwise. There is an important assumption in this definition. Debt enforcement must not change around the reform to ensure that the effect only comes from the change in creditor rights. In Figure D.1 of Appendix D, we plot the difference in the average length of bankruptcy proceeding durations of low debt

enforcement provinces relative to high debt enforcement provinces around the 2005 reform. We find that the difference in the average durations for treatment and control groups is statistically insignificant (coefficient estimate = 0.0246, t-stat = 0.83). This result reassures us that the effect of the 2005 Bankruptcy reform on firms' tax avoidance only comes from the change in law. Using the Italian data, we then estimate the following model:

$$GAAP ETR_{i,t} = \alpha_0 + \beta_1 Low Debt Enforcement Prov_{i,t} * Post_t \tag{9}$$

$$+ \beta_2 X_{i,t} + v_i + \eta_j * \varphi_r * \omega_t + \varepsilon_{p,t}$$

where *GAAP ETR* is the dependent variable. The variable *Post* equals to one for post-reform years 2005-2007. The main variable of interest is the interaction term between *Low Debt Enforcement Prov.* and *Post*, which is the difference-in-differences coefficient. Given that the 2005 Bankruptcy reform led to a decrease in creditor rights (Favara et al. 2017), we expect firms located in low debt enforcement provinces to increase tax avoidance relative to similar firms operating in high debt enforcement provinces ($\beta_1 < 0$). Our specification controls for firm-fixed effects (v_i) and region-industry-year fixed effects ($\eta_j * \varphi_r * \omega_t$). The latter set of fixed effects enables us to compare treated firms with control group firms in the same industry and region that differ only by debt enforcement but are otherwise subject to the same local economic environment. For example, firms from Bari, Brindisi, Foggia, Lecce, and Taranto are all located in the Apulia region but are different with respect to the province they belong to and the related debt enforcement. We add the vector (X) of firm-level variables, which includes firm size, leverage, income, investment, cash, intangibles, and profit margin.¹⁷ We cluster standard errors at the province level.

¹⁷ Appendix C.1 provides variable definitions for the Italian setting.

Table 3.8 presents the summary statistics for our variables. On average, the sample firms have an effective tax rate of 60.8% and have a leverage ratio of 67.7%. Furthermore, the average firm holds 7.6% of total assets in cash and short-term investments and 2.8% in intangible assets. Moreover, the average firm has an EBITDA-to-assets-ratio of 11.7% and a profit margin of 6.7%.

Table 3.8: Summary Statistics – Italian Setting

This table reports summary statistics for the main variables in the Italian setting. The sample consists of Amadeus industrial firms (excluding financials) over the period 2003 to 2007 and includes 15,504 firm-year observations for 4,166 unique firms. All the continuous variables are winsorized at the top and bottom one-percentiles. Appendix C.1 provides variable definitions.

Variables	Obs.	Mean	Std. Dev.	25th Perc.	Median	75th Perc
Dependent Variables						
GAAP ETR	15,504	0.608	0.256	0.429	0.570	0.821
Firm-level Controls						
Size	15,504	16.764	1.396	15.862	16.630	17.587
Leverage	15,504	0.677	0.217	0.542	0.723	0.847
Income	15,504	0.117	0.090	0.058	0.091	0.147
Investment	15,504	0.071	0.136	0.010	0.032	0.082
Cash	15,504	0.076	0.112	0.006	0.030	0.094
Intangibles	15,504	0.028	0.063	0.001	0.006	0.024
Profit Margin	15,504	0.067	0.114	0.012	0.030	0.070

3.5.3 Baseline Results

Table 3.9 (Panel A column (1)) reports the results. As predicted, we find that the coefficient estimate of the interaction term is negative and statistically significant at the 5% level. In economics terms, the results indicate that firms located in low debt enforcement decrease the *GAAP ETR* by 1.67% or 2.75% relative to the sample mean ($=0.0167/0.608$), compared to control group firms in the same industry and region located in high debt enforcement provinces.

For the results to hold and be consistent with our international-setting analyses, theory predicts that firms have fewer (more) opportunities to substitute tax avoidance with debt when creditor rights decrease (increase). Thus, to provide evidence on the change in firm-level debt following the 2005 bankruptcy reform, we rerun the estimation equation (9) in first-differences and now use

the change in leverage measured in year $t+1$ as the dependent variable. Consistent with weaker creditor rights leading firms in low debt enforcement provinces to take on less debt, we expect the sign of β_1 to be negative. Similar to the previous analysis, we add all firm-level controls, coupled with province-, and region-industry-year fixed-effects. We correct standard errors for clustering at the province level. The results are presented in column (3) of Table 3.9 (Panel A). In line with our prediction, we find that the coefficient estimate of the interaction term is negative and statistically different from zero at the 10% level. Economically, the results indicate that firms located in low debt enforcement provinces reduce debt by 1.46% or 2.16% ($=0.0146/0.677$) with respect to the sample mean, relative to firms in the same industry and region located in high debt enforcement provinces.

A concern with our baseline analysis is that characteristics of firms in low debt enforcement provinces differ from those of firms in high debt enforcement provinces and these differences could drive the documented tax avoidance and leverage differences (Atanasov and Black 2016). To address this concern, we employ entropy-balancing matching to pair treated and control firms on observable firm-level controls in the year prior to the reform (Hainmüller 2012). We then reestimate Eq. (9) using the weights from the entropy balancing matching. The results for tax avoidance and debt are reported in columns (2) and (4) of Table 3.9 (Panel A), respectively. We find that the results are statistically and economically similar to those reported in columns (1) and (3).

Furthermore, to ensure that the observed tax avoidance and leverage effects are not sensitive to the definition of treatment and control group, in Table 3.9 (Panel B) we present the results from estimating Eq. (9) and changing the definition of treatment and control group. Here, we define the treatment group (*Low Debt Enforcement Prov.* = 1) as those firms located in a low debt

enforcement province whose duration of bankruptcy proceedings is above the average duration across 103 Italian provinces over the period 2003-2004, and zero otherwise. Throughout all four specifications, the results are similar in significance and magnitude to the main findings of Table 3.9 (Panel A). Overall, the results are consistent with firms in low debt enforcement provinces taking on less debt and engaging in tax avoidance when creditor rights decrease.

Table 3.9: Creditor Rights, Leverage and Tax Avoidance – Italian Setting

This table reports the results of the effect of the Italian Bankruptcy reform in 2005 on leverage and tax avoidance for a setting of Italian firms over the period 2003-2007. We use *GAAP ETR* (columns (1) to (2)) and the change in *Leverage* (i.e., computed over t to $t+1$) (columns (3) to (4)) as the dependent variable. In Panel A, we define a province as *Low Debt Enforcement* if the bankruptcy proceedings days are above the median of days across 103 Italian provinces in 2004 and 0 otherwise. In Panel B, we define a province as *Low Debt Enforcement* if the average bankruptcy proceedings days are above the average of days across 103 Italian provinces over the 2003-2004 years and 0 otherwise. In columns (2) and (4), we match treated and control firms in 2004 (i.e., the year before the bankruptcy reform) using the entropy balance matching and including all firm-level controls. All variables are described in Appendix C.1. All the continuous variables are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions (columns (1) and (2)) and OLS in first-differences (columns (3) and (4)) with standard errors adjusted for heteroskedasticity and clustered at the province-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	GAAP ETR		ΔLeverage_{t,t+1}	
Panel A: Baseline	(1)	(2)	(3)	(4)
Low Debt Enforcement Prov. *Post	-0.0167** (0.0083)	-0.0176** (0.0080)	-0.0146* (0.0075)	-0.0146* (0.0080)
Firm-level controls	✓	✓	✓	✓
Firm FE	✓	✓	-	-
Province FE	-	-	✓	✓
Region-Industry-Year FE	✓	✓	✓	✓
#Observations	15,504	15,307	12,070	12,001
Adjusted-R ²	0.555	0.564	0.0466	0.0599
Panel B: Altern. Definition	(1)	(2)	(3)	(4)
Low Debt Enforcement Prov. *Post	-0.0165** (0.0073)	-0.0162** (0.0078)	-0.0125* (0.0071)	-0.0130* (0.0077)
Firm-level controls	✓	✓	✓	✓
Firm FE	✓	✓	-	-
Province FE	-	-	✓	✓
Region-Industry-Year FE	✓	✓	✓	✓
#Observations	15,504	15,307	12,070	12,001
Adjusted-R ²	0.555	0.563	0.0466	0.0566

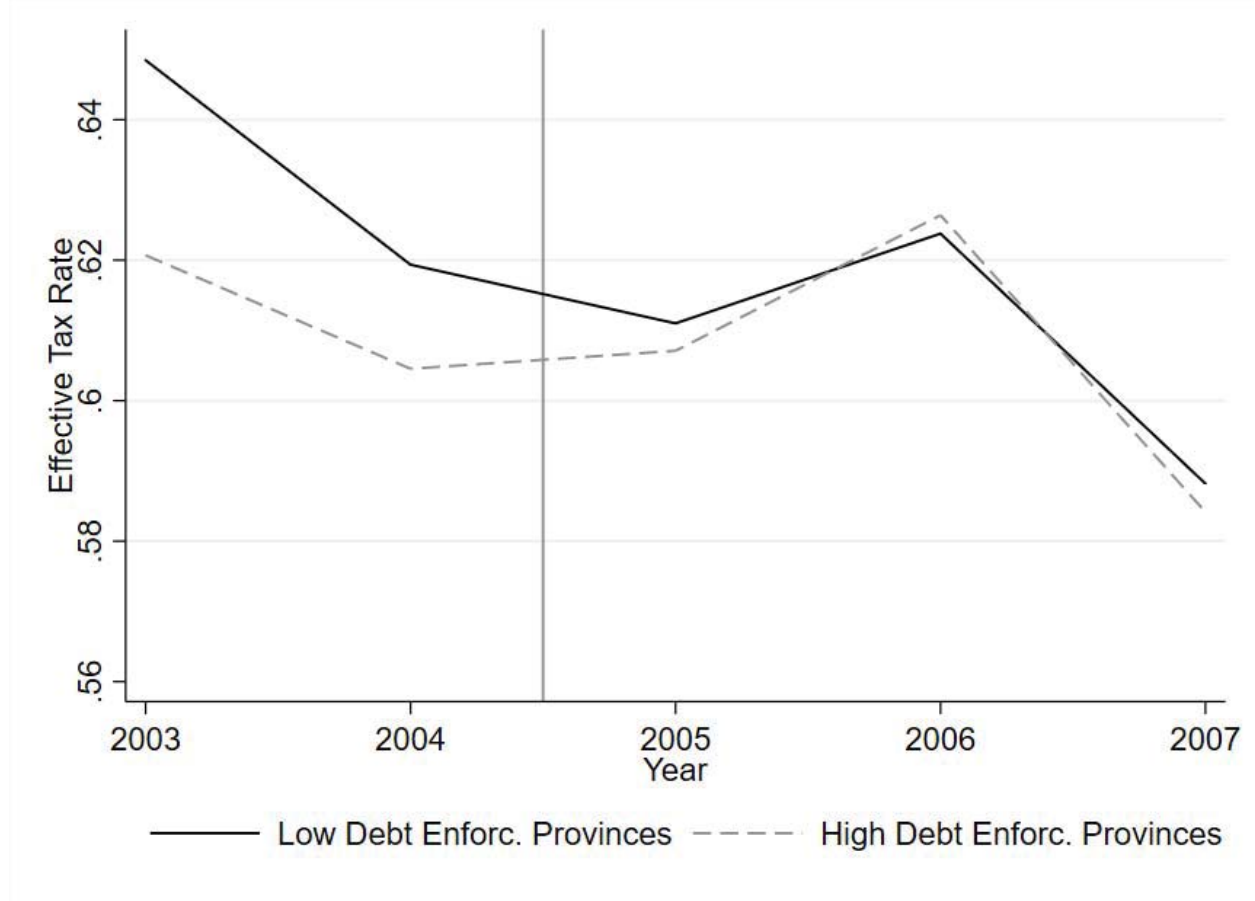
3.5.4 Additional Analyses

3.5.4.1 The timing of changes in Tax Avoidance

The causal interpretation of the results rests on the parallel trends assumption that, absent the change in creditor rights, the average change in tax avoidance for firms in low and high debt enforcement provinces would have been the same. Our analyses indicate that the parallel trends assumption plausibly holds in our sample. In Figure 3.4, we report the average *GAAP* of treated and control group firms over the period 2003-2007. In the pre-reform period, firms located in low debt enforcement provinces have higher effective tax rates compared to firms in high debt enforcement provinces. However, after the 2005 reform, treated firms close this gap. In further support of this evidence, we perform two (untabulated) tests. First, we regress the *GAAP ETR* on three interaction terms – which we define as the low debt enforcement prov. variable times year indicators for the pre-reform period (2002-2004) – and year-fixed effects. This test yields insignificant results for all interaction terms with p-values above 21%. Second, we also find that the three interaction coefficients are jointly statistically insignificant. Overall, these analyses validate the assumption of parallel trends in our Italian setting.

Figure 3.4: Difference in GAAP ETR between Firms in Low and High Debt Enforcement Italian Provinces, 2003-2007

This figure plots the average *GAAP ETR* of treated firms relative to counterfactual firms over the period 2003-2007. Treated firms are located in low debt enforcement provinces whose bankruptcy proceedings duration (in days) is above the median across 103 Italian provinces in 2004. Counterfactual firms are from high debt enforcement provinces whose bankruptcy proceedings duration is below the median in the same year. We separately present the *GAAP ETR* for treated firms located in low debt enforcement provinces (black line) and for counterfactual firms located in high debt enforcement provinces (gray line). The gray vertical line separates the pre-reform period from the post-reform years.



3.5.4.2 Assessing the channels: Creditor Rights and Firm characteristics – Italian Setting

In the final set of tests, we examine whether the theoretical channel linking creditor rights to tax avoidance is also at work in our Italian setting. For the results to hold, our theory predicts that the documented tax avoidance and leverage effects are due to the changed cost-benefit analysis that firms make when maximizing after-tax profits. Consistently, we should then not observe any effect on capital input, output, and cost of debt for firms located in low debt enforcement provinces.

Following the international-setting analyses, we use *Investment* as a proxy for a firm's capital input. Since Amadeus does not provide information on capital expenditures, we define *Investment* as the change in fixed assets before depreciation divided by lagged total assets (e.g., Jacob et al. 2017). Relatedly, we use *Total Sales* as a proxy for output, which is equal to the natural logarithm of a firm's total sales. For a firm's cost of debt (*Interest/Total Debt*) we use the total interest expenses divided by total debt. For any given firm i , we measure *Investment* in year t , whereas *Total Sales* and *Interest/Total Debt* are measured at $t+1$. Table 3.10 reports the results from estimating Eq. (9) using proxies for capital input, output and cost of debt as dependent variables. As expected, we do not find any significant effect of the 2005 Bankruptcy reform on capital input, output and cost of debt for firms located in low debt enforcement provinces relative to firms in the same industry and region located in high debt enforcement provinces. Similarly, we do not find any significant result when using the alternative definition of treatment and control firms (Table D.4 of Appendix D).

Finally, in columns (1) and (2) Panel B of Table 3.10, we use total interest expenses relative to total assets (*Interest/Total Assets*) measured in year $t+1$ as the dependent variable and rerun Eq. (9). We expect firms in low debt enforcement provinces to have higher total interest expenses relative to firms in the same industry and region located in high debt enforcement provinces ($\beta_1 > 0$). Contrary to our prediction, we do not find statistical significance in this test. Although we

acknowledge that this non-finding seems not to support the robust evidence on interest expenses found in the international-setting analyses, we are also aware that the Amadeus data have often measurement error that could also be the reason for this non-result. Nevertheless, given the baseline results and several robustness tests suggest an effect of the Italian Bankruptcy reform on tax avoidance and debt that is fully consistent with our main analysis using the international setting, we cautiously interpret the findings as evidence that firms take on (more) less debt and increase (decrease) tax avoidance when creditor rights decrease (increase).

Table 3.10: Creditor Rights and Firm Characteristics – Italian Setting

This table reports the results of the effect of the Italian Bankruptcy reform in 2005 on firm characteristics for a setting of Italian firms over the period 2003-2007. In Panel A, we use *Investment* at t (columns (1) to (2)), and *Total Sales* at $t+1$ (columns (3) to (4)) as the dependent variable. In Panel B, we use *Interest/Total Assets* at $t+1$ (columns (1) to (2)), and *Interest/Total Debt* at $t+1$ (columns (3) to (4)) as the dependent variable. We define a province as *Low Debt Enforcement* if the bankruptcy proceedings days are above the median of days across 103 Italian provinces in 2004 and 0 otherwise. In columns (2) and (4), we match treated and control firms in 2004 (i.e., the year before the bankruptcy reform) using the entropy balance matching and including all firm-level controls. All variables are described in Appendix C.1. All the continuous variables are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the province-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	Investment_t		Total Sales_{t+1}	
Panel A:	(1)	(2)	(3)	(4)
Low Debt Enforcement Prov.*Post	-0.0025 (0.0061)	0.0006 (0.0053)	-0.0071 (0.0147)	-0.0113 (0.0141)
Firm-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Region-Industry-Year FE	✓	✓	✓	✓
#Observations	15,504	15,307	14,799	14,690
Adjusted-R ²	0.312	0.330	0.941	0.943
Dep. Var.	Interest/Total Assets_{t+1}		Interest/Total Debt_{t+1}	
Panel B:	(1)	(2)	(3)	(4)
Low Debt Enforcement Prov.*Post	-0.0001 (0.0005)	-0.0001 (0.0005)	0.0007 (0.0008)	0.0010 (0.0008)
Firm-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Region-Industry-Year FE	✓	✓	✓	✓
#Observations	14,686	14,574	14,686	14,574
Adjusted-R ²	0.793	0.796	0.679	0.683

3.6 Conclusion

This paper examines whether credit legal institutions alter firms' incentives to engage in tax avoidance. We argue that firms forgo to engage in tax avoidance and substitute it with debt when creditor rights increase. An important policy implication is that firms reduce tax avoidance in countries with stronger creditor rights. Using firm-level data from 34 countries over the 2000-2013 period, we document robust evidence in support of this prediction and additionally generalize Graham and Tucker's work (2006) to a large-scale sample.

We also show that the substitution between debt and tax avoidance depends on the degree of deductibility of capital allowed by the country's tax code. Furthermore, we find that the substitution is less pronounced in countries where debt enforcement is weaker, thereby revealing a novel channel through which financial leverage alters the incentives for tax avoidance. We also corroborate this finding by exploiting the Italian Bankruptcy reform in 2005 as a quasi-natural experiment and by taking advantage of the heterogeneous administration of bankruptcy justice across Italian provinces. We find that, after the law comes into force reducing creditor rights, firms operating in low debt enforcement provinces reduce debt and increase tax avoidance relative to counterfactual firms located in high debt enforcement provinces in the same industry and region.

Overall, this paper points out the interdependence of creditor rights, debt enforcement and tax avoidance. We show that protecting creditors – an important stakeholder group – can affect tax avoidance. However, this effect is unrelated to oversight or monitoring but due to the changed cost-benefit trade-off that firms make when maximizing profits. Our results point towards laws and regulations having important externalities beyond their intended aims. In this case, it appears as if strengthening creditor rights can reduce tax avoidance, which is currently a key issue for policy makers around the world (Clemons and Shevlin 2016; OECD 2013a; 2013b; 2017a; 2017b).

4 Corporate Tax Reforms and Tax-Motivated Profit Shifting: Evidence from the EU¹

4.1 Introduction

Multinationals' tax avoidance and profit shifting have drawn the extensive attention of policymakers, the media, investors, and the academic literature over the past two decades. Despite the global downward trend of corporate tax rates (Organisation for Economic Co-operation and Development, or OECD, 2011), anecdotal evidence suggests that multinational firms still take advantage of different tax rates across countries to avoid taxes.² In this regard, recent work finds that the effective tax rates of U.S. multinational companies have declined over the past 25 years (Dyreng et al. 2017b). These findings highlight that tax avoidance and income shifting³ have grown in the United States over time (Grubert 2012; Klassen and Laplante 2012) to such an extent that the federal government recently approved the Tax Cuts and Jobs Act with the intent to curb the phenomenon.⁴

On the other hand, in Europe over the last decade, several tax reforms have tightened anti-avoidance rules (Lohse and Riedel 2013), broadened the tax base, and lowered the statutory tax rate (Devereux et al. 2008), leading Dharmapala (2014) to posit that these tax reforms may have reduced profit shifting. Despite the relevance of this claim for European Union (EU) regulators,⁵ the empirical literature has so far neglected to test this conjecture.

¹ This chapter is based on Alexander, A., De Vito, A., and Jacob, M. (2016): "Corporate Tax Reforms and Tax-Motivated Profit Shifting: Evidence from the EU", FAccT Center Working Paper Nr. 23/2016.

² Rochelle Toplensky, "EU to hit Amazon with bill for Luxembourg back taxes," *Financial Times*, October 3, 2017.

³ Throughout the paper, we use the terms *profit shifting* and *income shifting* interchangeably.

⁴ Barney Jopson, "US tax reform targets avoidance by multinationals," *Financial Times*, November 3, 2017.

⁵ Jim Brunsten, "Multinational companies face tax avoidance EU crackdown," *Financial Times*, February 8, 2016.

