



Tax and financial reporting aggressiveness: evidence from Europe

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Biographical Note

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Abstract

This study examines the relation between financial and tax aggressive reports on public companies from Europe-15, over the period of 2001-2015. Also, it pretends to analyse if the link between tax and financial aggressiveness gets weaker after IFRS adoption in Europe. To run empirical work, I use discretionary accruals calculated by modified-Jones model (Dechow, Sloan, and Sweeney 1995) as a proxy of financial aggressiveness (DFIN) and discretionary permanent differences as a measure of tax aggressiveness (DTAX) (used by Mary Frank, Luann Lynch and Sonja Rego, 2009), which I estimate using EGLS cross section weights for year and Fama- French 12 industries.

To prove that firms with aggressive tax report tend to be financial aggressive and that the link between tax and financial aggressiveness is more significant before IFRS implementation I analyse Pearson and Spearman correlation. Additionally, I estimate relation between DTAX and DFIN when controlling for firm size, earnings management and tax planning incentives using OLS and apply the same model with period restriction for before and after IFRS adoption.

Results suggest that financial aggressive firms tend to also be tax aggressive and the link between these two aggressive reports is weaker after IFRS adoption.

Key words

Tax planning, earnings management, book tax differences, aggressive financial report, aggressive tax report.

Resumo

Este estudo examina a relação entre a agressividade fiscal e contabilística nas empresas privadas cotadas da Europa-15, durante o período de 2001-2015. Também pretende analisar se a relação entre a agressividade fiscal e contabilística fica mais fraca após a adoção das IFRS na Europa.

Para desenvolver a análise empírica, uso accruals discricionários calculados pelo modelo de Jones Modificado (Dechow, Sloan, and Sweeney 1995) usando-os como proxy da agressividade contabilística (DFIN) e aplico as diferenças discricionárias entre a fiscalidade e a contabilidade como medida de agressividade fiscal (DTAX) (usado por Mary Frank, Luann Lynch and Sonja Rego, 2009), os quais estimei usando EGLS cross section weights por ano e pelas 12 classificações de indústria de Fama- French.

Analiso a correlação entre estas variáveis usando os testes de Pearson e Spearman para provar que as empresas com agressividade fiscal tendem a ser também agressivas a nível contabilístico e que a relação entre estas agressividades é mais significativa antes da adoção das IFRS. Adicionalmente, estimei a relação entre DTAX e DFIN controlando os efeitos de dimensão das empresas, a manipulação de resultados e o planeamento fiscal, para isso uso o método OLS e aplico da mesma forma o modelo com restrição no período para casos antes ou após a adoção das IFRS.

Os resultados sugerem que as empresas com agressividade contabilística tendem a ser fiscalmente agressivas e que a relação entre estes dois reportes agressivos é mais fraca após a adoção das IFRS.

Palavras-chave

Planeamento fiscal; manipulação de resultados; diferenças entre fiscalidade e contabilidade; reporte contabilístico agressivo; reporte fiscal agressivo.

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I. Introduction

Aggressive tax and financial reports are two themes with a several literature background, still there are very few analysis who cover these issues as a joint strategy in Europe. Also, is important for investors to know if a firm that engages in aggressive financial report tend to also engage in aggressive tax report and vice versa.

Therefore, this study doesn't assume, like most of the studies, that there's a trade-off between aggressive tax report and aggressive financial report (Shackelford and Shevlin 2001), where managers who want to improve book income will be lead to higher tax costs or managers who desire to pay less taxes end up decreasing income reported to tax authorities leading to a lower income to shareholders. Otherwise **I propose to investigate if tax aggressive firms tend to also be financial aggressive (H1).**

It is possible to conciliate these two strategies using complex tax activities to reduce tax expense and being able to manipulate earnings in order to expose to investors results that will not affect their decisions. I choose some empirical cases (Enron, Tyco and Xerox) of both aggressive reports to show that this is a problem with impact in the real world.

Once there are different needs of information, tax report for tax authorities and financial report for capital markets, which follows different rules. These differences are called book tax differences and can be originated by differences between tax rules and accounting principles or by opportunistic tax and accounting management. The discretionary nature of GAAP (generally accepted accounting principles) (Philips, Pincus, and Rego 2003; Hanlon 2005; and others), for example, makes it possible for managers to judge when the results should be recognised and gives them the possibility to choose accounting methods (eg. assets valuation or depreciation method). Two positions arise in literature about book tax differences, one of them defends conformity between two reports and the other supporting non conformity. Arguments in favour of increased conformity support, among others, are that less managerial discretion over financial reporting will bring less earnings management (Desai, 2005 and Whitaker, 2005) and proposes that non-conformity between book income

and tax income deteriorates quality and reliability of corporate financial reports (Desai, 2005). On the other hand, non conformity proponents suggest that the two reports have two different functions once information required by financial statement users and tax authorities differs significantly and they also suggest that book tax conformity will lead to loss of financial information (Blaylock, Gaertner and Shevlin, 2015). Thus, in order to measure tax aggressiveness (DTAX) I used discretionary permanent book-tax differences exactly like Mary Frank, Luann Lynch and Sonja Rego (2009).