In this study, we fill this gap and examine whether corporate tax reforms enacted across European countries over 2003–2013 have constrained multinationals’ profit shifting. Examining profit shifting helps us understand which tax strategies multinational companies implement to achieve their tax avoidance targets (Wilde and Wilson 2018). To answer our research question, we differ from the approach used by most previous studies (e.g., Dischinger et al. 2011; Karkinsky and Riedel 2012). In particular, we identify profit shifting not only through variation in the tax rate but also through variation in the tax base. We consider all tax base items (i.e., transfer pricing documentation requirements, thin capitalization rules, tax consolidation rules, loss carryback and carryforward, accelerated tax depreciation allowances), since they target profit shifting. Analysis that neglects to consider changes in the tax base would be incomplete, because governments trade off between low tax rates and broad tax bases (Haufler and Schjelderup 2000; Devereux et al. 2008; OECD 2010) to counteract profit shifting. Thus, the novelty of our method lies in taking into account changes in both the tax rate and in the tax base to measure the extent of profit shifting across countries and over time.

We add to the literature on tax avoidance and profit shifting in two ways. First, we estimate the tax rate sensitivity of profit shifting while controlling for several changes in the tax base elements that occurred in Europe during 2003–2013. Next, we follow Goncharov and Jacob (2014) and combine the tax base elements into one overall index that ranges from zero (very narrow tax base) to six (very broad tax base) to estimate the joint tax rate and tax base effect on profit shifting. Consistent with the *headquarters bias* view (Dischinger et al. 2014a), we find that profits are shifted from the subsidiary to the parent company as the tax rate difference between the host (country where the subsidiary is located) and the parent country (country where the headquarters are located) increases. Most importantly, we show that the income flowing from the host to the parent country is

significantly lower when we account for policy changes aimed at broadening the tax base (e.g., the introduction of transfer pricing documentation requirements and/or thin capitalization rules). In economic terms, we find that the semi-elasticity of reported profits to the tax rate decreases by 0.18, or 26%, relative to the average semi-elasticity of 0.695.

Second, motivated by this evidence, we test whether corporate tax reforms have also changed the trend in profit shifting in Europe over the past decade. The analyses reveal an interesting and novel pattern. In particular, we find a downward trend in the semi-elasticity of the reported profits to the tax rate. More specifically, in the final years of our sample period (2011–2013), profit shifting decreased significantly, by more than 50%. Economically, the semi-elasticity was reduced to 0.38, compared to a semi-elasticity of 0.66 observed for 2003–2006. Consistent with prior literature (Haufler and Schjelderup 2000; Dharmapala 2014), we explain this finding as broader tax bases and anti-avoidance rules having successfully constrained profit shifting over the years.

This study has important policy implications. Although the discussion of the creation of a Common Corporate Tax Base or Common Consolidated Corporate Tax Base for the EU has again gained momentum,⁶ European multinational firms still report their taxable income to multiple tax authorities. This clearly creates scope for exploiting tax differences across countries. To overcome this issue, governments have introduced an array of tax base-broadening measures and laid down several rules against tax avoidance and profit shifting over the years. It is therefore of particular interest to evaluate whether these tax laws have achieved their intended aim. Our results speak directly to this policy debate and show that tax base-broadening reforms and anti-avoidance rules can effectively mitigate profit-shifting activities.

⁶ Jim Brunsten, “EU efforts to impose heavier taxes on tech giants gather momentum,” *Financial Times*, September 16, 2017.

The chapter proceeds as follows. Section 4.2 summarizes the related literature and describes the theoretical background. Section 4.3 presents the empirical strategy and the data. Section 4.4 discusses the main findings. Section 4.5 concludes the chapter.

4.2 Literature Review and Theoretical Background

Multinational firms have dramatically increased the scale of their operations over the last three decades (Desai 2009). In addition to reallocating real economic activities in response to value creation opportunities, these firms also exploit international differences in corporate income tax rates by engaging in profit shifting (Heckemeyer and Overesch 2017). A number of empirical studies have documented multinationals' income shifting. For example, prior work has exploited cross-sectional variation in corporate tax rates on multinational subsidiaries' profitability (Gruber and Mutti 1991; Hines and Rice 1994; Huizinga and Laeven 2008). Relatedly, other studies have focused on specific profit-shifting channels, particularly in intra-firm trade activity (Bartelsman and Beetsma 2003; Clausing 2003) and debt shifting (Desai et al. 2004; Buettner and Wamser 2013; Dharmapala and Riedel 2013).

Another stream of literature has examined the profit-shifting incentives stemming from the tax rate differential between the country of the parent company and the country of the subsidiary. In particular, Dischinger et al. (2014a) use this approach to investigate the peculiar role of the parent company in setting up the profit-shifting strategy within the multinational group. Their findings suggest that income shifting between the parent company and its subsidiaries is biased *toward* the parent company (i.e., the so-called headquarters bias). In line with this reasoning, Weichenrieder (2009) also finds a negative correlation between the tax rate of the host country and the reported profits at the multinational affiliate level. However, the results are only weakly significant, leading the

author to question whether tax base-broadening reforms have compensated the tax rate effect over the author's sample period.⁷

All the studies above share the same empirical approach and measure the extent of profit shifting by exploiting variations in tax rates across countries. Starting with Bartelsman and Beetsma (2003), the literature on profit shifting has also investigated whether other tax regulations beyond the corporate tax rate play any role in facilitating or discouraging profit shifting. Notably, though, these studies focus on only one specific tax regulation at a time, either transfer pricing or thin capitalization rules. For example, Lohse et al. (2012) and Lohse and Riedel (2013) develop an index to capture the stringency of transfer pricing regulations across European countries. In a similar vein, Beer and Loeprick (2015) assess the effect of transfer pricing rules and find that imposing documentation requirements on multinational companies mitigates income-shifting behavior. Furthermore, Buettner et al. (2012) and Blouin et al. (2013) analyze several thin capitalization regimes and conclude that these rules deter debt shifting.

In this study, we move a step forward and employ a broader approach. In particular, we take into account both changes in the tax rate and changes in the tax base to measure the extent of profit shifting across countries and over time. Our methodology is grounded in theoretical evidence (Haufler and Schjelderup 2000) and policy recommendation (OECD 2010) that suggest that governments trade off lower tax rates with a broader tax base to counteract profit shifting.

Subsequently, we examine whether the tax base-broadening reforms had an impact on the trend in profit shifting in Europe over the past decade. While some studies using U.S. data (Grubert 2012; Klassen and Laplante 2012; Dyreng et al. 2017b) argue that tax avoidance and profit shifting have grown over the past two decades, the empirical

⁷ It is worth noting that the author does not test this conjecture empirically.

evidence for Europe is scant. Besides, as pointed out in the literature (Dharmapala 2014), the majority of European countries have introduced several tax rules into their tax systems aimed at curbing multinationals' income shifting over the same period. Hence, an evaluation of whether these tax measures have achieved their intended effect is deemed relevant. In the following analyses, we fill this void in the literature.

4.3 Empirical Setting

4.3.1 Variation in Corporate Tax Rates and Tax Base Elements

The taxation of corporate income has changed considerably over the past 20 years. A number of European countries have reformed their corporate tax systems by lowering the statutory tax rate and broadening the tax base to address competitive pressure from neighboring countries (e.g., Devereux et al. 2008) or to set incentives for firms to invest. We exploit this variation in tax rates and examine its effect on profit shifting. To this purpose, we use the adjusted corporate tax rates from *Taxation Trends in Europe 2014*, provided by Eurostat, and additionally cross-check the tax rate information with the OECD corporate and subcentral income tax database. We employ the corporate tax rate that is applicable in the top tax bracket and identify 63 corporate tax changes (10 increases and 53 decreases in the statutory tax rate) over 2003–2013. Note that, in case of local differences in statutory corporate tax rates due to additional regional business taxes, as, for example, in Italy or Germany, we use the sum of the top marginal corporate tax rate and the average regional tax, as well as supplementary charges. As a preliminary analysis, in Figure 4.1, we plot the yearly average of the corporate tax rate across EU countries and find a decreasing trend over the sample period that is fully consistent with tax competition putting downward pressure on the corporate tax rate (Devereux et al. 2002).

Figure 4.1: Trend in the Corporate Tax Rate in Europe, 2003–2013

This figure plots the yearly mean of the corporate tax rate across 26 European countries over 2003–2013.

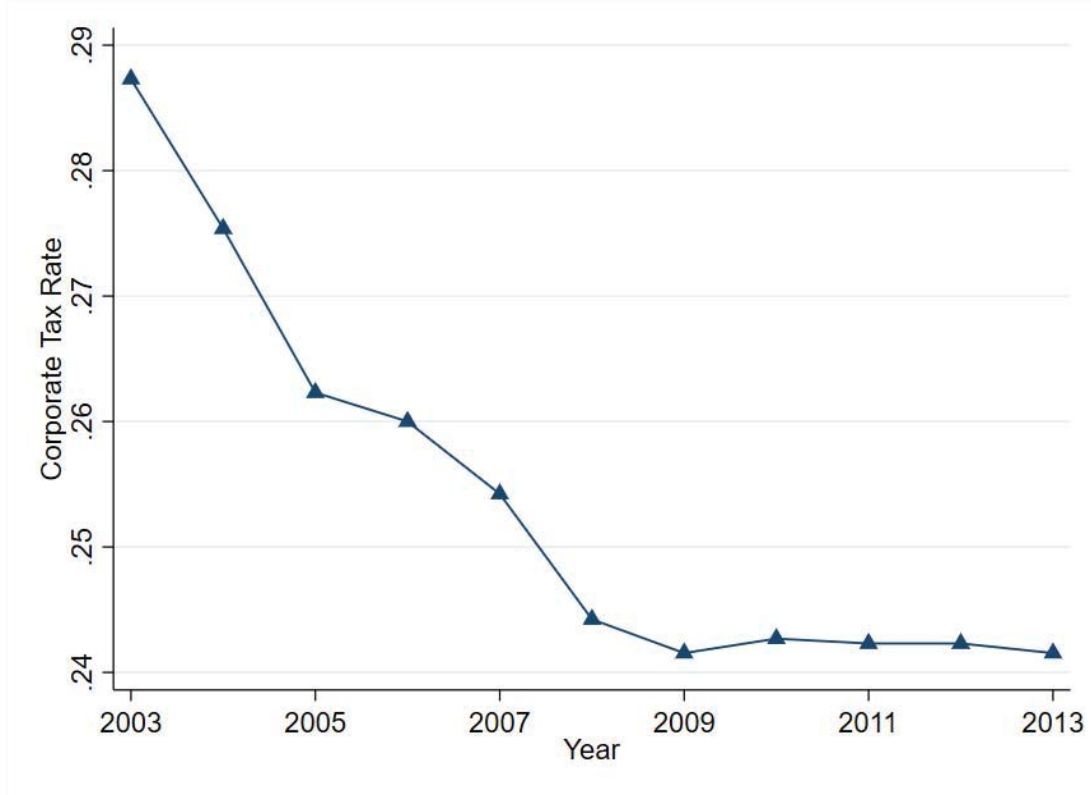


Table 4.1 lists our sample countries and the corporate tax rates in each sample year. Most countries changed their tax rate more than once during the sample period and only a few experienced corporate tax rate changes smaller than one percentage point. Changes in corporate income tax occurred in almost all countries and were staggered over time. Given the high number of tax rate changes and potential host and parent countries, we have meaningful tax variations with which to examine the effect of corporate tax reforms on multinational firms' profit-shifting behavior. More importantly, these changes do not cluster around a certain year and/or country. One potential concern is that country-level economic conditions could drive the tax rate changes. In untabulated analysis, we find that the average tax change during economic downturns (-0.2%) is statistically

indistinguishable from the average change during upturns (-0.5%). This result reassures us that, in our sample, the tax rate changes are not driven by the business cycle.⁸

⁸ More specifically, we run panel regression models at the country level, with country and year fixed effects. We consistently find an insignificant relation between indicators of economic growth and of economic development and corporate tax rate changes. The results are available upon request.

Table 4.1: Adjusted top statutory tax rates on corporate income (in percentage points), 2003–2013

ISO Code	Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
AT	Austria	34.0	34.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
BE	Belgium	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
BG	Bulgaria	23.5	19.5	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
HR	Croatia	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
CZ	Czech Republic	31.0	28.0	26.0	24.0	24.0	21.0	20.0	19.0	19.0	19.0	19.0
DK	Denmark	30.0	30.0	28.0	28.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
EE	Estonia	26.0	26.0	24.0	23.0	22.0	21.0	21.0	21.0	21.0	21.0	21.0
FI	Finland	29.0	29.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	24.5	24.5
FR	France	35.4	35.4	35.0	34.4	34.4	34.4	34.4	34.4	34.4	36.1	36.1
DE	Germany	39.6	38.3	38.7	38.7	38.7	30.2	30.2	30.2	30.2	30.2	30.2
HU	Hungary	19.6	17.6	17.5	17.5	21.3	21.3	21.3	20.6	20.6	20.6	20.6
IS	Iceland	18.0	18.0	18.0	18.0	18.0	15.0	15.0	18.0	20.0	20.0	20.0
IE	Ireland	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
IT	Italy	38.3	37.3	37.3	37.3	37.3	31.4	31.4	31.4	31.4	31.4	31.4
LU	Luxembourg	30.4	30.4	30.4	29.6	29.6	29.6	28.6	28.6	28.8	28.8	29.2
MT	Malta	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
NL	Netherlands	34.5	34.5	31.5	29.6	25.5	25.5	25.5	25.5	25.0	25.0	25.0
NO	Norway	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
PL	Poland	27.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
PT	Portugal	33.0	27.5	27.5	27.5	26.5	26.5	26.5	29.0	29.0	31.5	31.5
RO	Romania	25.0	25.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
SK	Slovak Republic	25.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	23.0
SI	Slovenia	25.0	25.0	25.0	25.0	23.0	22.0	21.0	20.0	20.0	18.0	17.0
ES	Spain	35.0	35.0	35.0	35.0	32.5	30.0	30.0	30.0	30.0	30.0	30.0
SE	Sweden	28.0	28.0	28.0	28.0	28.0	28.0	26.3	26.3	26.3	26.3	22.0
GB	United Kingdom	30.0	30.0	30.0	30.0	30.0	30.0	28.0	28.0	26.0	24.0	23.0

In addition to estimating the effect of corporate tax rate changes on profit shifting, the novelty of our study consists in accounting for specific tax base changes in the tax code that could outweigh the tax rate effect. We rely on the Ernst & Young Corporate Tax Guides from 2003 to 2013 and collect data on several tax base items: transfer pricing documentation requirements, thin capitalization rules, loss carryback and loss carryforward, tax consolidation, and accelerated tax depreciation. First, we include transfer pricing documentation requirements, since the preparation of comprehensive documentation mitigates multinationals' profit shifting (e.g., Beer and Loeprick 2015; Beuselinck et al. 2015). Second, we follow Buettner et al. (2012) and collect information on thin capitalization rules in Europe to account for restrictions on the tax deductibility of interest payments. Third, recent literature also documents that corporate losses play a role in explaining the profit-shifting behavior of multinational firms. Namely, loss-making affiliates could reverse profit shifting from a low- to a high-tax country to save on taxes (Hopland et al. 2015; Koethenbueger et al. 2016; De Simone et al. 2017). Therefore, we gather information on loss carryback and loss carryforward rules from Bethmann et al. (2018) and add the missing data for our sample countries. Fourth, we collect data on the tax consolidation rules in European countries, since such regimes make it easier to transfer profits and/or losses between group affiliates. Finally, since tax relief on depreciable assets has an impact on the tax base, we collect data on accelerated depreciation allowances over our sample period to proxy for changes in the tax deductibility of investment expenditure.

Table 4.2 lists our sample countries and their respective tax base items. Most countries had already enacted rules on transfer pricing documentation by the early 2000s, with some following later during the sample period. However, a limited number of countries never required any transfer pricing documentation during the sample years. Most countries had provisions to restrict debt shifting within multinational firms, that is, thin capitalization

rules. While the debt-to-equity rule seems to be the most common rule in place, there are a few notable switches to the earnings stripping regime, for example, in Germany and Italy in 2008. Furthermore, most countries allowed for tax consolidation over the sample years, thereby permitting the transfer of profits and/or losses across group companies. Nearly all countries allowed accelerated depreciation provisions to defer corporate income taxes at some point during the sample period. Finally, all countries allowed firms to carry forward tax losses (with several differences in the carryforward time windows), while only a few had loss carryback provisions in place (see also Bethmann et al. 2018).

Table 4.2: Evolution of tax policy regulation on tax base items, 2003–2013

Country	Transfer Pricing Documentation	Debt-to-Equity Rule	Earnings Stripping Rule	Tax Consolidation	Accelerated Depreciation	Loss Carry-back	Loss Carryforward
Austria				From 2003 on			Unlimited years
Belgium		From 2003 on			From 2003 on		Unlimited years
Bulgaria		From 2003 on			2003; from 2005 on		5 years
Croatia		From 2005 on			From 2003 on		5 years
Czech Republic		From 2003 on			From 2003 on		7 years in 2003, 5 years from 2004 on
Denmark	From 2003 on	From 2003 on		From 2003 on	From 2008 on		Unlimited years
Estonia	From 2007 on						
Finland	From 2007 on			From 2003 on	From 2009 on		10 years
France	From 2010 on	2003 to 2006		From 2003 on	From 2003 on	From 2003 on	5 years in 2003, unlimited years from 2004 on
Germany	From 2003 on	2003 to 2007	From 2008 on	From 2003 on	2003 to 2007; 2009 to 2010	From 2003 on	Unlimited years
Great Britain	From 2008 on	2003 to 2005		From 2003 on	From 2003 on	From 2003 on	Unlimited years
Hungary	From 2010 on	From 2003 on					5 years in 2003, unlimited years from 2004 on
Iceland				From 2003 on	From 2010 on		8 years in 2003, 10 years from 2004 on
Ireland	From 2011 on			From 2003 on		From 2003 on	Unlimited years

Italy	From 2010 on	2005 to 2007	From 2008 on	From 2004 on	2003 to 2008	5 years from 2003 to 2011, unlimited years from 2012 on
Luxembourg		From 2003 on		From 2003 on	From 2003 on	Unlimited years
Malta				From 2003 on	From 2003 on	Unlimited years
Netherlands	From 2003 on	2004 to 2012		From 2003 on	2009 to 2010	Unlimited years from 2003 to 2006, 9 years from 2007 on
Norway	From 2008 on			From 2003 on	From 2003 on	10 years from 2003 to 2005, unlimited years from 2006 on
Poland	From 2003 on	From 2003 on		From 2003 on	2003 to 2006	5 years
Portugal	From 2003 on	2003 to 2012		From 2003 on	From 2003 on	6 years from 2003 to 2010, 4 years from 2011 to 2012, 5 years in 2013
Romania	From 2007 on	From 2003 on			From 2003 on	5 years from 2003 to 2008, 7 years from 2009 on
Slovenia	From 2005 on	From 2005 on		2003 to 2006	2003 to 2006	5 years from 2003 to 2006, unlimited years from 2007 on
Slovakia	From 2009 on	2003			From 2003 on	5 years from 2003 to 2009, 7 years from 2010 on
Spain	From 2009 on	2003 to 2011	From 2012 on	From 2003 on	From 2003 on	15 years from 2003 to 2011, 18 years from 2012 on
Sweden	From 2007 on			From 2003 on	From 2003 on	Unlimited years

4.3.2 *Sample selection*

To examine the effect of corporate tax reforms on profit shifting in Europe, we use firm-level data from the commercial database Amadeus, compiled by Bureau van Dijk. The sample comprises firms in the countries of EU 27, Norway, and the United Kingdom. One advantage of using Amadeus is that it enables us to link accounting data to information on the ownership structures of parent firms and their subsidiaries (see also Huizinga and Laeven 2008; Dischinger and Riedel 2011; Karkinsky and Riedel 2012). We classify subsidiaries as being part of a multinational group if they are owned by a foreign parent company. To be precise, the global ultimate owner must be an independent company that owns more than 90% of the capital (for a similar approach, see Becker and Riedel 2012; Beer and Loeprick 2015).

The Amadeus database only provides ownership information for the last reported date, which was November 2014, when we downloaded our sample. In a panel study, this could cause misclassifications if the ownership structure changed over the observed years. To track potential changes, we rely on previous versions of Amadeus to obtain panel data on ownership classifications. If a firm's ownership data were not included in earlier versions of Amadeus, we rely on the most recent information for the entire sample period.

Following the literature on profit shifting (Maffini and Mokkas 2011), we exclude consolidated balance sheets to identify profit-shifting behavior. To ensure that the accounting period is uniform in our sample, we remove observations with fiscal years other than 12 months. The observational unit in our analyses is the multinational subsidiary per year. In total, the data set comprises 106,458 (104,432) firm-year observations for 18,452 (18,299) unique affiliates, depending on the dependent variable used in the regression analyses. The numbers of firm-year observations and of affiliate firms resemble those of previous studies (e.g., Dischinger et al. 2014a).

4.3.3 Empirical Strategy

To analyze the effect of corporate tax reforms on profit shifting, we estimate the following panel regression model:

$$\begin{aligned} Profit_{i,j,k,t} = & \beta_0 + \beta_1 Tax\ Difference_{j,k,t} + \beta_2 K_{i,j,k,t} + \beta_3 L_{i,j,k,t} \\ & + \beta_4 Intangibles_{i,j,k,t} + \beta_5 R\&D_{i,j,k,t} + \beta_6 X_{j,t} + \beta_7 X_{k,t} + \beta_8 \Pi_{j,t} \\ & + \beta_9 \Pi_{k,t} + \partial_i + \omega_{l,t} + \epsilon_{i,j,k,t} \end{aligned} \quad (1)$$

where $Profit_{i,j,k,t}$ is the dependent variable of affiliate i located in host country j with the parent company in country k in year t . We use two separate specifications with different dependent variables. One specification uses the natural logarithm of *EBIT* as the dependent variable to account for transfer pricing manipulation (Maffini and Mokkas 2011). The other specification uses the natural logarithm of *Pre-tax Profits*, which accounts for both transfer pricing and debt shifting (e.g., Dharmapala and Riedel 2013). Following Hines and Rice (1994) and De Simone (2016), we control for capital and labor using the natural logarithm of fixed assets ($K_{i,j,k,t}$) and the natural logarithm of cost of employees ($L_{i,j,k,t}$), respectively. Moreover, we include the natural logarithm of intangible assets ($Intangibles_{i,j,k,t}$) and the natural logarithm of research and development expenses ($R\&D_{i,j,k,t}$), since these assets are potential drivers of profit shifting (Beer and Loeprick 2015).

We capture the profit-shifting incentive between the parent company and its affiliates by computing the tax difference ($Tax\ Difference_{j,k,t}$) in the statutory corporate tax rates between the parent and the host country (for a similar approach, see Dischinger 2008; Weichenrieder 2009; Dischinger et al. 2014a). The coefficient of interest is β_1 , for which we expect a negative sign ($\beta_1 < 0$). That is, an increase in the tax difference (e.g., following an increase in the tax rate of the host country or a decrease in the tax rate of the

parent country) provides incentives to shift profits *toward* the parent company, thereby resulting in a lower amount of profits at the subsidiary level.⁹ In addition to controlling for the tax rate difference, we control for changes in the tax base by including the vector ($X_{j,t}$) with the tax base elements of the host country and the vector ($X_{k,t}$) with the tax base elements of the parent country.¹⁰ We include these tax base elements together because most of them concurrently target profit shifting. Most importantly, controlling for tax base changes of the host and parent countries simultaneously allows us to understand not only which regulations can curb income shifting but also which country is the most effective at constraining the income flowing from the multinational affiliate to the parent company.¹¹

In line with prior studies (Dischinger 2008; Disdier and Head 2008; Erel et al. 2012; Beer and Loeprick 2015), we further control for non-tax country-level characteristics of the host country ($\Pi_{j,t}$) and parent country ($\Pi_{k,t}$) to ensure that economic and institutional conditions do not spuriously drive the results. More specifically, we add the gross domestic product (GDP) growth (*GDP Growth*), the GDP per capita (*GDP per capita*), a proxy for the geographic proximity of the host to the parent country (*Distance*), the inflation rate (*Inflation*), and the unemployment rate (*Unemployment*). Finally, we account for the institutional quality of both countries by including the yearly estimate of a country's control of corruption (*Control of Corruption*) from the World Governance Indicators. We do not make any *ex ante* predictions on the sign direction of the country-level variables, since there could be reasons to expect both negative and positive

⁹ In this paper, we focus on the bilateral flow of income between the parent company and its affiliates, since several studies in corporate finance (e.g., Jensen 1986; Rajan et al. 2000) and taxation (Dischinger et al. 2014b) show that profits and valuable resources within a multinational group are ultimately managed by the parent company.

¹⁰ As argued in Section 3.1, we control for transfer pricing documentation requirements, thin capitalization rules (i.e., debt-to-equity or earnings stripping rules), accelerated tax depreciation allowances, loss carryback and loss carryforward rules, and provisions on tax consolidation regimes.

¹¹ In Section 4.2, we adopt a different approach and combine all the tax base elements into one unique index. We show that the significance of the results and the magnitude of the tax difference coefficient are largely unchanged.

coefficients. Taking the control of corruption variable as an example, we could expect firms to shift their profits to highly regulated environments and protect themselves from potential expropriation (Dharmapala and Hines 2009) or to weaker institutional environments and better conceal income (Johannesen et al. 2016).

Throughout all specifications, we include firm fixed effects (θ_i) as well as year or industry–year fixed effects defined at the one-digit Standard Industrial Classification level ($\omega_{i,t}$). As in previous profit-shifting studies (Dischinger 2014b), firm fixed effects absorb any firm- or country-level time-invariant characteristics that could also be correlated with a multinational company’s profit-shifting strategy. Besides, firm fixed effects also ensure that the identification of all the coefficients stems from changes in the tax rate as well as in the tax base over time. Relatedly, the inclusion of industry–year fixed effects ensures that we compare multinational affiliates within the same industry while absorbing transitory industry shocks that could also affect a multinational’s profit-shifting behavior. We correct standard errors for clustering at the firm level. Alternatively, we test the robustness of the results to clustering at the host–parent pair level.

4.3.4 Summary Statistics

Table 4.3 presents the summary statistics. On average, a multinational subsidiary has a log of *EBIT (Pre-tax Profits)* of 13.531 (13.490) and a log of fixed assets (*K*) and a log of cost of employees (*L*) of 13.333 and 14.511, respectively. Moreover, the average multinational subsidiary accounts for a log of *Intangibles (R&D expenses)* of about 7.062 (0.071). In line with previous studies (Dischinger et al. 2014a), the tax difference averages -2% but varies markedly between -28% and 27%.

Furthermore, 60% (70%) of the host (parent) countries have laws requiring multinational firms to provide tax authorities with transfer pricing documentation during

2003–2013. On average, about 50% (38%) of the host (parent) countries have thin capitalization rules in place, with debt-to-equity rules being the most widely used. Almost all parent countries have a tax consolidation regime, while the host countries allow groups of wholly owned or majority-owned companies to be a single entity for tax purposes to a lesser extent (about 70% of the sample). As for loss-offsetting regulations, about half (one-third) of the parent (host) countries allow carrying back tax losses. In contrast, both sets of sample countries largely allow carryforward tax losses, with the average number of years being 56 (80) in the host (parent) countries. Further, 76% (68%) of the host (parent) countries grant accelerated tax depreciation allowances.

Moreover, multinational subsidiaries tend to reside in more corrupt environments than their parent firms do. With respect to *GDP Growth*, there seems to be no difference among the sample countries. On the contrary, parent companies mainly reside in highly developed European countries, with a higher *GDP per capita* and lower *Unemployment*. Finally, *Inflation* in the host country is similar to that of the parent country and amounts to about 2%.

Table 4.3: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max
Firm-level controls					
Log EBIT	106,558	13.531	2.342	2.398	26.811
Log Pre-tax Profits	104,432	13.490	2.445	0	27.947
Log Fixed Assets	106,558	13.333	2.986	0	28.215
Log Cost of Employees	106,558	14.511	2.230	0	27.222
Log Intangibles	106,558	7.062	5.911	0	27.429
Log R&D	106,558	0.071	0.995	0	20.363
Tax base controls					
Tax Difference	106,558	-0.021	0.081	-0.287	0.273
Transfer Pricing Host	106,558	0.580	0.494	0	1
Transfer Pricing Parent	106,558	0.685	0.465	0	1
Debt to Equity Rule Host	106,558	0.491	0.500	0	1
Debt to Equity Rule Parent	106,558	0.382	0.486	0	1
Earnings Stripping Rule Host	106,558	0.117	0.321	0	1
Earnings Stripping Rule Parent	106,558	0.228	0.419	0	1
Tax Consolidation Host	106,558	0.707	0.455	0	1
Tax Consolidation Parent	106,558	0.920	0.272	0	1
Accelerated Depr. Host	106,558	0.760	0.427	0	1
Accelerated Depr. Parent	106,558	0.680	0.466	0	1
Loss Carryback Host	106,558	0.317	0.465	0	1
Loss Carryback Parent	106,558	0.570	0.495	0	1
Loss Carryforward Host	106,558	56.538	46.452	0	100
Loss Carryforward Parent	106,558	80.794	37.298	0	100
Tax Base Index Host	106,558	2.779	1.535	0	5
Tax Base Index Parent	106,558	2.261	1.128	0	5
Country-level controls					
Control of Corruption Host	106,558	1.049	0.755	-0.300	2.550
Control of Corruption Parent	106,558	1.663	0.581	-0.300	2.550
Distance	106,558	6.604	0.678	4.020	8.124
GDP Growth Host	106,558	0.013	0.030	-0.147	0.107
GDP Growth Parent	106,558	0.011	0.027	-0.147	0.107
GDP Per Capita Host	106,558	10.123	0.654	8.239	11.364
GDP Per Capita Parent	106,558	10.576	0.303	8.239	11.364
Inflation Host	106,558	0.023	0.023	-0.054	0.147
Inflation Parent	106,558	0.018	0.013	-0.054	0.147
Unemployment Host	106,558	0.087	0.037	0.025	0.261
Unemployment Parent	106,558	0.073	0.028	0.023	0.261

Notes: This table presents descriptive statistics for our main variables during 2003–2013. Firm-level variables are on a logarithmic scale, as well as some country-level controls, that is, *Distance* and *GDP per capita* Host (Parent)). The variable *Tax Difference* is the difference in the statutory corporate tax rates of the subsidiary considered and its parent firm. The variables *Transfer pricing* Host (Parent), *Debt to Equity Rule* Host (Parent), *Earnings Stripping Rule* Host (Parent), *Tax Consolidation* Host (Parent), *Accelerated Depreciation* Host (Parent), and *Loss Carryback* Host (Parent) are dummy variables that range from zero to one. The variables *GDP Growth* Host (Parent), *Inflation* Host (Parent), and *Unemployment* Host (Parent) are in percentage points. All the variables are defined in the Appendix E.

4.4 Empirical Results

4.4.1 Baseline Results

Table 4.4 presents the results from estimating equation (1) and using the log of *EBIT* as the dependent variable. In columns (1) to (4), we include all multinational subsidiaries with available financial information, regardless of the industry in which they operate. Subsequently, we test the robustness of our findings to excluding financial institutions (column (5)) and affiliates whose parent company is located in the Netherlands (column (6)). In line with Merz and Overesch (2016), we exclude financial institutions, since these firms employ different profit-shifting strategies to relocate income to low-tax jurisdictions. Furthermore, we follow Dharmapala and Hines (2009) and exclude affiliates whose headquarters are in the Netherlands, since this country is a well-known European tax haven used by multinational companies for treaty shopping (Weyzig 2013).¹²

As expected, throughout all specifications, we find that the tax difference coefficient is consistently negative and statistically different from zero at the 1% and 5% levels. In line with previous studies (e.g., Dischinger et al. 2014a, 2014b), the negative sign of the tax difference indicates that multinational affiliates shift profits *toward* the parent company as the tax difference between the host and parent countries increases. Interestingly, we note that the economic magnitude of our tax difference coefficient is below the consensus estimate in the literature.

More specifically, we use as a reference point our regression output in column (2) of Table 4.4 (which controls for firm and industry–year fixed effects along with all firm- and country-level variables) and compare our semi-elasticity of the reported *EBIT* value (0.453) to that found in the meta-analysis of Heckemeyer and Overesch (2017), 0.475. The

¹² We repeat the analysis in column 6 while also excluding other well-known European tax havens (i.e., Estonia, Ireland, Luxembourg, and Malta) and find unchanged inferences. The results are available upon request.

difference between the two coefficients (0.022) might not appear large at first glance. However, it is worth pointing out that it is meaningful, given the logarithmic scale of the dependent variable. In economic terms, our estimate indicates that an increase of 10 percentage points in the tax difference corresponds to a decrease of about 4% in reported profits at the affiliate level.¹³ This novel finding suggests that controlling for changes in the tax base as well as for changes in the tax rate seems to be more precise when gauging the extent of profit shifting. In this regard, we also find that most of the tax base elements aimed at curbing profit shifting (i.e., transfer pricing regulations and the earnings stripping rule set by the parent company) are positively and statistically different from zero at the 1% and 10% levels. These results suggest that multinational affiliates shift fewer profits *toward* the parent company when such rules are in place. Moreover, the results show a positive correlation between the accelerated tax depreciation rules of the host country and the profit level of the multinational subsidiary. On the contrary, the coefficient of the proxy for the tax consolidation regime in the parent country is negative and statistically significant at the 5% level in some specifications, which indicates that such tax regimes facilitate the transfer of profits/losses *toward* the parent company.

Furthermore, the coefficients of the remaining control variables are mostly in line with prior profit-shifting studies (e.g., Dharmapala and Riedel 2013). In particular, we find that all firm-level controls enter positively in our regressions and most are statistically different from zero. As for the country-level controls, we find that the GDP growth of both the host and parent countries is positively associated with the profitability of the multinational subsidiary. Relatedly, the inflation rate and the control of corruption in the host country are positively correlated with the multinational affiliate's EBIT and resemble the findings

¹³ In untabulated analyses, we also test for the non-linearity in the tax difference (see Dowd et al. 2017 for a similar approach). Namely, we run the main specification while additionally controlling for the quadratic term of the *Tax Difference*. While the main coefficient is still significant and close to our baseline estimate, we find that the quadratic term is not significant, suggesting that in our sample the tax rate effect is linear.

reported in previous work (e.g., Dischinger 2008). By contrast, the unemployment rate is negative and statistically significant at the 1% level across all specifications.

Table 4.4: Corporate tax reforms and profit shifting I

Sample	OLS Affiliate Fixed Effects, Panel 2003–2013					
	All Subsidiaries			No Financ. Sector	No NL Parent Firms	
Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)
Tax Difference	-0.513*** (0.189)	-0.453** (0.189)	-0.513** (0.232)	-0.453** (0.227)	-0.487** (0.192)	-0.598*** (0.211)
Log Fixed Assets	0.076*** (0.006)	0.075*** (0.006)	0.075*** (0.008)	0.075*** (0.008)	0.074*** (0.007)	0.072*** (0.007)
Log Cost of Employees	0.398*** (0.015)	0.397*** (0.015)	0.398*** (0.023)	0.397*** (0.023)	0.426*** (0.017)	0.404*** (0.016)
Log Intangibles	0.003* (0.001)	0.002* (0.001)	0.003* (0.002)	0.002 (0.002)	0.002 (0.001)	0.002 (0.001)
Log R&D	0.017*** (0.005)	0.0162*** (0.005)	0.0171*** (0.006)	0.0162*** (0.006)	0.0161*** (0.005)	0.0166*** (0.005)
Transfer Pricing Host	0.016 (0.015)	0.017 (0.015)	0.016 (0.017)	0.017 (0.017)	0.018 (0.015)	0.022 (0.016)
Transfer Pricing Parent	0.046*** (0.016)	0.044*** (0.016)	0.046** (0.020)	0.044** (0.020)	0.042*** (0.016)	0.037** (0.016)
Debt to Equity Rule Host	0.003 (0.024)	0.001 (0.024)	0.003 (0.023)	0.001 (0.023)	-0.005 (0.025)	0.001 (0.026)
Debt to Equity Rule Parent	0.028 (0.025)	0.021 (0.025)	0.028 (0.026)	0.021 (0.026)	0.027 (0.026)	0.013 (0.026)
Earnings Stripping Rule Host	-0.008 (0.032)	-0.004 (0.032)	-0.008 (0.033)	-0.004 (0.034)	-0.011 (0.032)	-0.003 (0.033)
Earnings Stripping Rule Parent	0.061** (0.030)	0.057* (0.030)	0.061* (0.033)	0.057* (0.033)	0.063** (0.031)	0.068** (0.034)
Tax Consolidation Host	0.143 (0.105)	0.129 (0.104)	0.143 (0.099)	0.129 (0.096)	0.120 (0.105)	0.125 (0.106)
Tax Consolidation Parent	-0.233 (0.146)	-0.229 (0.140)	-0.233** (0.111)	-0.229** (0.099)	-0.226 (0.139)	-0.219 (0.140)

Accelerated Depr. Host	0.038** (0.018)	0.041** (0.018)	0.041* (0.021)	0.041** (0.018)	0.044** (0.019)
Accelerated Depr. Parent	-0.014 (0.013)	-0.013 (0.013)	-0.013 (0.017)	-0.016 (0.014)	-0.015 (0.015)
Loss Carryback Host	-0.024 (0.035)	-0.030 (0.035)	-0.030 (0.033)	-0.024 (0.035)	-0.016 (0.037)
Loss Carryback Parent	-0.019 (0.054)	-0.017 (0.054)	-0.017 (0.080)	-0.013 (0.056)	-0.011 (0.056)
Loss Carryforward Host	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Loss Carryforward Parent	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Control of Corruption Host	0.069** (0.029)	0.076*** (0.029)	0.076** (0.033)	0.066** (0.030)	0.085*** (0.031)
Control of Corruption Parent	-0.003 (0.027)	-0.004 (0.027)	-0.004 (0.032)	-0.004 (0.027)	-0.008 (0.028)
Distance	-0.037 (0.135)	-0.030 (0.138)	-0.030 (0.129)	-0.084 (0.155)	0.034 (0.151)
GDP Growth Host	1.476*** (0.213)	1.554*** (0.212)	1.476*** (0.315)	1.698*** (0.216)	1.473*** (0.222)
GDP Growth Parent	0.880*** (0.307)	0.786** (0.307)	0.880** (0.407)	0.747** (0.312)	0.635* (0.333)
GDP Per Capita Host	-0.073 (0.146)	-0.102 (0.146)	-0.073 (0.159)	-0.138 (0.149)	-0.051 (0.153)
GDP Per Capita Parent	-0.027 (0.221)	0.017 (0.221)	-0.027 (0.226)	0.078 (0.222)	-0.072 (0.249)
Inflation Host	0.380* (0.227)	0.427* (0.227)	0.380 (0.300)	0.459** (0.231)	0.324 (0.236)
Inflation Parent	-0.533 (0.328)	-0.454 (0.328)	-0.533 (0.383)	-0.427 (0.337)	-0.527 (0.336)
Unemployment Host	-1.480*** (0.259)	-1.517*** (0.259)	-1.480*** (0.259)	-1.579*** (0.260)	-1.626*** (0.275)
Unemployment Parent	-0.278 (0.382)	-0.283 (0.382)	-0.278 (0.419)	-0.239 (0.380)	-0.312 (0.407)

Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry-Year FE	-	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	-	✓	✓	-	-	-	-	-
#Observations	106,558	106,558	106,558	106,558	106,558	106,558	102,052	94,986	
#Affiliates	18,452	18,452	18,452	18,452	18,452	18,452	17,545	16,433	
R-Squared	0.892	0.893	0.892	0.892	0.893	0.893	0.893	0.892	

Notes: Heteroskedasticity-robust standard errors clustered at the firm level (specifications (1) and (2) and (5) and (6)) and at the host-parent pair level (specifications (3) and (4)) in parentheses. The superscripts *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Observational units are profit-making *multinational subsidiaries* per year. All specifications include a full set of affiliate dummies and a full set of year dummies. Industry-year dummies (SIC, one-digit level) are included where indicated. The variable *Tax Difference* equals the subsidiary tax rate minus the parent tax rate, *No Financ.* *Sector* consists solely of subsidiaries outside the financial sector, and *No NL Parent Firms* excludes all subsidiaries whose parent firm is located in the Netherlands.

Table 4.5 presents the results from estimating equation (1) using the log of *Pre-tax Profits* as the dependent variable. As expected, we still find a negative coefficient for the tax difference, but its statistical significance is weaker. More specifically, we find that only three out of six specifications are statistically different from zero. Consistent with the work of Heckemeyer and Overesch (2017), we interpret these findings as transfer pricing being a more prominent profit-shifting channel than debt shifting. Following the previous analysis, we use as a reference point our regression output in column (1) and compare our semi-elasticity of reported *Pre-tax Profits* (0.397) to that found in the meta-analysis of Heckemeyer and Overesch (2017), 0.821. We note that the difference between the two coefficients is larger and economically meaningful. In economic terms, our estimate indicates that an increase of 10 percentage points in the tax difference corresponds to a decrease in the reported *Pre-tax Profits* value of about 3% at the subsidiary level.

As for the tax base controls, we find results similar to those of the previous analysis. In addition to most of the transfer pricing and thin capitalization variables (i.e., debt-to-equity and earnings stripping rules) being significant at all conventional levels, we find that the presence of a tax group regime in the host country decreases the incentives to shift income from the affiliate back to the parent country. The same result holds for the loss carryforward coefficient of the host country, although its economic magnitude appears very small.

With respect to the remaining controls, we find that the firm-level variables are mostly positive and statistically significant at the 1% level, consistent with the first baseline analysis, as well as previous studies (e.g., Dischinger et al. 2014b). Similarly, we find that better control of corruption is positively associated with higher profits at the multinational subsidiary level. The same holds for the GDP growth of the host country. Consistent with

the previous analysis, we find that the coefficient of the unemployment rate of the host country loads negatively and statistically significant at the 1% level.