On the other hand, to measure financial aggressiveness (DFIN) I employed discretionary accruals based on the modified-Jones model (Dechow, Sloan, and Sweeney 1995).

With these two measures set, I tested for positive relation between tax and financial aggressive report. For this I decided to define public Europe-15 firms as my data sample and define the period from 2001 to 2015. The choice of Europe-15 resides in the constitution of Europe in 2001 the first year of the sample.

A set of a Pearson and Spearman correlation test and a model that estimate relation between DTAX and DFIN when controlling for firm size, earnings management and tax planning incentives, leads to the conclusion that tax aggressive firms are likely financial aggressive as well (**H1**).

Once, implementation of IFRS meant to promote a homogeneous, comparable and universally recognized accounting system that leads to better financial report quality and so to market efficiency **I tested (H2) if the link between financial and tax aggressive report is more significant before this implementation (2001-2004).**

To find evidence of this hypothesis I ran the same Pearson and Spearman correlation test and the model that estimates relation between DTAX and DFIN when controlling for firm size, earnings management and tax planning incentives, but with the period division of before (2001-2004) and after (2005-2015) IFRS adoption. Results confirm **H2** showing that IFRS adoption brought a decrease in the link between financial and tax report.

This study contributes to the literature with several topics. First, it is a current subject that shows great interest to investors and academics. The literature has many studies on

earnings management and tax planning, but few relate a tax and financial aggressiveness in Europe, which gives relevance to this research. Second, I additionally studied the relationship of tax and financial aggressiveness controlling for incentives of firm size, tax planning and earnings management, also studied by Frank, Lynch and Rego (2009), which isn't much explored in Europe. Finally, I added the study of the relation between tax and financial aggressiveness before and after IFRS adoption which is a contribution to IFRS implementation literature.

The present study will be divided in sections. Section II shows Prior research and hypothesis definition, which decomposes in A. Book-tax conformity and non-conformity, B. Adoption of IFRS and C. Tax planning and earnings management: empirical cases. Hereafter, there are section III Methodology divided in A. Data and B. Models and variables. Section IV presents empirical results of models estimation and lastly section V shows the conclusions, the limitation of the study and future research suggestions.

II. Prior research and hypothesis development

Chapter II starts with the main question of this study and some initial definitions to make a way for all the analysis developed being then divided in three sections. Section A proposes two key positions on literature about book-tax differences. Section B describes an important period for conformity in Europe and section C relates how book- tax differences were used in empirical cases and on literature developing here the two hypothesis.

Thus, the main question of this study relies on how managers can increase book profits and at the same time decrease taxable income, this is the existence of aggressive financial report and aggressive tax report. The generally accepted answer is that firms can only embrace this strategy because there are two types of reports, tax report for tax authorities and financial report for capital markets, that follows different rules which creates book tax differences. Some authors (Philips, Pincus, and Rego 2003; Hanlon 2005; and others) show that this gap happens in part because of the discretionary nature of GAAP (generally accepted accounting policies). Chen, Gaviious and Yosef (2013) provides evidence that non conformity between tax and financial reports lead firms to manage book and taxable income in the same period, while if firms are under a conformity system they have to face a trade-off between aggressive tax report and aggressive financial report.

Book tax differences could be divided in two components: temporary differences and permanent differences.

The first ones (temporary differences) result from temporal variances between tax and accounting recognition, they are the differences between the value of assets and liabilities for both accounting and tax purposes, that result in a value that will be taxed or deducted in future years when assets have been recovered or liabilities have been regularized (generally amortizations and debt impairment).

On the other hand permanent differences result from different definition of results for tax and accounting report and directly affect taxes payable.

There are many studies related to book tax differences in literature as presented below:

Desai (2003) found that depreciation methods, foreign income and non-qualified stock options explain less than 50% of book-tax differences (BTD), the rest may be associated with either earnings management or tax shelters.

Lev and Nissim (2004) argue that being aware of earnings management, investors use tax income as the benchmark, once they found that ratio of tax-to-book income predicts earnings growth up to five years ahead.