Table 4.5: Corporate tax reforms and profit shifting II

Sample	All Subsidiaries					
	(1)	(2)	(3)	(4)	(5)	(6)
OLS Affiliate Fixed Effects, Panel 2003–2013						
Dependent Variable: Log (Pre-tax Profits)						
Explanatory Variables:					No Financ. Sector	No NL Parent Firms
Tax Difference	-0.397* (0.206)	-0.327 (0.207)	-0.397* (0.239)	-0.327 (0.237)	-0.290 (0.210)	-0.480** (0.231)
Log Fixed Assets	0.053*** (0.007)	0.052*** (0.007)	0.053*** (0.007)	0.052*** (0.007)	0.054*** (0.007)	0.049*** (0.007)
Log Cost of Employees	0.401*** (0.016)	0.400*** (0.016)	0.401*** (0.021)	0.400*** (0.021)	0.421*** (0.017)	0.412*** (0.017)
Log Intangibles	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.002)
Log R&D	0.007 (0.006)	0.005 (0.006)	0.007 (0.008)	0.005 (0.008)	0.007 (0.006)	0.004 (0.007)
Transfer Pricing Host	-0.014 (0.016)	-0.009 (0.016)	-0.014 (0.019)	-0.009 (0.019)	-0.008 (0.016)	-0.009 (0.017)
Transfer Pricing Parent	0.048*** (0.017)	0.047*** (0.017)	0.048*** (0.023)	0.047*** (0.023)	0.043** (0.017)	0.036** (0.018)
Debt to Equity Rule Host	-0.047* (0.027)	-0.051* (0.027)	-0.047* (0.028)	-0.051* (0.028)	-0.058** (0.028)	-0.052* (0.028)
Debt to Equity Rule Parent	0.011 (0.028)	0.005 (0.028)	0.011 (0.028)	0.005 (0.027)	0.011 (0.028)	-0.007 (0.028)
Earnings Stripping Rule Host	-0.064* (0.034)	-0.061* (0.035)	-0.064* (0.038)	-0.061 (0.038)	-0.059* (0.035)	-0.058 (0.036)
Earnings Stripping Rule Parent	0.026 (0.033)	0.024 (0.033)	0.026 (0.036)	0.024 (0.034)	0.021 (0.034)	0.022 (0.037)
Tax Consolidation Host	0.268** (0.115)	0.244** (0.114)	0.268** (0.128)	0.244** (0.124)	0.237** (0.114)	0.221* (0.116)

Tax Consolidation Parent	-0.002 (0.169)	-0.006 (0.166)	-0.002 (0.083)	-0.006 (0.084)	-0.015 (0.167)	0.022 (0.166)
Accelerated Depr. Host	0.0160 (0.019)	0.019 (0.019)	0.016 (0.021)	0.019 (0.021)	0.023 (0.020)	0.022 (0.021)
Accelerated Depr. Parent	-0.021 (0.014)	-0.020 (0.014)	-0.021 (0.021)	-0.020 (0.021)	-0.024* (0.015)	-0.029* (0.017)
Loss Carryback Host	0.035 (0.036)	0.026 (0.036)	0.035 (0.038)	0.026 (0.038)	0.033 (0.037)	0.034 (0.038)
Loss Carryback Parent	0.016 (0.064)	0.023 (0.064)	0.016 (0.084)	0.023 (0.083)	0.038 (0.065)	0.028 (0.065)
Loss Carryforward Host	0.000 (0.000)	0.001* (0.000)	0.000* (0.000)	0.001* (0.00)	0.001* (0.000)	0.001 (0.000)
Loss Carryforward Parent	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Control of Corruption Host	0.069** (0.032)	0.078** (0.032)	0.069** (0.034)	0.078** (0.034)	0.085*** (0.032)	0.092*** (0.034)
Control of Corruption Parent	0.021 (0.030)	0.021 (0.030)	0.021 (0.035)	0.021 (0.036)	0.012 (0.030)	0.015 (0.030)
Distance	0.072 (0.233)	0.072 (0.240)	0.072 (0.226)	0.072 (0.232)	0.035 (0.282)	0.200 (0.258)
GDP Growth Host	1.567*** (0.234)	1.663*** (0.234)	1.567*** (0.325)	1.663*** (0.316)	1.720*** (0.238)	1.647*** (0.244)
GDP Growth Parent	0.535 (0.345)	0.441 (0.346)	0.535 (0.426)	0.441 (0.424)	0.392 (0.353)	0.189 (0.373)
GDP Per Capita Host	-0.436*** (0.161)	-0.469*** (0.161)	-0.436*** (0.182)	-0.469*** (0.183)	-0.449*** (0.164)	-0.423** (0.169)
GDP Per Capita Parent	0.071 (0.252)	0.126 (0.251)	0.071 (0.244)	0.126 (0.250)	0.138 (0.256)	0.003 (0.277)
Inflation Host	0.343 (0.255)	0.414 (0.255)	0.343 (0.399)	0.414 (0.414)	0.440* (0.257)	0.422 (0.265)
Inflation Parent	-0.173 (0.348)	-0.069 (0.348)	-0.173 (0.431)	-0.069 (0.426)	-0.098 (0.355)	-0.104 (0.355)
Unemployment Host	-1.385*** (0.286)	-1.430*** (0.285)	-1.385*** (0.281)	-1.430*** (0.275)	-1.424*** (0.289)	-1.511*** (0.301)

Unemployment Parent	-0.186 (0.391)	✓	-0.186 (0.406)	✓	-0.199 (0.390)	✓	-0.199 (0.415)	✓	-0.189 (0.399)	✓	-0.247 (0.411)	✓
Firm FE	-		-		✓		✓		✓		✓	
Industry-Year FE	✓		✓		-		-		-		-	
Year FE	104,432		104,432		104,432		104,432		99,890		93,201	
#Observations	18,299		18,299		18,299		18,299		17,380		16,317	
#Affiliates	0.884		0.884		0.885		0.885		0.884		0.885	
R-Squared												

Notes: Heteroskedasticity-robust standard errors clustered at the firm level (specifications (1) and (2) and (5) and (6)) and at the host-parent pair level (specifications (3) and (4)) in parentheses. The superscripts *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Observational units are profit-making *multinational subsidiaries* per year. All specifications include a full set of affiliate dummies and a full set of year dummies. Industry-year dummies (SIC, one-digit level) are included where indicated. The variable *Tax Difference* equals the subsidiary tax rate minus the parent tax rate, *No Financ.* *Sector* consists solely of subsidiaries outside the financial sector, and *No NL Parent Firms* excludes all subsidiaries whose parent firm is located in the Netherlands.

Next, we subject our baseline regression results to two sets of robustness tests. First, to strengthen the interpretation of our findings, we assess whether the parallel trends assumption plausibly holds in our sample. To this end, we re-estimate equation (1) in first differences while additionally including leads and lags of the tax difference (for a similar approach, see Ljungqvist and Smolyansky 2016).¹⁴ In untabulated results, we find that multinational affiliates shift profits to the parent company only in the year when the tax difference changes—because of a corporate tax reform in either the host or the parent country—and they do not anticipate future tax changes. This analysis lends support to a plausible parallel trends assumption in our sample. Furthermore, these results hold for both the log of *EBIT* as well as the log of *Pre-tax Profits*.

Finally, to alleviate the remaining concern that the business cycle is driving our results, we re-estimate equation (1) while excluding recession years. More specifically, we exclude firm–year observations in which either the host or the parent country experienced more than two consecutive quarters of negative GDP growth, which is consistent with the conventional definition of recession (Blanchard and Johnson 2013). Table 4.6 presents the results. Throughout all four specifications, we find that the tax difference coefficient is negative and statistically different from zero at all conventional levels. Interestingly, we note that the economic magnitude is larger outside recession times. Furthermore, the results suggest that firms also engage in debt shifting outside economic downturns.

¹⁴ The results are available upon request.

Table 4.6: Corporate tax reforms and profit shifting—Robustness tests

OLS Affiliate Fixed Effects, Panel 2003–2013				
Dependent Variable:	Log (EBIT)		Log (Pre-tax Profits)	
Sample	All subsidiaries whose parent and host countries did not experience a recession in the year			
Explanatory Variables:	(1)	(2)	(3)	(4)
Tax Difference	-0.747*** (0.267)	-0.692*** (0.267)	-0.597** (0.288)	-0.534* (0.289)
Log Fixed Assets	0.086*** (0.008)	0.086*** (0.008)	0.056*** (0.008)	0.056*** (0.008)
Log Cost of Employees	0.397*** (0.019)	0.395*** (0.019)	0.403*** (0.020)	0.403*** (0.020)
Log Intangibles	0.004** (0.002)	0.003** (0.002)	0.003 (0.002)	0.003 (0.002)
Log R&D	0.024*** (0.006)	0.024*** (0.006)	0.014* (0.007)	0.013* (0.007)
Transfer Pricing Host	0.031 (0.021)	0.032 (0.021)	-0.002 (0.023)	0.001 (0.023)
Transfer Pricing Parent	0.028 (0.021)	0.025 (0.021)	0.050** (0.023)	0.049** (0.023)
Debt to Equity Rule Host	0.006 (0.025)	0.002 (0.025)	-0.028 (0.028)	-0.033 (0.028)
Debt to Equity Rule Parent	0.009 (0.026)	0.004 (0.026)	0.013 (0.028)	0.008 (0.028)
Earnings Stripping Rule Host	-0.025 (0.049)	-0.019 (0.049)	-0.057 (0.052)	-0.052 (0.052)
Earnings Stripping Rule Parent	0.118*** (0.044)	0.118*** (0.044)	0.092* (0.048)	0.092* (0.048)
Tax Consolidation Host	0.166 (0.124)	0.169 (0.123)	0.207 (0.135)	0.199 (0.135)
Tax Consolidation Parent	-0.290** (0.146)	-0.284** (0.143)	-0.149 (0.170)	-0.146 (0.169)
Accelerated Depr. Host	0.051** (0.025)	0.052** (0.025)	0.030 (0.027)	0.033 (0.027)
Accelerated Depr. Parent	-0.004 (0.019)	-0.005 (0.019)	-0.013 (0.021)	-0.014 (0.021)
Loss Carryback Parent	-0.047 (0.169)	-0.015 (0.172)	0.151 (0.251)	0.188 (0.257)
Loss Carryforward Host	0.002** (0.001)	0.002** (0.001)	0.001 (0.001)	0.001 (0.001)
Loss Carryforward Parent	-0.001** (0.000)	-0.001** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Control of Corruption Host	0.053 (0.034)	0.057* (0.034)	0.068* (0.037)	0.074** (0.037)
Control of Corruption Parent	-0.015 (0.031)	-0.016 (0.031)	-0.004 (0.034)	-0.004 (0.034)
Distance	0.098 (0.144)	0.100 (0.152)	0.040 (0.346)	0.030 (0.357)
GDP Growth Host	1.621*** (0.406)	1.693*** (0.404)	1.444*** (0.461)	1.553*** (0.458)

GDP Growth Parent	0.934** (0.448)	0.903** (0.450)	0.190 (0.493)	0.149 (0.495)
GDP Per Capita Host	-0.056 (0.173)	-0.065 (0.173)	-0.388** (0.192)	-0.400** (0.192)
GDP Per Capita Parent	-0.013 (0.283)	0.036 (0.283)	-0.034 (0.301)	0.030 (0.302)
Inflation Host	0.878** (0.385)	0.934** (0.386)	1.224*** (0.449)	1.314*** (0.445)
Inflation Parent	0.288 (0.523)	0.275 (0.523)	-0.111 (0.559)	-0.0913 (0.561)
Unemployment Host	-1.514*** (0.396)	-1.544*** (0.395)	-1.218*** (0.439)	-1.224*** (0.436)
Unemployment Parent	1.007* (0.580)	1.077* (0.580)	0.418 (0.596)	0.496 (0.595)
Firm FE	✓	✓	✓	✓
Industry–Year FE	-	✓	-	✓
Year FE	✓	-	✓	-
#Observations	67,643	67,643	66,437	66,437
#Affiliates	16,612	16,612	16,432	16,432
R-Squared	0.918	0.918	0.909	0.910

Notes: Heteroskedasticity-robust standard errors clustered at the firm level (specifications (1) and (4)) in parentheses. The superscripts *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Observational units are profit-making *multinational subsidiaries* whose parent and host countries did not experience a recession in the year. All specifications include a full set of affiliate dummies and a full set of year dummies. Industry–year dummies (SIC, one-digit level) are included where indicated. Specifications (1) and (2) use the logarithm of EBIT (*Earnings before Interests and Taxes*) as the dependent variable, whereas specifications (3) and (4) use the logarithm of *Pre-tax Profits* as the dependent variable. The variable *Tax Difference* equals the subsidiary tax rate minus the parent tax rate. The loss carryback host coefficient is omitted in the analyses, since firm fixed effects capture it across all specifications.

4.4.2 Joint Effect of the Tax Rate and the Tax Base on Profit Shifting

In the previous analyses, we identified profit shifting through changes in the tax rate and in the tax base separately. In this section, we adopt a comprehensive approach to estimate the joint effect of the tax rate and the tax base on profit shifting. More specifically, we follow the methodology of Goncharov and Jacob (2014)¹⁵ and combine all the tax base items into an overall index (*Tax Base Index*) that measures the breadth of the tax base in a given host country j or parent country k in year t . The index theoretically ranges from zero (very narrow tax base) to six (very broad tax base with transfer pricing documentation requirements, thin capitalization rules, no tax consolidation, no accelerated depreciation allowances, no loss carryback rule, and loss carryforward up to a maximum of five years).

Table 4.7 lists our sample countries and the *Tax Base Index* values in each sample year. Consistent with Devereux et al. (2008), most of our sample countries lowered the corporate tax rate and broadened the tax base over 2003–2013. In our sample, the actual empirical distribution of *Tax Base Index* ranges from zero to five, as also shown in Table 4.3. In line with this reasoning, Figure 4.2 shows that the yearly average of *Tax Base Index* has an increasing trend across the EU countries over 2003–2013. In further support of this result, we also find that *Tax Base Index* has a correlation of -0.371 with the corporate tax rate (statistically significant at the 1% level). We take this finding as evidence that our index conceptually captures the tax rate cut *cum* base-broadening reforms that have occurred over the past decade in Europe.

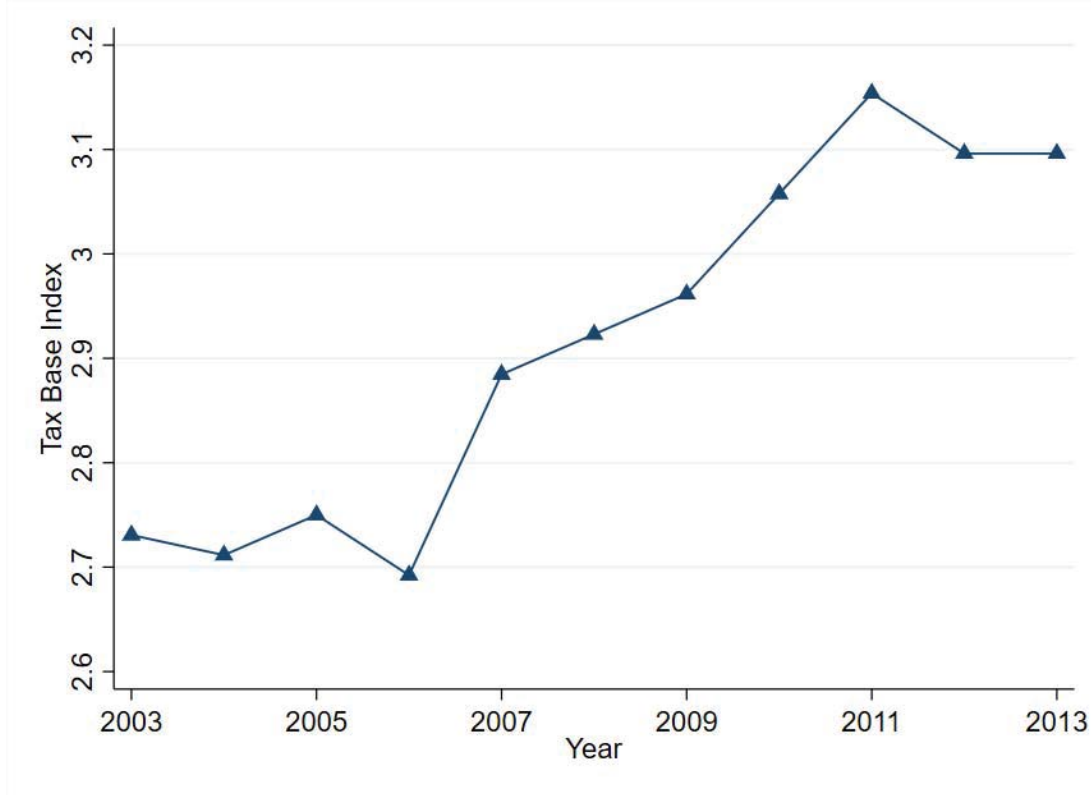
¹⁵ It is worth noting that, in the accounting literature this approach has been originally adopted by Hung (2000).

Table 4.7: Tax Base Index in Europe, 2003–2013

ISO Code	Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
AT	Austria	2	2	2	2	2	2	2	2	2	2	2
BE	Belgium	3	3	3	3	3	3	3	3	3	3	3
BG	Bulgaria	4	5	4	4	4	4	4	4	4	4	4
HR	Croatia	3	3	3	3	3	3	3	3	3	3	3
CZ	Czech Republic	3.5	4	4	4	4	4	4	4	4	4	4
DK	Denmark	4	4	4	4	4	3	3	3	3	3	3
EE	Estonia	4	4	4	4	5	5	5	5	5	5	5
FI	Finland	2.5	2.5	2.5	2.5	3.5	3.5	2.5	2.5	2.5	2.5	2.5
FR	France	2	1	1	1	0	0	0	1	1	1	1
DE	Germany	2	2	2	2	2	3	2	2	3	3	3
HU	Hungary	5	4	4	4	4	4	4	5	5	5	5
IS	Iceland	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5	1.5
IE	Ireland	1	1	1	1	1	1	1	1	2	2	2
IT	Italy	3	2	3	3	3	3	4	5	5	4	4
LU	Luxembourg	2	2	2	2	2	2	2	2	2	2	2
MT	Malta	2	2	2	2	2	2	2	2	2	2	2
NL	Netherlands	2	3	3	3	3	3	3.5	3.5	3.5	3.5	3.5
NO	Norway	1.5	1.5	1.5	1	1	1	1	2	2	2	2
PL	Poland	4	4	4	4	5	5	5	5	5	5	5
PT	Portugal	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4
RO	Romania	4	4	4	4	5	5	4.5	4.5	4.5	4.5	4.5
SK	Slovak Republic	4	3	3	3	3	3	4	3.5	3.5	3.5	3.5
SI	Slovenia	2	3	4	4	5	5	5	5	5	5	5
ES	Spain	2.5	2.5	2.5	2.5	2.5	2.5	3.5	3.5	3.5	3	3
SE	Sweden	1	1	1	1	2	2	2	2	2	2	2
GB	United Kingdom	1	1	1	0	0	1	1	1	1	1	1

Figure 4.2: Trend in the Tax Base Index in Europe, 2003–2013

This figure plots the yearly mean of the tax base index across 26 European countries over 2003–2013.



To test the joint effect of the tax rate and the tax base on profit shifting, we estimate equation (1) while additionally interacting the *Tax Base Index* variables of the host and parent countries with the tax difference. We run equation (1) using both the log of *EBIT* and the log of *Pre-tax Profits* as the dependent variable, respectively. Table 4.8 presents the regression results. Throughout all specifications, we find that the tax difference is negative and statistically significant. These findings are consistent with multinational subsidiaries shifting profits *toward* the parent company. Furthermore, we find that the interaction between the tax difference and the *Tax Base Index* value of the host country is always positive and mostly significantly different from zero. On the contrary, the interaction term with *Tax Base Index* for the parent country never loads significantly.

To interpret the economic magnitude of our results, we use as a reference point the regression output in column (3) of Table 4.8, which uses the log of *EBIT* as the dependent

variable and controls for all firm- and country-level variables along with firm and industry-year fixed effects. The positive interaction term between *Tax Base Index* for the host country and the tax difference indicates that a one-unit increase in *Tax Base Index* (e.g., when the host country enacts transfer pricing documentation requirements) decreases the semi-elasticity of the reported profits by 0.180, or by 26% of the average semi-elasticity of 0.695 ($= 0.18/0.695$). Furthermore, we find the coefficient of the tax difference and its interaction with *Tax Base Index* for the host country to be jointly significant at conventional levels across all specifications. Taken together, these results suggest that a broader tax base and anti-avoidance rules set by the host country can constrain income flowing from a multinational affiliate to its parent company.

Table 4.8: Corporate tax reforms and tax base broadening

Dependent Variable:	Log (EBIT)							
	All Subsidiaries				Log (Pre-tax Profits)			
Sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
OLS Affiliate Fixed Effects, Panel 2003–2013								
Explanatory Variables:								
Tax Difference*Tax Base Index Host	0.207** (0.082)	0.205** (0.083)	0.180** (0.082)	0.180** (0.082)	0.170* (0.089)	0.173* (0.089)	0.135 (0.089)	0.140 (0.089)
Tax Difference*Tax Base Index Parent	-0.820*** (0.252)	-0.753** (0.315)	-0.695*** (0.252)	-0.692** (0.314)	-0.719*** (0.262)	-0.842** (0.331)	-0.557** (0.263)	-0.751** (0.331)
Tax Base Index Host	-0.008 (0.009)	-0.007 (0.009)	-0.007 (0.009)	-0.007 (0.009)	-0.020** (0.010)	-0.020** (0.010)	-0.018* (0.010)	-0.018* (0.010)
Tax Base Index Parent	0.030*** (0.009)	0.029*** (0.009)	0.029*** (0.009)	0.029*** (0.009)	0.028*** (0.009)	0.029*** (0.009)	0.027*** (0.009)	0.029*** (0.009)
Joint Significance (<i>Tax Difference*Tax Base Index Host + Tax Difference</i>)	-0.613*** (0.194)	-0.548** (0.265)	-0.515*** (0.195)	-0.512* (0.265)	-0.548*** (0.203)	-0.669** (0.281)	-0.422** (0.203)	-0.611** (0.280)
Firm-level Controls	✓	✓	✓	✓	✓	✓	✓	✓
Country-level Controls	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
Industry-Year FE	-	-	✓	✓	-	-	✓	✓
Year FE	✓	✓	-	-	✓	✓	-	-
#Observations	106,558	106,558	106,558	106,558	104,432	104,432	104,432	104,432
#Affiliates	18,452	18,452	18,452	18,452	18,299	18,299	18,299	18,299
R-Squared	0.892	0.892	0.893	0.893	0.884	0.884	0.885	0.885

Notes: Heteroskedasticity-robust standard errors clustered at the firm level (specifications (1) to (8)) in parentheses. The superscripts *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Observational units are profit-making *multinational subsidiaries* per year. All specifications include a full set of affiliate dummies and a full set of year dummies. Industry-year dummies (SIC, one-digit level) are included where indicated. Specifications (1) to (4) use the logarithm of EBIT (*Earnings before Interests and Taxes*) as the dependent variable, whereas specifications (5) to (8) use the logarithm of *Pre-tax Profits* as the dependent variable. The variable *Tax Base Index* is an index ranging from zero (very narrow tax base) to six (very broad tax base with transfer pricing documentation requirements, restrictions on interest payments deductibility, no tax consolidation, no accelerated depreciation allowances, no loss carryback rule, and loss carryforward up to a maximum of five years). It indicates how broad the tax base is according to the tax code in the country. The variable *Tax Difference* equals the subsidiary tax rate minus the parent tax rate. The variable *Joint Significance* tests the following effect: (*Tax Difference*Tax Base Index Host + Tax Difference*).

4.4.3 Trend in Profit Shifting across EU Countries over the Past Decade

The previous analysis shows that countries can successfully curb profit shifting by broadening the tax base and introducing anti-avoidance regulations in the tax system. Motivated by this evidence, in the final set of analyses, we test whether these corporate tax reforms have also changed the trend in profit shifting in Europe over the past decade. More specifically, we rerun equation (1) while estimating the tax difference coefficient for three different subperiods. In particular, the first subperiod groups all firm-year observations from 2003 to 2006, the second subperiod groups all firm-year observations from 2007 to 2010, and the last sub-period groups all firm-year observations from 2011 to 2013.¹⁶

Table 4.9 presents the results. In columns (1) and (2), we estimate equation (1) using the log of *EBIT* as the dependent variable. We find that the tax difference is negative and statistically different from zero at conventional levels across all subperiods. The results indicate that multinational affiliates shift profits *toward* the parent company by engaging in transfer pricing across all subperiods. We note that the economic magnitude of the tax difference coefficients denotes a clear downward trend, with earlier (later) years having the highest (lowest) semi-elasticity for the reported *EBIT*. Using the coefficient estimates in column (2) as a reference point, we find that the difference in the semi-elasticities between the first subperiod (2003–2006) and the last subperiod (2011–2013) is statistically different from zero (at the 10% level). In economic terms, this translates to a reduction in the semi-elasticity of about 57% ($= 0.377/0.660$).

Similarly, in columns (3) to (4) of Table 4.9, we estimate equation (1) using the log of *Pre-tax Profits* as the dependent variable. Although the tax difference coefficients are

¹⁶ Ideally, one would like to estimate the tax difference coefficient yearly to better evaluate the trend in profit shifting over time. However, due to different sample sizes over the years, this would lead to inconsistent coefficient estimates. Therefore, we prefer adopting this approach, which reassures us that we are correctly estimating the semi-elasticity of the reported profits for each sub-period.

negative and decreasing across all subperiods, we find statistical significance (at the 5% and 1% levels) only for the first subperiod (2003–2006). This result is consistent with our main findings in Table 4.5 and the work of Heckemeyer and Overesch (2017), who find that transfer pricing appears to be the most prominent tax avoidance strategy for multinational companies, since thin capitalization rules have successfully constrained the debt-shifting channel over the years.

Table 4.9: Profit shifting and development over time

OLS Affiliate Fixed Effects, Panel 2003–2013				
Dependent Variable:	Log (EBIT)		Log (Pre-tax Profits)	
Sample	All Subsidiaries			
Explanatory Variables:	(1)	(2)	(3)	(4)
Tax Difference*2003–2006	-0.683*** (0.223)	-0.660*** (0.222)	-0.625*** (0.241)	-0.599** (0.241)
Tax Difference*2007–2010	-0.470** (0.203)	-0.420** (0.203)	-0.310 (0.221)	-0.263 (0.222)
Tax Difference*2011–2013	-0.455** (0.195)	-0.377* (0.195)	-0.327 (0.212)	-0.234 (0.213)
Test of Equality of Coefficients				
(Tax Difference*2003–2006 - Tax Difference*2011–2013)	-0.227 (0.162)	-0.283* (0.162)	-0.297* (0.173)	-0.365** (0.173)
Firm-level Controls	✓	✓	✓	✓
Tax base Controls	✓	✓	✓	✓
Country-level Controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry–Year FE	-	✓	-	✓
Year FE	✓	-	✓	-
#Observations	106,558	106,558	104,432	104,432
#Affiliates	18,452	18,452	18,299	18,299
R-Squared	0.892	0.893	0.884	0.885

Notes: Heteroskedasticity-robust standard errors clustered at the firm level (specifications (1) to (4)) in parentheses. The superscripts *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Observational units are profit-making *multinational subsidiaries* per year. All specifications include a full set of affiliate dummies and a full set of year dummies. Industry–year dummies (SIC, one-digit level) are included where indicated. Specifications (1) and (2) use the logarithm of EBIT (*Earnings before Interests and Taxes*) as the dependent variable, whereas specifications (3) and (4) use the logarithm of *Pre-tax Profits* as the dependent variable. The variable *Tax Difference* equals the subsidiary tax rate minus the parent tax rate. The variable *Test of Equality of Coefficients* checks the equality of the two coefficients *Tax Difference*2003–2006* and *Tax Difference*2011–2013*.

4.5 Conclusion

This paper investigates the effect of corporate tax reforms on tax-motivated profit shifting. We use a large sample of multinationals and their subsidiaries in Europe and exploit 63 corporate tax reforms over 2003–2013. We focus on the income flowing from multinational subsidiaries to their parent company. With a panel regression model, we assess whether the corporate tax reforms enacted over the past decade have constrained this particular tax strategy. While, on average, multinational affiliates still shift profits *toward* the parent company, we document that profit shifting is significantly lower when accounting for policy changes that broaden the tax base and introduce anti-avoidance regulations in the tax system (Haufler and Schjelderup 2000; OECD 2010).

Finally, we analyze whether the corporate tax reforms have also changed the direction of profit shifting over the sample period. We find a downward trend in the semi-elasticity of the reported profits in relation to the tax rate, which translates to a decrease in profit shifting of more than 50% in the last years of the sample period. Overall, our findings are consistent with broader tax bases and anti-avoidance rules having successfully curbed profit shifting across European countries over the past decade (Dharmapala 2014).

5 Conclusion

This thesis contributes to the line of research investigating how the regulatory environment influences tax avoidance. Existing empirical studies focusing on this topic have mainly dealt with accounting (Hope et al. 2013; De Simone 2016) or tax (e.g., Atwood et al. 2012; Shevlin et al. 2017) rules and have paid less attention to whether other regulations also have an effect on corporate tax avoidance. Given the widespread interest and concern over firms' tax affairs in recent years (Organisation for Economic Co-operation and Development, or OECD, 2014; 2017a), it is of particular interest for academics and policy makers not to be constrained by the silos of disciplines and to evaluate other sets of rules that also “*interact with taxes*” (Dyreng and Maydew 2017, p. 5). This thesis informs this public debate by examining the effect of labor laws (chapter 2), bankruptcy laws (chapter 3), and tax laws (chapter 4) on tax avoidance.

Chapter 2 argues that providing employees with more employment protection comes at a price of increased dismissal costs for firms. This, in turn, results in firms substituting labor with capital on the margin and avoiding taxes because the shift from labor to capital input broadens the tax base and ultimately increases the benefits of tax avoidance. In line with this reasoning, the results show that firms engage in more tax avoidance in countries with greater employment protection. In addition, firms more reliant on labor ex-ante experience larger increases in tax avoidance. Overall, this study draws the attention to the interdependence of corporate tax avoidance with labor market regulation and in particular, employment protection laws. Therefore, this study provides interesting and novel insights into how employment protection laws trigger tax avoidance and it informs policy makers and academics on the economic consequences of employment protection legislation.

Chapter 3 examines how creditor rights relate to corporate tax avoidance. The paper finds that firms forgo to engage in tax avoidance when creditor rights increase and substitute tax avoidance with debt. An important policy implication of the results is that firms reduce tax avoidance in countries with stronger creditor rights. Moreover, the findings also show that firms reduce tax avoidance to a lesser extent in countries with higher deductibility of capital or with weaker debt enforcement. These findings provide evidence on how capital markets regulations, such as creditor rights, the tax system or the judiciary system interrelate and shape firms' tax avoidance. In sum, the paper shows that protecting creditors, which constitute an important stakeholder group, can affect tax avoidance by altering the cost-benefit trade-off firms make when maximizing profits. Thus, the results point towards stronger creditor rights having important externalities beyond their intended effects. Policy makers concerned with tackling tax avoidance might therefore consider these results with regard.

Chapter 4 examines whether the corporate tax reforms enacted in Europe over the 2003-2013 period have been effective at curbing profit shifting. Contrary to much of the extant literature (for a review, see Dharmapala 2014; Heckemeyer and Overesch 2017), this study points out that firms take into account not only the tax rate but also the tax base rules they are subject to when formulating their profit shifting strategies. Therefore, it is fundamental to consider the joint tax rate and tax base effect when gauging the extent of profit shifting. In this regard, the results document that income shifting is significantly lower when accounting for tax laws that broaden the tax base and introduce anti-avoidance regulations in the tax system (Haufler and Schjelderup 2000; OECD 2010). Closely related to this, the study also finds that the corporate tax reforms enacted over the past decade have successfully led to a downward trend in profit shifting. Hence, the findings inform the

ongoing policy debate over tax avoidance in Europe and show that tax base broadening reforms and anti-avoidance rules can effectively mitigate profit-shifting activities.

Overall, this thesis highlights the important role the legal environment plays in firms' decision making over tax avoidance behavior. While increasing employment protection might not be desirable because it appears to incentivize tax avoidance (chapter 2), this dissertation also provides evidence on the potential benefit of strengthening creditor rights (chapter 3) and of broadening the tax base (chapter 4) to curb tax avoidance. Despite the indubitable relevance of the results, this thesis refrains from inferring welfare implications, but it encourages more work in this area to evaluate the desirability of these laws within a general equilibrium framework. In a similar vein, it is acknowledged that other important sets of laws may well have an effect on tax avoidance beyond labor, bankruptcy and tax laws. For example, considerations over tax avoidance may also arise with the newest patent box regimes and the effectiveness of a country's property rights regime, if the enforcement of patent infringements proves difficult and it discourages intangibles-related income shifting to low-tax jurisdictions. Identifying the relevance of these laws and institutions appears to be an interesting and fruitful area, which this thesis leaves for future research.

Appendix

Appendix A: Variable definitions Chapter 2

Firm-level variables (source: Compustat North America and Compustat Global)

<i>GAAP ETR</i>	<i>GAAP ETR</i> is income taxes (<i>TXT</i>) divided by pre-tax income less special items (<i>PI-SPI</i>). The variable is bounded between 0 and 1.
<i>GAAP ETR 3</i>	<i>GAAP ETR 3</i> is the three-year sum of income taxes (<i>TXT</i>) divided by the three-year sum of pre-tax income minus special items (<i>PI - SPI</i>). The three years cover from <i>t-1</i> to <i>t+1</i> . The variable is bounded between 0 and 1.
<i>CURRENT ETR</i>	<i>CURRENT ETR</i> is current taxes (<i>TXC</i>) divided by pre-tax income less special items (<i>PI-SPI</i>). I replace current taxes (<i>TXC</i>) with income taxes (<i>TXT</i>) minus deferred income taxes (<i>TXDI</i>) where missing. The variable is bounded between 0 and 1.
<i>CURRENT ETR 3</i>	<i>CURRENT ETR 3</i> is the three-year sum of current taxes (<i>TXC</i>) divided by the three-year sum of pre-tax income minus special items (<i>PI - SPI</i>). The three years cover from <i>t-1</i> to <i>t+1</i> . The variable is bounded between 0 and 1.
<i>ADJUSTED GAAP ETR</i>	<i>ADJUSTED GAAP ETR</i> is income taxes (<i>TXT</i>) divided by pre-tax income less special items plus R&D expenses plus depreciation and amortization (<i>PI-SPI+XRD+DP</i>). The variable is bounded between 0 and 1.
<i>ADJUSTED GAAP ETR 3</i>	<i>ADJUSTED GAAP ETR 3</i> is the three-year sum of income taxes (<i>TXT</i>) divided by the three-year sum of pre-tax income less special items plus R&D expenses plus depreciation and amortization (<i>PI-SPI+XRD+DP</i>). The three years cover from <i>t-1</i> to <i>t+1</i> . The variable is bounded between 0 and 1.
<i>BTDI</i>	<i>BTDI</i> is pre-tax income less non-controlling interest (<i>PI-MII</i>) minus current taxes (<i>TXC</i>) divided by the corporate tax rate (<i>Corporate Tax Rate</i>), scaled by lagged totals assets (<i>AT</i>).

<i>BTD2</i>	<i>BTD2</i> is pre-tax income less non-controlling interest (<i>PI-MII</i>) minus income taxes (<i>TXT</i>) divided by the corporate tax rate (<i>Corporate Tax Rate</i>), scaled by lagged total assets (<i>AT</i>).
<i>Change in Employment</i>	<i>Change in Employment</i> is the one-year percentage change in a firm's number of employees ($EMP_t/EMP_{t-1}-1$).
<i>Gross Margin</i>	<i>Gross Margin</i> is sales (<i>SALE</i>) minus costs of goods sold (<i>COGS</i>) scaled by sales.
<i>Gross Profit to Assets Ratio</i>	<i>Gross Profit to Assets Ratio</i> is gross profit (<i>SALE-COGS</i>) scaled by average total assets (<i>AT</i>).
<i>Size</i>	<i>Size</i> is the natural logarithm of the firm's total assets (<i>AT</i>).
<i>Leverage</i>	<i>Leverage</i> is the total debt (<i>DLC+DLTT</i>) scaled by lagged total assets (<i>AT</i>).
<i>Accruals</i>	<i>Accruals</i> are computed following the definition by Richardson et al. (2005) and Atwood et al. (2012), as the sum of the change in net non-cash working capital (ΔWC), the change in net noncurrent operating assets (ΔNCO), and the change in net financial assets (ΔFIN).
<i>MtB</i>	<i>MtB</i> is the market-to-book ratio calculated as common shares outstanding (<i>CSHO</i>) multiplied by the stock price at the fiscal year-end (<i>PRCC_F</i>) divided by total common equity (<i>CEQ</i>). The firm's market capitalization is retrieved from the Datastream database.
<i>Dividend</i>	<i>Dividend</i> is an indicator variable taking the value of 1 if the firm pays dividend and 0 otherwise.
<i>R&D</i>	<i>R&D</i> is the R&D expenses (<i>XRD</i>) scaled by lagged total assets (<i>AT</i>). I replace missing values with zero (Dyreng, Hanlon, and Maydew 2010).
<i>Capex</i>	<i>Capex</i> is the capital expenditure (<i>CAPX</i>) scaled by lagged property, plant, and equipment.
<i>Employees</i>	<i>Employees</i> is the natural logarithm of the firm's number of employees. If the number of employees is missing for a firm, I use the average industry-year (three digit-SIC code) (Louis and Urcan 2017).

<i>Intangibles</i>	<i>Intangibles</i> is the intangible assets (<i>INTAN</i>) scaled by lagged total assets (<i>AT</i>).
<i>ROA</i>	<i>ROA</i> is the pre-tax income (<i>PI</i>) scaled by lagged total assets (<i>AT</i>).
<i>ROA Vol</i>	<i>ROA Vol</i> is the three-year volatility of <i>ROA</i> (from <i>t-2</i> to <i>t</i>).
<i>Cash Flow</i>	<i>Cash Flow</i> is the firm's <i>EBITDA</i> scaled by lagged total assets (<i>AT</i>).
<i>Loss</i>	<i>Loss</i> is an indicator variable equal to one if pre-tax income (<i>PI</i>) is lower than zero.
<i>Low Capital Intensity</i>	<i>Low Capital Intensity</i> is an indicator variable that is set to one if the value of firm's capital intensity (<i>Capital Intensity</i>) is below the industry-adjusted median distribution <i>j</i> (three-digit SIC code) in year <i>t-2</i> and <i>t-1</i> and zero otherwise. The variable <i>Capital Intensity</i> for each firm <i>i</i> in year <i>t-2</i> and <i>t-1</i> is property, plant, and equipment (<i>PPENT</i>) scaled by lagged total assets (<i>AT</i>).
<i>High Ind. Employment Vol</i>	<i>High Ind. Employment Vol</i> is an indicator variable that is set to one if the industry employment volatility (<i>Ind. Employment Vol</i>) is above the sample median and zero otherwise. The variable <i>Ind. Employment Vol</i> is the mean employment volatility across all firms in the same 3-digit SIC industry, where employment volatility is the standard deviation of the ratio of the number of employees (<i>EMP</i>) to property, plant, and equipment (<i>PPENT</i>) over years <i>t-2</i> to <i>t-1</i> .
<i>Low Enforcement</i>	<i>Low Enforcement</i> is an indicator variable that is set to one if the value of the World Bank Indicator <i>Control of Corruption</i> in a certain country <i>k</i> is below the yearly sample median in year <i>t-1</i> and zero otherwise.
<i>DISC EXP1</i>	<i>DISC EXP1</i> is selling, general, and administrative expenses (<i>XSGA</i>) plus R&D (<i>XRD</i>) divided by lagged total assets (<i>AT</i>).
<i>DISC EXP2</i>	<i>DISC EXP2</i> is selling, general, and administrative expenses (<i>XSGA</i>) plus R&D (<i>XRD</i>) divided by lagged sales (<i>SALE</i>).

DISC EXP3 $DISC EXP3$ is the deviations from the predicted values from the corresponding (3-digit SIC level) industry-year regression $DISC EXP1 = \alpha_0 + \alpha_1 \left(1/AT_{t-1}\right) + \alpha_2 \left(SALE_{t-1}/AT_{t-1}\right) + \varepsilon_t$.

DISC EXP4 $DISC EXP4$ is the deviations from the predicted values from the corresponding (48 Fama-French) industry-year regression $DISC EXP1 = \alpha_0 + \alpha_1 \left(1/AT_{t-1}\right) + \alpha_2 \left(SALE_{t-1}/AT_{t-1}\right) + \varepsilon_t$.

Country-level control variables (source: IMF, OECD, United Nation University, World Bank)

EPL EPL is an indicator that takes values of 1 (if EPL went up in country k in year t), or -1 (If EPL went down in country k in year t), and 0 otherwise. EPL is defined recursively starting from $EPL_{1995}=0$.

OECD EPL $OECD EPL$ is an aggregate index of employment protection legislation in country k in year t , computed by the OECD. It ranges between 0 and 6.

Corporate Tax Rate $Corporate Tax Rate$ is the top marginal corporate tax rate in country k in year t .

GDP Growth $GDP Growth$ is the annual percentage growth rate of GDP in constant 2005 U.S. dollars.

GDP per capita $GDP per capita$ is the natural logarithm of GDP per capita in constant 2005 USD.

Inflation $Inflation$ is the rate of price change in a country k as a whole as measured by the annual growth rate of the GDP implicit deflator.

Recession $Recession$ is an indicator variable taking the value of one if there are two consecutive quarters with negative GDP growth in a certain country k and year t , and zero otherwise.

Unemployment Rate $Unemployment Rate$ is the average share of the total labor force without work, but currently seeking employment.

Population $Population$ is the natural logarithm of the number of people living in a country (in millions).

Gini $Gini$ is the indicator of income inequality in a certain country k and year t .

Rule of Law

Rule of Law is the yearly estimate of a country's quality relating to rule of law.

Left-wing Government

Left Government is an indicator taking the value of one if there is a left-wing government in power in a certain country k and year t .

Union Density

Union Density is the share of union members in the labor force.

Appendix B: Additional Analyses Chapter 2

Table B.1: Determinants of Employment Protection Legislation

This table models the determinants of changes in employment protection legislation. Column (1) (column (2)) reports the linear-probability model for increases (decreases) in EPL over the 1996-2013 period across 19 OECD countries. All variables are described in Appendix A. Standard errors are adjusted for heteroskedasticity and clustered at the country-level. *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	Probability of	
	Increase in EPL (1)	Decrease in EPL (2)
Corporate Tax Rate _{kt-1}	1.046** (2.482)	-0.238 (-0.436)
GDP Growth _{kt-1}	1.727 (1.499)	1.465 (1.586)
GDP per capita _{kt-1}	0.305 (1.462)	0.257 (0.866)
Inflation _{kt-1}	-0.197 (-0.332)	-0.0759 (-0.155)
Recession _{kt-1}	0.00837 (0.257)	0.154* (1.968)
Unemployment Rate _{kt-1}	-0.482 (-0.591)	1.486* (2.063)
Population _{kt-1}	-0.0660 (-0.0892)	1.108 (1.323)
Gini _{kt-1}	-0.00224 (-0.412)	0.000432 (0.0635)
Left-wing Government _{kt-1}	0.0508 (1.422)	0.00705 (0.280)
Rule of Law _{kt-1}	-0.560** (-2.771)	-0.214 (-0.976)
Union Density _{kt-1}	-0.0168** (-2.175)	0.00854* (1.769)
Country FE	✓	✓
Year FE	✓	✓
#Observations	292	292
Adjusted-R ²	0.132	0.0435

Table B.2: Employment Protection and Tax Avoidance – Robustness to using Fama-French Industry classification

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. Columns (3) and (6) exclude the USA from the sample. All specifications include industry-year fixed effects. I define industries as the 48 Fama-French industries. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level using the Fama-French industry code. *t-statistics* are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0132*** (-5.538)	-0.0135*** (-5.568)	-0.0126*** (-5.395)	-0.0157*** (-5.415)	-0.0159*** (-5.570)	-0.0128*** (-4.489)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	71,414	71,414	39,254	65,807	65,807	37,083
Adjusted-R ²	0.343	0.365	0.402	0.434	0.442	0.520

Table B.3: Employment Protection and Tax Avoidance – Robustness to clustering the standard errors at the country-level

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. Columns (3) and (6) exclude the USA from the sample. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-level. *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0130*** (-4.669)	-0.0131*** (-4.993)	-0.0118*** (-4.380)	-0.0142*** (-3.137)	-0.0145*** (-3.178)	-0.0119*** (-3.203)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	71,362	71,362	39,230	63,183	63,183	35,552
Adjusted-R ²	0.343	0.365	0.405	0.465	0.470	0.541

Table B.4: Employment Protection and Tax Avoidance – Robustness to Excluding Loss-making Firms

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. Columns (3) and (6) exclude the USA from the sample. All specifications exclude loss-making firms from the sample. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t-statistics* are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0114*** (-5.482)	-0.0118*** (-5.716)	-0.0109*** (-5.042)	-0.0129*** (-5.406)	-0.0133*** (-5.564)	-0.0114*** (-4.684)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	68,330	68,330	38,351	60,053	60,053	34,448
Adjusted-R ²	0.381	0.392	0.416	0.474	0.478	0.533

Table B.5: Employment Protection and Tax Avoidance – Robustness to Requiring at least three consecutive years of data

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable. Columns (3) and (6) exclude the USA from the sample. All specifications require firms to be at least three consecutive years in the sample. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0121*** (-5.527)	-0.0121*** (-5.657)	-0.0115*** (-5.130)	-0.0152*** (-5.752)	-0.0153*** (-5.844)	-0.0135*** (-4.986)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	65,596	65,596	37,229	60,665	60,665	35,267
Adjusted-R ²	0.345	0.366	0.402	0.439	0.447	0.519

Table B.6: Employment Protection and Tax Avoidance – Robustness to Truncating at 0 and 1 the dependent variable

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *GAAP ETR* (columns (1) to (3)) and *GAAP ETR 3* (columns (4) to (6)) as the dependent variable and truncate both at 0 and 1. Columns (3) and (6) exclude the USA from the sample. All variables are described in Appendix A. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	GAAP ETR			GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0079*** (-4.532)	-0.0084*** (-4.606)	-0.0078*** (-4.253)	-0.0083*** (-4.524)	-0.0076*** (-4.165)	-0.0078*** (-3.789)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	58,835	58,835	33,883	48,371	48,371	29,031
Adjusted-R ²	0.438	0.444	0.476	0.584	0.590	0.622

Table B.7: Employment Protection and Tax Avoidance – Alternative Measures of Tax Avoidance

This table reports the results of the effect of employment protection legislation on firm-level tax avoidance. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. Following Markle and Shackelford (2012) and Blackburne and Blouin (2016), I use alternative measures of tax avoidance as the dependent variable. In Panel A, I use *CURRENT ETR* (columns (1) to (3)) and *CURRENT ETR 3* (columns (4) to (6)). In Panel B, I use *ADJUSTED GAAP ETR* (columns (1) to (3)) and *ADJUSTED GAAP ETR 3* (columns (4) to (6)). In Panel C, I use *BTD1* (columns (1) to (3)) and *BTD2* (columns (4) to (6)). Columns (3) and (6) exclude the USA from the sample. All variables are described in Appendix A and B. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Panel A:	CURRENT ETR			CURRENT ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0306*** (-9.469)	-0.0374*** (-11.57)	-0.0371*** (-11.89)	-0.0347*** (-8.899)	-0.0403*** (-10.44)	-0.0375*** (-10.30)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	57,607	57,607	33,382	52,800	52,800	31,502
Adjusted-R ²	0.479	0.486	0.566	0.597	0.609	0.688
Panel B:	ADJUSTED GAAP ETR			ADJUSTED GAAP ETR 3		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0060*** (-4.429)	-0.0056*** (-4.385)	-0.0042*** (-3.187)	-0.0049*** (-3.653)	-0.0046*** (-3.510)	-0.0039*** (-2.810)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	66,980	66,980	36,287	52,491	52,491	29,388
Adjusted-R ²	0.403	0.431	0.461	0.578	0.594	0.642
Panel C:	BTD1			BTD2		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	0.0207*** (7.773)	0.0243*** (9.136)	0.0235*** (10.02)	0.00115* (1.873)	0.00249*** (3.885)	0.00149** (2.215)
Firm-level controls	-	✓	✓	-	✓	✓
Country-level controls	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓	✓	✓
#Observations	65,661	65,661	38,433	67,174	67,174	39,009
Adjusted-R ²	0.373	0.587	0.612	0.280	0.465	0.488

Table B.8: Employment Protection and Discretionary Expenses

This table reports the robustness results of the effect of employment protection legislation on firm-level discretionary expenses. The employment protection indicator (*EPL*) is based on 44 labor reforms over the 1996-2013 period across 19 OECD countries. I use *DISC EXP1* (column (1)), *DISC EXP2* (column (2)), *DISC EXP3* (column (3)), and *DISC EXP4* (column (4)) as the dependent variable. All variables are described in Appendix A and B. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-industry level (two-digit SIC code). *t*-statistics are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

	DISC EXP1	DISC EXP2	DISC EXP3	DISC EXP4
	(1)	(2)	(3)	(4)
EPL	-0.00479 (-1.369)	-0.00755*** (-2.743)	-0.00305 (-0.917)	-0.000718 (-0.208)
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
#Observations	68,129	68,033	66,294	68,091
Adjusted-R ²	0.848	0.512	0.658	0.683

Appendix C: Variable definitions Chapter 3

Firm-level variables (source: Compustat North America and Compustat Global)

<i>GAAP ETR</i>	<i>GAAP ETR</i> is income taxes (<i>TXT</i>) dividend by pre-tax income less special items (<i>PI-SPI</i>). The variable is bounded between 0 and 1.
<i>GAAP ETR 3</i>	<i>GAAP ETR 3</i> is the three-year sum of income taxes (<i>TXT</i>) divided by the three-year sum of pre-tax income minus special items (<i>PI - SPI</i>). The three years cover from <i>t-2</i> to <i>t</i> . The variable is bounded between 0 and 1.
<i>Tax Avoid 3</i>	<i>Tax Avoid 3</i> is the three-year sum of the tax on pre-tax income calculated at the home-country statutory tax rate $[\sum_{t-2}^t (PI - SPI) * Corporate Tax Rate]$ minus the taxes actually paid $[\sum_{t-2}^t (TXC - \Delta TXP)]$, divided by the three-year sum of pre-tax income minus special items $[\sum_{t-2}^t (PI - SPI)]$ (Atwood et al. 2012).
<i>BTD</i>	<i>BTD</i> is pre-tax income less non-controlling interest (<i>PI-MII</i>) minus income taxes (<i>TXT</i>) divided by the corporate tax rate (<i>Corporate Tax Rate</i>), scaled by lagged totals assets (<i>AT</i>).
<i>Size</i>	<i>Size</i> is the natural logarithm of the firm's total assets (<i>AT</i>).
<i>Leverage</i>	<i>Leverage</i> is the total debt (<i>DLC+DLTT</i>) scaled by total assets (<i>AT</i>).
<i>Income</i>	<i>Income</i> is the firm's <i>EBITDA</i> scaled by lagged total assets (<i>AT</i>).
<i>Investment</i>	<i>Investment</i> is the capital expenditure (<i>CAPX</i>) scaled by lagged total assets (<i>AT</i>).
<i>Cash</i>	<i>Cash</i> is cash and short-term investments (<i>CHE</i>) scaled by lagged total assets (<i>AT</i>).
<i>Accruals</i>	<i>Accruals</i> are computed following the definition by Richardson et al. (2005) and Atwood et al. (2012), as the sum of the change in net non-cash working capital (ΔWC), the change in net noncurrent operating assets (ΔNCO), and the change in net financial assets (ΔFIN).
<i>Intangibles</i>	<i>Intangibles</i> is the intangible assets (<i>INTAN</i>) scaled by total assets (<i>AT</i>).

<i>Profit Margin</i>	<i>Profit Margin</i> is pre-tax income (<i>PI</i>) scaled by sales (<i>SALE</i>).
<i>R&D</i>	<i>R&D</i> is the ratio of R&D expenses (<i>XRD</i>) scaled by sales (<i>SALE</i>). We replace missing values with zero (Dyreng, Hanlon, and Maydew 2010).
<i>Z-score</i>	<i>Z-score</i> is the modified Altman's (1968) Z-score. We follow Hasan et al. (2014) and compute the Z-score as follows: $(1.2*WCAP+1.4*RE+3.3*PI+0.999*SALE)/AT$.
<i>MtB</i>	<i>MtB</i> is the market-to-book ratio calculated as common shares outstanding (<i>CSHO</i>) multiplied by the stock price at the fiscal year-end (<i>PRCC_F</i>) divided by total common equity (<i>CEQ</i>). The firm's market capitalization is retrieved from the Datastream database.
<i>Dividend</i>	<i>Dividend</i> is an indicator variable taking the value of 1 if the firm pays dividend and 0 otherwise.
<i>Interest/Total Assets</i>	<i>Interest/Total Assets</i> is interest expense (<i>XINT</i>) scaled by total assets (<i>AT</i>).
<i>Interest/Total Debt</i>	<i>Interest/Total Debt</i> is interest expense (<i>XINT</i>) scaled by total debt (<i>DLTT+DLC</i>).
<i>Low Leverage</i>	<i>Low Leverage</i> is an indicator variable that is set to one if the value of a firm's leverage (<i>Leverage</i>) is equal to or below the bottom quartile of the yearly industry distribution <i>j</i> (one-digit SIC code) in country <i>k</i> and zero otherwise.
<i>Low Intangibles</i>	<i>Low Intangibles</i> is an indicator variable that is set to one if the value of a firm's intangible assets (<i>Intangibles</i>) is equal to or below the bottom quartile of the yearly industry distribution <i>j</i> (one-digit SIC code) in country <i>k</i> and zero otherwise.
<i>Deductibility Index</i>	<i>Deductibility Index</i> is increasing with deductibility and it ranges from 0 (very low deductibility of capital with restrictions on interest payments deductibility, no allowance for corporate equity, no loss carryback rule and loss carryforward up to a maximum 5 years) to 3 (very high deductibility with no thin capitalization rules, allowance for corporate equity, loss carryback rule and loss carry forward from a minimum of 6 years to unlimited). This index measures the deductibility of capital allowed by a country <i>k</i> 's tax code in year <i>t</i> .

Debt Enforcement

Debt Enforcement is the natural logarithm of the number of days to enforce a contract in country k in year t . For the period of 2000 to 2003, we use the contract enforcement time from Andrei Shleifer's website, whereas for the period of 2004 to 2013 we use the contract enforcement time from the World Bank Doing Business Reports.

Country-level control variables (source: IMF, OECD, World Bank)

CR Reforms

CR Reforms is an indicator that takes values of 1 (if creditor rights went up in country k in year t), or -1 (if creditor rights went down in country k in year t), and 0 otherwise. *CR Reforms* is defined recursively starting from $CR\ Reforms_{1999}=0$.

CR Index

CR Index is based on the methodology of Qi et al. (2017). We use the strength of legal rights index from 2005 to 2013 from the World Bank Doing Business Reports and normalize it to the range of 0 and 4. For the period of 2000 to 2004, we use the variations of the *CR Index* from Djankov et al. (2007).

Corporate Tax Rate

Corporate Tax Rate is the top marginal corporate tax rate in country k in year t .

GDP Growth

GDP Growth is the annual percentage growth rate of GDP in constant 2005 U.S. dollars.

GDP per capita

GDP per capita is the natural logarithm of GDP per capita in constant 2005 USD.

Inflation

Inflation is the rate of price change in a country k as a whole as measured by the annual growth rate of the GDP implicit deflator.

Rule of Law

Rule of Law is the yearly estimate of a country's quality relating to rule of law.

Legal Origin

Legal origin proxies for four different legal origins: English, French, German, and Scandinavian.

Religion

Religion proxies for five distinct religions: Buddhism, Catholicism, Muslim, Orthodoxy, Protestantism

Appendix C.1: Variable Definitions – Italian Setting

<i>Firm-level variables</i> (source: Amadeus)	
<i>GAAP ETR</i>	<i>GAAP ETR</i> is income taxes (<i>TAXA</i>) dividend by pre-tax income (<i>PLBT</i>). The variable is bounded between 0 and 1.
<i>Size</i>	<i>Size</i> is the natural logarithm of the firm’s total assets (<i>TOAS</i>).
<i>Leverage</i>	<i>Leverage</i> is the total debt (<i>CULI+LTDB</i>) scaled by total assets (<i>TOAS</i>).
<i>Income</i>	<i>Income</i> is the firm’s <i>EBITDA</i> (<i>EBTA</i>) scaled by lagged total assets (<i>TOAS</i>).
<i>Investment</i>	<i>Investment</i> is the change in fixed assets (Δ <i>FIAS</i>) before depreciation (<i>DEPR</i>) scaled by lagged total assets (<i>AT</i>).
<i>Cash</i>	<i>Cash</i> is cash and short-term investments (<i>CASH</i>) scaled by lagged total assets (<i>TOAS</i>).
<i>Intangibles</i>	<i>Intangibles</i> is the intangible assets (<i>IFAS</i>) scaled by total assets (<i>TOAS</i>).
<i>Profit Margin</i>	<i>Profit Margin</i> is pre-tax income (<i>PLBT</i>) scaled by sales (<i>TURN</i>).
<i>Bankruptcy proceedings data</i> (source: ISTAT)	
<i>Low Debt Enforcement Prov.</i>	<i>Low Debt Enforcement Prov.</i> is an indicator that takes the value of 1 if the number of days for a bankruptcy proceeding to close in province <i>l</i> is above the median of days across the 103 Italian provinces in 2004, and 0 otherwise.
<i>Low Debt Enforcement Prov. (Alternative Definition)</i>	<i>Low Debt Enforcement Prov. (Alternative Definition)</i> is an indicator that takes the value of 1 if the average number of days for a bankruptcy proceeding to close in province <i>l</i> is above the average of days across the 103 Italian provinces over the 2003-2004 years, and 0 otherwise.
<i>Post</i>	<i>Post</i> is a dummy variable that takes the value of 1 after the “Legislative Decree N. 35 and Law N. 80” in 2005 and in the following years, and 0 otherwise.

Appendix D: Additional Analyses Chapter 3

Figure D.1: Difference in the length of bankruptcy proceedings between Low and High Debt Enforcement Italian Provinces, 2003-2007

This figure plots the difference in the average length of bankruptcy proceedings (in days) of low debt enforcement provinces relative to high debt enforcement provinces over the period 2003-2007. Low debt enforcement provinces are those whose number of days for a bankruptcy proceeding to close is above the median of days across 103 Italian provinces in 2004. High debt enforcement provinces are those whose number of days is below the median in the same year. We include province and year fixed effects when estimating the difference between Low and High Debt Enforcement provinces. We separately present the difference for low debt enforcement provinces (triangle symbol) and for high debt enforcement provinces (circle symbol) and present the difference-in-differences estimate in t_0 (DD estimate) with the t-statistic. Standard errors adjusted for heteroskedasticity are clustered at the province-level. The dashed vertical line divides the pre-reform period from the post-reform period.

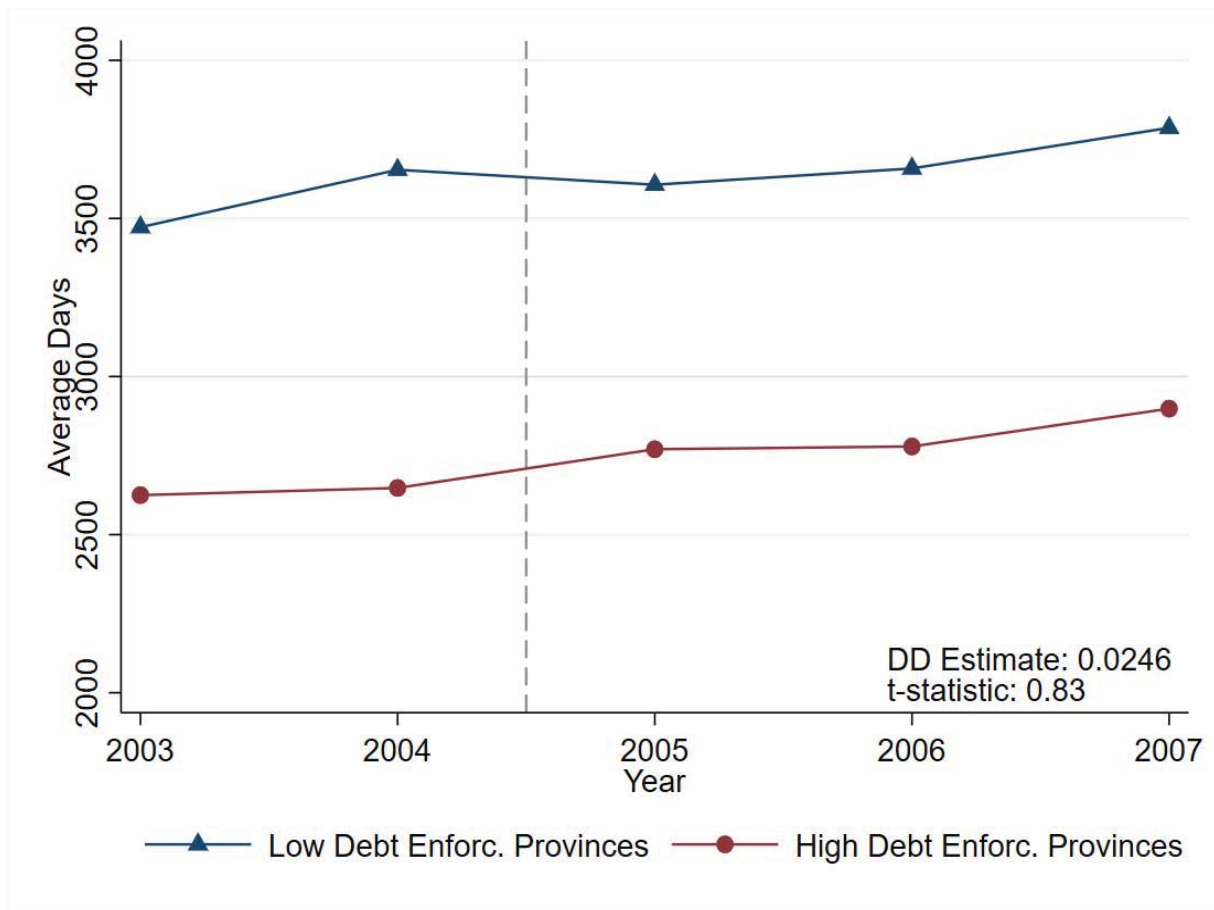


Table D.1: Creditor Rights and Tax Avoidance – Robustness Tests

This table reports the results of the relationship between creditor rights and firm-level tax avoidance. The *CR Reforms* is based on 6 bankruptcy reforms across 34 sample countries over the period 2000-2013, whereas the *CR Index* is a time-varying creditor rights index as in Qi et al. (2017). We use *GAAP ETR* (columns (1) to (2)) and *GAAP ETR 3* (columns (3) to (4)) as the dependent variable. In Panel A, we allow each country to have different trends in tax avoidance. The time trend variable is the interaction term between the current year minus 1999 and an indicator variable for each country. In Panel B, we use *GAAP ETR* (columns (1) to (2)) and *GAAP ETR 3* (columns (3) to (4)) as the dependent variable and truncate both at 0 and 1. All variables are described in Appendix C. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the country-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	GAAP ETR		GAAP ETR 3	
Panel A: Country Trends	(1)	(2)	(3)	(4)
CR Reforms	0.0181*		0.0308***	
	(0.0092)		(0.0044)	
CR Index		0.0040**		0.0068
		(0.0017)		(0.0049)
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	-	-	-	-
Country-Trends	✓	✓	✓	✓
#Observations	85,205	85,205	85,205	85,205
Adjusted-R ²	0.430	0.430	0.538	0.538
Panel B: Truncated ETRs	(1)	(2)	(3)	(4)
CR Reforms	0.0130***		0.0124**	
	(0.0036)		(0.0058)	
CR Index		0.0052***		0.0058***
		(0.0016)		(0.0016)
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓
#Observations	71,091	71,091	71,091	71,091
Adjusted-R ²	0.554	0.554	0.708	0.708

Table D.2: Creditor Rights and Tax Avoidance – Alternative Dependent Variables

This table reports the results of the relationship between creditor rights and firm-level tax avoidance. The *CR Reforms* is based on 6 bankruptcy reforms across 34 sample countries over the period 2000-2013, whereas the *CR Index* is a time-varying creditor rights index as in Qi et al. (2017). In Panel A, we use *Tax Avoid 3* as in Atwood et al. (2012) (columns (1) to (2)) and *BTD* (columns (3) to (4)) as the dependent variable. In Panel B, we use the change in *Tax Avoid 3* (columns (1) to (2)) and the change in *BTD* (columns (3) to (4)) as the dependent variable. The change in *Tax Avoid 3* is defined as the difference between *Tax Avoid 3* at t (i.e., computed over t to $t+2$) and *Tax Avoid 3* at $t-3$ (i.e., computed over $t-3$ to $t-1$). All variables are described in Appendix C. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions (Panel A columns (1) to (4)) and OLS in first-differences (Panel B columns (1) to (4)) with standard errors adjusted for heteroskedasticity and clustered at the country-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	Tax Avoid 3		BTD	
Panel A	(1)	(2)	(3)	(4)
CR Reforms	-0.0972*** (0.0326)		-0.0071*** (0.0022)	
CR Index		-0.0412** (0.0187)		-0.0027*** (0.0007)
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓
#Observations	65,709	65,709	82,909	82,909
Adjusted-R ²	0.587	0.586	0.457	0.457
Dep. Var.	ΔTax Avoid 3		ΔBTD	
Panel B	(1)	(2)	(3)	(4)
CR Reforms	-0.0458* (0.0251)		-0.0051* (0.0026)	
CR Index		-0.0330*** (0.0118)		-0.0025** (0.0010)
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Firm FE	-	-	-	-
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓
#Observations	31,469	31,469	74,834	74,834
Adjusted-R ²	0.145	0.148	0.167	0.167

Table D.3: Creditor Rights and Tax Avoidance – Alternative Estimation Strategy

This table reports the correlated random effect regression results of creditor rights on firm-level tax avoidance across 34 sample countries over the period 2000-2013. We also control for additional country-level institutional proxies: legal origin and religion. The CR (Djankov et al. 2007) is the 2002 value of the CR Index from Djankov et al. (2007). We use *GAAP ETR* (columns (1) to (2)) and *GAAP ETR 3* (columns (3) to (4)) as the dependent variable. All variables are described in Appendix C. All the non-indicator variables, except country-level variables, are winsorized at the top and bottom one-percentiles. Estimates are based on correlated random effect regressions with standard errors adjusted for heteroskedasticity and clustered at the country-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	GAAP ETR		GAAP ETR 3	
	(1)	(2)	(3)	(4)
CR (Djankov et al. 2007)	0.0106*** (0.0030)	0.0095** (0.0039)	0.0178*** (0.0037)	0.0153*** (0.0055)
English Legal Origin	-0.0391** (0.0153)	-0.0383** (0.0157)	-0.0518*** (0.0160)	-0.0515*** (0.0164)
French Legal Origin	-0.0334* (0.0179)	-0.0243 (0.0202)	-0.0159 (0.0207)	-0.0007 (0.0254)
German Legal Origin	0.0074 (0.0177)	0.0037 (0.0190)	0.0205 (0.0205)	0.0096 (0.0201)
Religion=Catholicism		-0.0228** (0.0099)		-0.0400*** (0.0132)
Religion=Muslim		0.0379** (0.0166)		0.0518*** (0.0190)
Religion=Orthodoxy		0.0322** (0.0154)		0.0039 (0.0205)
Religion=Protestantism		-0.0256*** (0.0071)		-0.0464*** (0.0113)
Firm-level controls	✓	✓	✓	✓
Country-level controls	✓	✓	✓	✓
Industry-Year FE	✓	✓	✓	✓
Group-Year FE	✓	✓	✓	✓
#Observations	85,205	85,205	85,205	85,205
Within-R ²	0.0219	0.0223	0.0217	0.0227
Between-R ²	0.388	0.391	0.372	0.376
Overall-R ²	0.244	0.246	0.276	0.279

Table D.4: Creditor Rights and Firm Characteristics – Italian Setting (Altern. Definition)

This table reports the results of the effect of the Italian Bankruptcy reform in 2005 on firm characteristics for a setting of Italian firms over the period 2003-2007. In Panel A, we use *Investment* at t (columns (1) to (2)), and *Total Sales* at $t+1$ (columns (3) to (4)) as the dependent variable. In Panel B, we use *Interest/Total Assets* at $t+1$ (columns (1) to (2)), and *Interest/Total Debt* at $t+1$ (columns (3) to (4)) as the dependent variable. We define a province as *Low Debt Enforcement* if the average bankruptcy proceedings days are above the average of days across 103 Italian provinces over the 2003-2004 years and 0 otherwise. In columns (2) and (4), we match treated and control firms in 2004 (i.e., the year before the bankruptcy reform) using the entropy balance matching and including all firm-level controls. All variables are described in Appendix C.1. All the continuous variables are winsorized at the top and bottom one-percentiles. Estimates are based on OLS regressions with standard errors adjusted for heteroskedasticity and clustered at the province-level. Standard errors are in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, and ***, respectively.

Dep. Var.	Investment_t		Total Sales_{t+1}	
Panel A: Altern. Definition	(1)	(2)	(3)	(4)
Low Debt Enforcement Prov.*Post	-0.0015 (0.0056)	0.0014 (0.0052)	-0.0111 (0.0132)	-0.0195 (0.0128)
Firm-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Region-Industry-Year FE	✓	✓	✓	✓
#Observations	15,504	15,307	14,799	14,690
Adjusted-R ²	0.312	0.328	0.941	0.944
Dep. Var.	Interest/Total Assets_{t+1}		Interest/Total Debt_{t+1}	
Panel B: Altern. Definition	(1)	(2)	(3)	(4)
Low Debt Enforcement Prov.*Post	-0.0005 (0.0004)	-0.0004 (0.0005)	0.0002 (0.0007)	0.0005 (0.0007)
Firm-level controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Region-Industry-Year FE	✓	✓	✓	✓
#Observations	14,686	14,574	14,686	14,574
Adjusted-R ²	0.793	0.797	0.679	0.686

Appendix E: Variable definitions Chapter 4

Firm-level controls (source: Amadeus)	
<i>Log EBIT</i>	<i>Log EBIT</i> is the natural logarithm of the firm's earnings before interest and taxes.
<i>Log Pre-tax Profits</i>	<i>Log Pre-tax Profits</i> is the natural logarithm of the firm's earnings before taxes.
<i>Log Fixed Assets</i>	<i>Log Fixed Assets</i> is the natural logarithm of the firm's fixed asset stock.
<i>Log Cost of Employees</i>	<i>Log Cost of Employees</i> is the natural logarithm of the firm's cost of employees.
<i>Log Intangibles</i>	<i>Log Intangibles</i> is the natural logarithm of the firm's intangible assets.
<i>Log R&D</i>	<i>Log R&D</i> is the natural logarithm of the firm's research and development expenses. We replace missing and zero values with one (Weichenrieder 2009).
Tax base controls (sources: <i>Taxation Trends in Europe 2014</i> , Eurostat; E&Y Corporate Tax Guides)	
<i>Tax Difference</i>	<i>Tax Difference</i> is the difference in the statutory corporate tax rates of the considered subsidiary and its parent firm.
<i>Transfer Pricing</i>	<i>Transfer Pricing</i> is a dummy variable equal to 1 if transfer-pricing regulations include a documentation requirement by law.
<i>Debt to Equity Rule</i>	<i>Debt to Equity Rule</i> is a dummy variable equal to 1 if the country imposes restrictions on the maximum amount of debt on which interest payments can be deductible.
<i>Earnings Stripping Rule</i>	<i>Earnings Stripping Rule</i> is a dummy variable equal to 1 if the country imposes restrictions on the maximum amount of deductible interests with respect to the ratio of interests to another variable (e.g., EBITDA).
<i>Tax Consolidation</i>	<i>Tax Consolidation</i> is a dummy variable equal to 1 if the country allows groups of wholly owned or majority-owned companies to be treated as a single entity for tax purposes.
<i>Accelerated Depreciation</i>	<i>Accelerated Depreciation</i> is a dummy variable equal to 1 if the country allows accelerated depreciation for tangible and intangible fixed assets.
<i>Loss Carryback</i>	<i>Loss Carryback</i> is a dummy variable equal to 1 if the country allows using a tax loss in the current year to offset previous year profits.
<i>Loss Carryforward</i>	<i>Loss Carryforward</i> is the number of years a multinational firm can use tax losses to offset the taxation of future profits. If the tax law allows for unlimited usage of tax losses, the variable is set to 100.
<i>Tax Base Index</i>	<i>Tax Base Index</i> is an index ranging from 0 (very narrow tax base) to 6 (very broad tax base with transfer pricing documentation requirements, restrictions on interest payments deductibility, no tax consolidation, no accelerated depreciation allowances, no loss carryback rule, and loss

carryforward up to a maximum 5 years). This index indicates how broad the tax base is according to the country's tax code.

Country-level controls (source: World Bank)

<i>Control of Corruption</i>	<i>Control of Corruption</i> is the yearly estimate of a country's quality relating to control of corruption.
<i>Distance</i>	<i>Distance</i> is the natural logarithm of the great circle distance between the capitals of the parent and host countries. The latitude and longitude of the capital cities of each country are obtained from the website Maps of the World (mapsofworld.com). The standard formula is then applied to calculate the distance (e.g., Erel et al. 2012).
<i>GDP Growth</i>	<i>GDP Growth</i> is the annual percentage growth rate of the GDP in constant 2005 U.S. dollars.
<i>GDP</i>	<i>GDP</i> is the natural logarithm of the GDP per capita in constant 2005 U.S. dollars.
<i>Inflation</i>	<i>Inflation</i> is the rate of price change in a country as a whole as measured by the annual growth rate of the GDP implicit deflator.
<i>Unemployment</i>	<i>Unemployment</i> is the number of unemployed people as a percentage of the total labor force. Unemployed people are those without work who have taken active steps to find work.

References

- Acharya, V. V., Amihud, Y., and Litov, L. (2011): Creditor rights and corporate risk-taking. *Journal of Financial Economics*, 102, 150-166.
- Alencar, L. and Ponticelli, J. (2016): Court enforcement, bank loans and firm investment: Evidence from a bankruptcy reform in Brazil. *Quarterly Journal of Economics*, 131, 1365-1413.
- Alexander, A., De Vito, A., and Jacob, M. (2016): Corporate tax reforms and tax-motivated profit shifting: Evidence from the EU. *FACCT Center Working Paper Nr. 23/2016*.
- Allard, G. (2005): Measuring job security over time in search of a historical indicator of EPL. *IE Working Paper N. 17*.
- Altonji, J. G., and Matzkin, R. L. (2005): Cross section and panel data estimators for nonseparable models with endogenous regressors. *Econometrica*, 73(4), 1053-1102.
- Altshuler, R., and Auerbach, A. J. (1990): The significance of tax law asymmetries: An empirical investigation. *Quarterly Journal of Economics*, 105, 61–86.
- Angrist, J. D., and Pischke, J.-S. (2009): *Mostly harmless econometrics: An empiricists companion*. Princeton University Press.
- Armstrong, C. S., Blouin, J. L., and Larcker, D. F. (2012): The incentives for tax planning. *Journal of Accounting and Economics*, 53, 391-411.
- Atanasov, V. and Black, B. (2016): Shock-based causal inference in corporate finance and accounting research. *Critical Finance Review*, 5(2), 207-304.
- Atwood, T. J., Drake, M. S., Myers, J. N., and Myers, L. A. (2012): Home country tax system characteristics and corporate tax avoidance: International Evidence. *The Accounting Review*, 87(6), 1831-1860.
- Auerbach, A. J. (2006): The future of capital income taxation. *Fiscal Studies*, 27, 399–420.
- Auerbach, A. J., Devereux, M. P., and Simpson, H. (2008): Taxing corporate income. *NBER Working Paper No. 14494*.
- Autor, D. H., Donohue, J. III, and Schwab, S., J. (2006): The costs of wrongful discharge laws. *Review of Economics and Statistics*, 88, 211-231.

- Autor, D. H., Kerr, W. R., and Kugler, A. D. (2007): Does employment protection reduce productivity? Evidence from US states. *The Economic Journal*, 117:F189-F217.
- Badertscher, B., Katz, S., Rego, S., and Wilson, R. (2016): Conforming tax avoidance and capital market pressure. *Unpublished Working Paper*.
- Bae, K., and Goyal, V. (2009): Creditor rights, enforcement and bank loans. *The Journal of Finance*, 64(2), 823-860.
- Bai, J. (Jianqiu), Fairhurst, D., and Serfling, M. (2017): Employment protection, investment, and firm growth. *Unpublished Working Paper*.
- Bartelsman, E. J., and Beetsma R. M. W. J. (2003): Why pay more? Corporate tax avoidance through transfer pricing in OECD countries. *Journal of Public Economics*, 87, 2225–2252.
- Bauer, A. M. (2016): Tax avoidance and the implications of weak internal controls. *Contemporary Accounting Research*, 33(2), 449-486.
- Beck, T., Demirguc-Kunt, A., and Levine, R. (2003a): Law and finance: Why does legal origin matter? *Journal of Comparative Economics*, 31, 653-675.
- Beck, T., Demirguc-Kunt, A., and Levine, R. (2003b): Law, endowments, and finance. *Journal of Financial Economics*, 70, 137-181.
- Beck, T., Chen, L., and Ma, Y. (2014): Why do firms evade taxes? The role of information sharing and financial sector outreach. *The Journal of Finance*, 69(2), 763-817.
- Beer, S., and Loeprik J. (2015): Profit shifting: Drivers of transfer (mis)pricing and the potential of countermeasures. *International Tax and Public Finance*, 22, 426-451.
- Becker, J., and Riedel, N. (2012): Cross-border tax effects on affiliate investment: Evidence from European multinationals. *European Economic Review*, 56(3), 436-450.
- Bentolila, S., and Bertola, G. (1990): Firing costs and labor demand: How bad is Eurosclerosis? *Review of Economic Studies*, 57, 381-402.
- Bernanke, B. S. (1983): Irreversibility, uncertainty, and cyclical investment. *Quarterly Journal of Economics*, 98:85-106.
- Bertola, G., Boeri, T., and Cazes, S. (1999): Employment protection and labour market adjustment in OECD countries: Evolving institutions and variable enforcement. *ILO Working Paper N. 48*.

- Bertola, G., and Caballero, R. J. (1994): Irreversibility and aggregate investment. *Review of Economic Studies*, 61:223-246.
- Bertrand, M., and Mullainathan, S. (2003): Enjoying the quiet life? Corporate Governance and managerial preferences. *Journal of Political Economy*, 111, 1043-1075.
- Bertrand, M., Duflo, E., and Mullainathan, S. (2004): How much should we trust difference-in-differences estimates? *Quarterly Journal of Economics*, 119, 249-275.
- Besley, T., and Burgess, R. (2004): Can labor regulation hinder economic performance? Evidence from India. *Quarterly Journal of Economics*, 119:91-134.
- Bethmann, I., Jacob, M., and Müller, M. A. (2018): Asymmetric treatment of tax losses and corporate investment. *The Accounting Review* (Forthcoming).
- Beuselinck, C., Deloof, M., and Vanstraelen A. (2015): Cross-jurisdictional income shifting and tax enforcement: Evidence from public versus private multinationals. *Review of Accounting Studies*, 20(2), 710-746.
- Bird, R. C., and Knopf, J. D. (2009): Do wrongful-discharge laws impair firm performance? *Journal of Law and Economics*, 52:197-222.
- Blackburne, T., and Blouin, J. (2016): Understanding the informativeness of book-tax differences. *Unpublished Working Paper*.
- Blanchard, O. (1997): The medium run. *Brookings Papers on Economic Activity*, 1997:89-158.
- Blanchard, O., and Johnson D. H. (2013): *Macroeconomics 6th Edition*, Pearson.
- Blouin, J., Huizing, H., Laeven, L., and Nicodème, G. (2013): Thin capitalization rules and multinational firm capital structure. *Working Paper 13/23, Oxford University Centre for Business Taxation*.
- Blundell, R., and Powell, J. L. (2003): Endogeneity in nonparametric and semiparametric regression models. *Econometric Society Monograph*, 36: 312-357.
- Boeri, T., Conde-Ruiz, J. I., and Galasso, V. (2012): The political economy of flexicurity. *Journal of the European Economic Association*, 10:684–715.
- Boeri, T, and Garibaldi, P. (2007): Two tier reforms of employment protection: A honeymoon effect? *The Economic Journal*, 117, 357-385.
- Botero, J., Djankov, S., La Porta, R., Lopez-de-Silanes, F., and Shleifer, A (2004): The regulation of labor. *Quarterly Journal of Economics*, 119(4), 1339-1382.

- Brown, J.L. (2011): The spread of aggressive corporate tax reporting: A detailed examination of corporate-owned life insurance shelter. *The Accounting Review*, 86(1), 23-57.
- Buettner, T., Overesch, M., Schreiber, U., and Wamser G. (2012): The impact of thin-capitalization rules on the capital structure of multinational firms. *Journal of Public Economics*, 96(11-12), 930-938.
- Buettner, T., and Wamser, G. (2013): Internal debt and multinational profit shifting: Empirical evidence from firm-level panel data. *National Tax Journal*, 66(1), 63–96.
- Caballero, R. J., and Hammour, M. L. (1998): Jobless growth: Appropriability, factor substitution, and unemployment. *Carnegie-Rochester Conference Series on Public Policy*, 48:51-94.
- Cameron, C. A., and Miller, D. L. (2015): A practitioner’s guide to cluster-robust inference. *Journal of Human Resources*, 50, 317-372.
- Carrillo, P., Pomeranz, D., and Singhal, M. (2017): Dodging the taxman: Firm misreporting and limits to tax enforcement. *American Economic Journal: Applied Economics*, 9(2):144-64.
- Chen, S., Chen, X., Cheng, Q., and Shevlin, T. (2010): Are family firms more tax aggressive than non-family firms? *Journal of Financial Economics*, 95(1), 41-61.
- Chen, Z., Dyreng, S. D., and Li, B. (2018): Corporate political contributions and tax avoidance. *Unpublished Working Paper*.
- Cho, S.-S., El Ghouli, S., Guedhami, O., and Suh, J. (2014): Creditor rights and capital structure: Evidence from international data. *Journal of Corporate Finance*, 25, 40-60.
- Chyz, J. A., Leung, W. S. C., Li, O Z., and Rui, O. M. (2013): Labor unions and tax aggressiveness. *Journal of Financial Economics*, 108(3), 675-698.
- Cingano, F., Leonardi, M., Messina, J., and Pica, G. (2016): Employment protection legislation, capital investment and access to credit: Evidence from Italy. *The Economic Journal*, 126:1798–1822.
- Clausing, K. A. (2003): Tax-motivated transfer pricing and US intra-firm trade prices. *Journal of Public Economics*, 87(9-10). 2207–2223.

- Clemons, R., and Shevlin, T. (2016): The tax policy debate: Increasing the policy impact of academic tax accounting research. *Journal of the American Taxation Association*, 38(1), 29-37.
- Colla, P., Ippolito, F., and Li, K. (2013): Debt specialization. *The Journal of Finance*, 68(5), 2117-2141.
- Cuff, K., Marceau, N., Mongrain, S., and Roberts, J. (2011): Optimal policies and the informal sector. *Journal of Public Economics*, 95, 1280-1291.
- Cuff, K., Marceau, N., Mongrain, S., and Roberts, J. (2017): Shades of grey: Business compliance with fiscal and labour regulations. *Simon Fraser University Department of Economics Working Paper 17-07*.
- DeAngelo, H. and Masulis, R. W. (1980): Optimal capital structure under corporate and personal taxation. *Journal of Financial Economics*, 8, 3-29.
- Demirguc-Kun, A. and Maksimovic, V. (1998): Law, finance, and firm growth. *The Journal of Finance*, 53(6), 2107-2239.
- Desai, M. A. (2003): The divergence between book income and tax income. *Tax Policy and the Economy*, 17, 169-206.
- Desai, M. A. (2009): The decentering of the global firm. *World Economy*, 32(9), 1271–1290.
- Desai, M. A., and Dharmapala, D. (2006): Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics*, 79, 145-179.
- Desai, M.A., and D. Dharmapala 2009. Corporate tax avoidance and firm value. *The Review of Economics and Statistics*, 91(3), 537-546.
- Desai, M. A., Foley, C. F., and Hines, J. R. (2004): A multinational perspective on capital structure choice and internal capital markets. *Journal of Finance*, 59(6), 2451–2487.
- Dessaint, O., Golubov, A., and Volpin, P. (2017): Employment protection and takeovers. *Journal of Financial Economics*, 125, 369-388.
- De Simone, L. (2016): Does a common set of accounting standards affect tax-motivated income shifting for multinational firms? *Journal of Accounting and Economics*, 61, 145-165.
- De Simone, L., Klassen, K., and Seidman J. K. (2017): Unprofitable affiliates and income shifting behavior. *The Accounting Review*, 92(3), 113-136.

- Devereux, M. P., Griffith, R., and Klemm, A. (2002): Corporate income tax reforms and international tax competition. *Economic Policy*, 17(35), 449-495.
- Devereux, M. P., Lockwood, B., and Redoano, M. (2008): Do countries compete over corporate tax rates? *Journal of Public Economics*, 92(5-6), 1210–1235.
- De Vito, A. (2017): Employment protection and tax avoidance. *Unpublished Working Paper*.
- De Vito, A., and Jacob, M. (2018): Creditor rights, enforcement and tax avoidance. *Unpublished Working Paper*.
- Dharmapala, D. (2014): What do we know about base erosion and profit shifting? A review of the empirical literature. *Fiscal Studies*, 35(4), 421–448.
- Dharmapala, D., and Hines, J. R. (2009): Which countries become tax havens? *Journal of Public Economics*, 93(9-10), 1058–1068.
- Dharmapala, D., and Riedel, N. (2013): Earnings shocks and tax-motivated income-shifting: Evidence from European Multinationals. *Journal of Public Economics*, 97, 95–107.
- Dischinger, M. (2008): Profit shifting by multinationals: Indirect evidence from European micro data. *Ludwig-Maximilians University Munich Discussion Paper*.
- Dischinger, M., and Riedel, N. (2011): Corporate taxes and the location of intangible assets within multinational firms. *Journal of Public Economics*, 95(7-8), 691–707.
- Dischinger, M., Knoll, B., and Riedel N. (2014a): The role of headquarters in multinational profit shifting strategies. *International Tax and Public Finance*, 21(2), 248–271.
- Dischinger, M., Knoll, B., and Riedel N. (2014b): There’s no place like home: The profitability gap between headquarters and their foreign subsidiaries. *Journal of Economics and Management Strategy*, 23(2), 369-395.
- Disdier, A. C., and Head K. (2008): The puzzling persistence of the distance effect on bilateral trade. *Review of Economics and Statistics*, 90(1), 37–48.
- Dixit, A. (1997): Investment and employment dynamics in the short run and the long run. *Oxford Economic Papers*, 49, 1-20.
- Djajic, S. (1997): Illegal immigration and resource allocation. *International Economic Review*, 38, 97-117.
- Djankov, S., La Porta, R., Lopez-de-Silanes, F., and Shleifer, A. (2003): Courts. *Quarterly Journal of Economics*, 118, 453-517.

- Djankov, S., McLiesh, C., and Shleifer, A. (2007): Private credit in 129 countries. *Journal of Financial Economics*, 84, 299-329.
- Djankov, S., Hart, O., McLiesh, C., Shleifer, A. (2008): Debt enforcement around the world. *Journal of Political Economy*, 116(6), 1105-1149.
- Dowd, T., Landefeld, P., and Moore, A. (2017): Profit shifting of U.S. multinationals. *Journal of Public Economics*, 148, 1-13.
- Dyreng, S. D., Hanlon, M., and Maydew, E. L. (2008): Long-run corporate tax avoidance. *The Accounting Review*, 83, 61-82.
- Dyreng, S. D., Hanlon, M., and Maydew, E. L. (2010): The effects of executives on corporate tax avoidance. *The Accounting Review*, 85, 1163-1189.
- Dyreng, S. D., Hanlon, M., Maydew, E., and Thornock, J. R. (2017b): Changes in corporate effective tax rates over the past 25 years. *Journal of Financial Economics*, 124(3), 441-463.
- Dyreng, S. D., Hoopes, J. L., and Wilde, J. H. (2016a): Public pressure on corporate tax behavior. *Journal of Accounting Research*, 54(1), 147-186.
- Dyreng, S. D., Jacob, M., Jiang, Xu, and Müller, M. A. (2017a): Tax avoidance and tax incidence. *Unpublished Working Paper*.
- Dyreng, S. D., Markle, K. S., and Medrano, J. C. (2016b): Trade-offs in the repatriation of foreign earnings. *Unpublished Working Paper*.
- Dyreng, S. D., and Maydew, E. L. (2017): Virtual issue on tax research published in the journal of accounting research. *Journal of Accounting Research*, forthcoming.
- Eberly, J., Rebelo, S., and Vincent, N. (2012): What explains the lagged-investment effect? *Journal of Monetary Economics*, 59(4), 370-380.
- Edwards, A., Schwab, C., and Shevlin, T. (2016): Financial constraints and cash tax savings. *The Accounting Review*, 91(3), 859–881
- Eisfeldt, A. L., and Rampini, A. (2009): Leasing, ability to repossess, and debt capacity. *Review of Financial Studies*, 22, 1621-1657.
- Erel, I., Liao, R. C., and Weisbach, M. S. (2012): Determinants of cross-border mergers and acquisitions. *Journal of Finance*, 67(3), 1045–1082.

- Erickson, M. M., Heitzman, S. M, and Zhang X. F. (2013): Tax-motivated loss shifting. *The Accounting Review*, 88:5, 1657-1682.
- Faccio, M., and Xu, J. (2015): Taxes and capital structure. *Journal of Financial and Quantitative Analysis*, 50(3), 277-300.
- Favara, G., Morellec, E., Schroth, E., and Valta, P. (2017): Debt enforcement, investment, and risk taking across countries. *Journal of Financial Economics*, 123, 22-41.
- Frank, M.M., Lynch, L.J., and Rego, S.O. (2009): Tax reporting aggressiveness and its relation to aggressive financial reporting. *The Accounting Review* 84 (2), 467-496.
- Fuest, C., Peichl, A., and Siegloch, S. (2017): Do higher corporate taxes reduce wages? Micro evidence from Germany. *American Economic Review*, forthcoming.
- Garibaldi, P. (2006): Personnel economics in imperfect labour markets. *Oxford University Press*.
- Garibaldi, P., and Violante, G. L. (2005): The employment effects of severance payments with wage rigidities. *The Economic Journal*, 115:799–832.
- Gennaioli, N. and Rossi, S. (2010): Judicial Discretion in Corporate Bankruptcy. *Review of Financial Studies*, 23(11), 4078-4114.
- Gianfreda G., and Vallanti, G. (2017): Institutions’ and firms’ adjustments: Measuring the impact of courts’ delays on job flows and productivity. *Journal of Law and Economics*, 60:1, 135-172.
- Giannetti, M. (2003): Do better institutions mitigate agency problems? Evidence from corporate finance choices. *The Journal of Financial and Quantitative Analysis*, 38(1), 185-212.
- Goncharov, I., and Jacob M. (2014): Why do countries mandate accrual accounting for tax purposes? *Journal of Accounting Research*, 52(5), 1127-1163.
- Graham, J. R., and Tucker, A. L. (2006): Tax shelters and corporate debt policy. *Journal of Financial Economics*, 81, 563-594.
- Grubert, H. (2012): Foreign taxes and the growing share of U.S. multinational company income abroad: Profits, not sales, are being globalized. *National Tax Journal*, 65(2), 247–282.
- Grubert, H., and Mutti, J. (1991): Taxes, tariffs and transfer pricing in multinational corporate decision making. *Review of Economics and Statistics*, 73(2), 285–293.

- Hainmüller, J. (2012): Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis*, 20(1), 25–46.
- Hanlon, M. (2003): What can we infer about a firm’s taxable income from its financial statements? *National Tax Journal*, 56(4), 831-863.
- Hanlon, M., and Heitzman, S. (2010): A review of tax research. *Journal of Accounting and Economics*, 50, 127-178.
- Hart, O., and Moore, J. (1998): Default and renegotiation: A dynamic model of debt. *Quarterly Journal of Economics*, 113(1), 1-41.
- Hasan, I., Hoi, C.K.S., Wu, Q., and Zhang, H. (2014): Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans. *Journal of Financial Economics*, 113, 109-130.
- Haufler, A., and Schjelderup G. (2000): Corporate tax systems and cross country profit shifting. *Oxford Economic Papers*, 52, 306–325.
- Heckemeyer, J. H., and Overesch, M. (2017): Multinationals’ profit response to tax differentials: Effect size and shifting channels. *Canadian Journal of Economics*, 50(4), 965-994.
- Heider, F., and Ljungqvist, A. (2015): As certain as debt and taxes: Estimating the tax sensitivity of leverage from state tax changes. *Journal of Financial Economics*, 118, 684-712.
- Hines, J. R., and Rice, E. M. (1994): Fiscal paradise: Foreign tax havens and American business. *Quarterly Journal of Economics*, 109(1), 149–182.
- Hoi, C. K., Wu, Q., and Zhang, H. (2013): Is corporate social responsibility (CSR) associated with tax avoidance? Evidence from irresponsible CSR activities. *The Accounting Review*, 88(6), 2025-2059.
- Hoopes, J. L., Mescall, D., and Pittman, J. A. (2012): Do IRS audits deter corporate tax avoidance? *The Accounting Review*, 87(5): 1603-1639.
- Hope, O.-K., Ma, M., and Thomas, W. B. (2013): Tax avoidance and geographic earnings disclosure. *Journal of Accounting and Economics*, 56 (2–3), 170-189.

- Hopenhayn, H., and Rogerson, R. (1993): Job turnover and policy evaluation: A general equilibrium analysis. *Journal of Political Economy*, 101(5), 915-938.
- Hopland, A. O., Lisowsky, P., Mardan, M., and Schindler D. (2015): Income shifting under losses. *NHH Discussion Paper*, FOR 21, Bergen.
- Huizinga, H., and Laeven, L. (2008): International profit shifting within multinationals: A multi-country perspective. *Journal of Public Economics*, 92(5-6), 1164–1182.
- Hung, M. (2000): Accounting standards and value relevance of financial statements: An international analysis. *Journal of Accounting and Economics*, 30(3), 401-420.
- Isin, A. A. (2018): Tax avoidance and cost of debt: The case for loan-specific risk mitigation and public debt financing. *Journal of Corporate Finance*, 49, 344-378.
- Jacob, M., Michaely, R., and Müller, M. A. (2017): Consumption taxes and corporate investment. *Unpublished Working Paper*.
- Japelli, T., Pagano, M., and Bianco, M. (2005): Courts and banks: Effects of judicial enforcement on credit market. *Journal of Money, Credit and Banking*, 37, 223-244.
- Jensen, M. C. (1986): Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review*, 76(2), 323-329.
- Jimeno, J. F., Martínez-Matute, M., and Mora-Sanguinetti, J. S. (2016): Employment protection legislation and labor court activity in Spain. *Banco de España Working Paper N. 1507*.
- Johannesen, N., Torslov, T., and Ludvig W. (2016): Are less developed countries more exposed to multinational tax avoidance? *Wider Working Paper 2016/10*.
- John, K., Kaviani, M., Kryzanowski, L., and Maleki, H. (2017): How do managers deal with strong creditors? Cross-country evidence on debt structure concentration. *Unpublished Working Paper*.
- Johnson, S., Kaufman, D., and Zoido-Lobaton P. (1998): Regulatory discretion and the unofficial economy. *American Economic Review*, 88(2), 387-392.
- Karkinsky, T., and Riedel, N. (2012): Corporate taxation and the choice of patent location within multinational firms. *Journal of International Economics*, 88(1), 176–185.
- Kaufmann, D., Kraay, A., and Mastruzzi, M. (2009): Governance matters VIII aggregate and individual governance indicators 1996-2008. *World Bank Policy Research Working Paper 4978*.

- Klassen, K. J., and Laplante S. K. (2012): Are U.S. multinational corporations becoming more aggressive income shifters? *Journal of Accounting Research*, 50(5), 1245–1285.
- Klugler, A., and Saint-Paul, G. (2004): How do firing costs affect worker flows in a world with adverse selection? *Journal of Labor Economics*, 22(3), 553-584.
- Koeniger, W., and Leonardi, M. (2007): Capital deepening and wage differentials: Germany versus US. *Economic Policy*, 22:71-116.
- Koethenbueger, M., Mardan, M., and Stimmelmayer M. (2016): Profit-shifting with loss-making MNE affiliates. *Working Paper ETH Zurich*.
- Kramarz, F., and Michaud, M.-L. (2010): The shape of hiring and separation costs in France. *Labour Economics*, 17(1), 27-37.
- Kubick, T. R., Lynch, D. P., Mayberry, M. A., and Omer, T. C. (2015): Product market power and tax Avoidance: Market leaders, mimicking strategies, and stock returns. *The Accounting Review*, 90(2), 675-702.
- Kubick, T. R., Lynch, D. P., Mayberry, M. A., Omer, T. C. (2016): The effects of regulatory scrutiny on tax avoidance: An examination of SEC comment letters. *The Accounting Review*, 91(6), 1751-1780.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R. W. (1997): Legal determinants of external finance. *The Journal of Finance*, 52(3), 1131–1150.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R. W. (1998): Law and finance. *Journal of Political Economy*, 106, 6, 1113-1155.
- Law, K. K. F., and Mills, L. F. (2015): Taxes and financial constraints: Evidence from linguistic cues. *Journal of Accounting Research*, 53(4), 777-819.
- Lazear, E. P. (1990): Job security and employment. *Quarterly Journal of Economics*, 105(3), 699-726.
- Levine, R. (1998): The legal environment, banks, and long-run economic growth. *Journal of Money, Credit, and Banking*, 30(3), 596-613.
- Levine, R. (1999): Law, finance, and economic growth. *Journal of Financial Intermediation*, 8, 8-35.

- Ljungqvist, A., and Smolyansky, M. (2016): To cut or not to cut? On the impact of corporate taxes on employment and income. *FEDS Working Paper No. 2016-6*.
- Lin, S., Tong, N., and Tucker, A. L. (2014): Corporate tax aggression and debt. *Journal of Banking and Finance*, 40, 227-241.
- Lisowsky, P. (2010): Seeking shelter: Empirically modeling tax shelters using financial statement information. *The Accounting Review*, 85(5), 1693-1720.
- Lo Cascio, G. (1999): La nuova disciplina dell'amministrazione straordinaria. *Corriere Giuridico*, 1193.
- Lohse, T., and Riedel N. (2013): Do transfer pricing laws limit international income shifting? Evidence from European multinationals. *CESifo, Working Paper no. 4404*.
- Lohse, T., Riedel, N., and Spengel, C. (2012): The increasing importance of transfer pricing regulations: A worldwide overview. *Working Paper 12/27, Oxford University Centre for Business Taxation*.
- Louis, H., and Urcan, O. (2017): Employment legislation and firm operating performance, *Unpublished Working Paper*.
- Lu, Y. (2014): Labor protection and corporate tax avoidance: A cross-country analysis. *Unpublished Working Paper*.
- Maffini, G., and Mokkalas, S. (2011): Profit shifting and measured productivity of multinational firms. *Oxford Bulletin of Economics and Statistics*, 73(1), 1–20.
- Markle, K. S. (2015): A comparison of the tax-motivated income shifting of multinationals in territorial and worldwide countries. *Contemporary Accounting Research*, 33(1), 7-43.
- Markle, K. S., and Shackelford, D. A. (2012): Cross-country comparisons of corporate income taxes. *National Tax Journal*, 65:3, 493-527.
- McGill, G.A., and Outslay, E. (2004): Lost in translation: Detecting tax shelter activity in financial statements. *National Tax Journal*, 57(3), 739-756.
- McGuire, S. T., Dechun, W., and Wilson, R. J. (2014): Dual class ownership and tax avoidance. *The Accounting Review*, 89(4), 1487-1516.
- McGuire, S. T., Omer, T. C., and Wang, D. (2012): Tax avoidance: Do industry experts make a difference? *The Accounting Review*, 87(3), 975–1003.

- Merz, J., and Overesch M. (2016): Profit shifting and tax response of multinational banks. *Journal of Banking and Finance*, 68, 57-68.
- Messina, J., and Vallenti, G. (2007): Job flow dynamics and firing restrictions: Evidence from Europe. *The Economic Journal*, 117, 279-301.
- Miller, D. P. and Reisel, N. (2011): Do country-level investor protections affect security-level contract design? Evidence from foreign bond covenants. *Review of Financial Studies*, 25(2), 408-438.
- Miller, M. H. (1977): Debt and taxes. *The Journal of Finance*, 32(2), 261-275.
- Mills, L. F., Nutter, S. E., and Schwab, C. M. (2013): The effect of political sensitivity and bargaining power on taxes: Evidence from federal contractors. *The Accounting Review*, 88(3), 977-1005.
- OECD (2004): *Employment protection regulation and labour market performance*. OECD Publishing, Paris.
- OECD (2010): *Choosing a Broad Base – Low Rate Approach to Taxation*. OECD Publishing, Paris.
- OECD (2011): *Tax Reform Trends in OECD Countries*. OECD Publishing, Paris.
- OECD (2013a): *Addressing Base Erosion and Profit Shifting*. OECD Publishing, Paris.
- OECD (2013b): *Action Plan on Base Erosion and Profit Shifting*. OECD Publishing, Paris.
- OECD (2014): *Trust in tax, not its tax avoidance*. OECD Publishing, Paris.
- OECD (2016): *Enhancing Economic Flexibility: What is in it for workers?* OECD Publishing, Paris.
- OECD (2017a): *Applying the Multilateral Instrument Step-by-Step*. OECD Publishing, Paris.
- OECD (2017b): *Country-by-Country Reporting: Handbook on Effective Implementation (BEPS Action 13)*. OECD Publishing, Paris.
- Oi, W. (1962): Labor as a quasi-fixed factor. *Journal of Political Economy*, 70, 538-555.
- Pagano, M., and Volpin, P. (2005): The political economy of corporate governance. *American Economic Review*, 95:1005-30.
- Perotti, E., and Von Thadden, E.-L. (2006): The political economy of corporate control and labor rents. *Journal of Political Economy*, 114:145-174.

- Petersen, M. (2009): Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies*, 22, 435-480.
- Ponticelli, J. (2013): Court enforcement and firm productivity: Evidence from a bankruptcy reform in Brazil. *Unpublished Working Paper*.
- Qi, Y., Roth, L., and Wald, J. K. (2017): Creditor protection laws, debt financing, and corporate investment over the business cycle. *Journal of International Business Studies*. 48(4), 477-497.
- Qian, J., and Strahan, P. (2007): How law and institutions shape financial contracts: The case of bank loans. *The Journal of Finance*, 62, 2803-2834.
- Rajan, R., Servaes, H., and Zingales, L. (2000): The cost of diversity: the diversification discount and inefficient investment. *Journal of Finance*, 55(1), 35-80.
- Rego, S. O. (2003): Tax-avoidance activities of U.S. multinational corporations. *Contemporary Accounting Research*, 20(4), 805-833.
- Richardson, G., and Lanis, R. (2007): Determinants of the variability in corporate effective tax rates and tax reform: Evidence from Australia. *Journal of Accounting and Public Policy*, 26, 689-704.
- Richardson, S., Sloan, R., Soliman, M., and Tuna, I. (2005): Accrual reliability, earnings persistence and stock prices. *Journal of Accounting and Economics*, 39(3), 437-485.
- Rodano, G., Serrano-Velarde, N., and Tarantino, E. (2016): Bankruptcy law and bank financing. *Journal of Financial Economics*, 120, 363-382.
- Roychowdhury, S. (2006): Earnings management through real activities manipulation. *Journal of Accounting and Economics*, 42, 335-370.
- Saint-Paul, G. (2002): The political economy of employment protection. *Journal of Political Economy*, 110:672-704.
- Sautner, Z. and Valdimirov, V. (2017): Indirect costs of financial distress and bankruptcy law: Evidence from trade credit and sales. *Review of Finance*, 32, 1-37.
- Scholes, M. S. and Wolfson, M. A. (1992): *Taxes and Business Strategy: a Planning Approach*. Prentice-Hall, Inc., Engelwood Cliffs, NJ.
- Serfling, M. (2016): Firing costs and capital structure decisions. *Journal of Finance*, 71(5), 2239-2286.

- Shackelford, D. A., and Shevlin, T. (2001): Empirical tax research in accounting. *Journal of Accounting and Economics*, 31(1), 321-387.
- Shevlin, T., Thornock, J., and Williams, B. (2017): An examination of firms' responses to tax forgiveness. *Review of Accounting Studies*, forthcoming.
- Simintzi, E., Vig, V., and Volpin, P. (2015): Labor protection and leverage. *Review of Financial Studies*, 28(2), 561-591.
- Stulz, R. M., and Williamson, R. (2003): Culture, openness, and finance. *Journal of Financial Economics*, 70(3), 313-349.
- Weber, R. (2005): Can the Sauvegarde reform save French bankruptcy law? A comparative look at chapter 11 and French bankruptcy law from an agency cost perspective. *Michigan Journal of International Law*, 27, 257-301.
- Weichenrieder, A. (2009): Profit shifting in the EU: Evidence from Germany. *International Tax and Public Finance*, 16(3), 281–297.
- Weisbach, D. (2002): Ten truths about tax shelters, *Tax Law Review*, 55(2).
- Weyzig, F. (2013): Tax treaty shopping: Structural determinants of foreign direct investment routed through the Netherlands. *International Tax and Public Finance*, 20(6), 910-937.
- Wilde, J. H. (2017): The deterrent effect of employee whistleblowing on firms' financial misreporting and tax aggressiveness. *The Accounting Review*, 92(5), 247-280.
- Wilde, J. H., and Wilson, R. J. (2018): Perspectives on corporate tax avoidance: Observations from the past decade. *Journal of American Taxation Association* (Forthcoming).
- Wilson, R. (2009): An examination of corporation tax shelter participants. *The Accounting Review*, 84(3), 969-999.
- Wooldridge, J. M. (2009): *Introductory Econometrics: A Modern Approach*. Mason, OH: South-Western.
- Zang, A. Y. (2012): Evidence on the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review*, 87(2), 675 – 703.
- Zimmerman, J. L. (1983): Taxes and firm size. *Journal of Accounting and Economics*, 5, 119-149.