Wilson (2009) suggest that BTD and discretionary accruals are the key attributes to identify tax sheltering firms.

Finally, Seidman (2010) found that changes in GAAP, economic conditions and discretionary accruals explain about 55% of BTD variance, with the remaining 45% being attributed to other factors as tax law changes and tax sheltering behaviour.

A. Book-tax conformity and non-conformity

So the literature held two positions about book- tax differences, the first supporting book-tax conformity and the second defending the non-conformity.

Several authors, namely, Desai (2005), Whitaker (2006) and many others have defended book-tax conformity.

A main argument for increased conformity states that less managerial discretion over financial reporting will bring less earnings management (Desai, 2005 and Whitaker, 2005) and that firms will not be getting the advantage of the major discretionary of GAAP face to tax rules (Phillips et al. 2003).

Another argument suggests that increased conformity would decrease earnings management by eliminating tax accruals, which can be used to either manage or smooth GAAP income without affecting taxable income (Whitaker 2005).

Desai (2005) proposes that non-conformity between book income and tax income deteriorates quality and reliability of corporate financial reports. He also suggests that the

discretionary nature of corporate profits have been increased by “financial engineering that transforms the nature and timing of receipts, the growing importance of contractual arrangements and the attendant ambiguity over the timing of receipts, and the increased accessibility of offshore tax havens”. This author questions the structure of the current corporate tax system, to be precise, Desai suggests that if corporate tax returns were less confidential, investors would have another view of corporate profitability; also advocates that firms should have some automatic incentives for having conformity of book and tax profits reducing this way the tax avoidance and earnings management. He also considers that the fact in which the dual reporting system enables managerial malfeasance is in itself an argument against the current corporate tax system.

More book-tax conformity probably reduces the possible ways taken by firms to handle both financial and tax incomes (Carnahan and Novack 2002) and would avoid a lose-lose situation, where capital markets end up with less meaningfully profits, government collects less revenue and as to allocate resources to exploit these opportunities (Desai 2005).

In China Chan et al. (2010) found an increase in tax audit adjustments over the period 1996–2003 as book-tax conformity decreased. These adjustments were related primarily to items that caused book-tax differences and not to book-tax conforming items, which make them conclude that tax noncompliance increased consistent with Chinese firms becoming more tax aggressive.

In summary, book-tax conformity will reduce managerial opportunism over financial reporting, restrain abusive tax shelters, and minimize firm compliance costs (Blaylock, Gaertner and Shevlin, 2015).

Although there’s a lot of authors supporting book-tax conformity who could prove their theories as studied above, there are also evidence that non-conformity increases both explanatory power of annual regressions of book income on taxable income and report quality, as I analyse bellow.

So there are authors like Hanlon (2008); Shackelford, D. (2006); Plesko (2006); Atwood et al. (2010) defending **non-conformity**.

These authors primarily suggest that the two reports have two different functions because the information required by financial statement users and tax authorities differs significantly, and book tax conformity will lead to loss of financial information. As well, reduction compliance costs would not be as large as proponents of book-tax conformity claim (Blaylock, Gaertner and Shevlin, 2015).

Michele Hanlon (2008) shows that when book- tax conformity increases the information given by the results it's reduced and book-tax differences have information about earnings persistence, accruals persistence and cash-flows (Hanlon 2005; Atwood et al. 2010).

Even considering that a greater conformity can restrict aggressive accounting and tax report, the benefits that are created by having different information to different sources like capital markets and tax authorities it's above the cost of opportunistic use of the two types of reports (Atwood et al. 2010)

Blaylock, Gaertner and Shevlin (2015) found that higher book-tax conformity could not limit earnings management and may actually work in the opposite direction.

B. Adoption of IFRS

Globalization brought a lot of transactions and investments in past years and so the need of harmonized accounting standards which promote a homogeneous, comparable and universally recognized accounting system that leads to better financial report quality and so to market efficiency.

Following a system of conformity as defended in section A and with the purpose of creating a harmonized system, the International Accounting Standards Committee (IASC) sets international accounting standards (IAS) which determines how transactions and other events should be reflected in financial statements.

Meanwhile in 2001, International Accounting Standards Board (IASB) established new standards known as the international financial reporting standards (IFRS). Although these standards were not set as an obligation, several countries required the financial statements of publicly traded companies to be prepared in accordance with them.

In Europe with E.U. Regulation No.1606/2002, after 1st January of 2005 all listed companies are obliged to use IFRS for their consolidated financial statement. Still for individual accounts and non-publicly traded companies, the obligation or option for IFRS implementation differs between member states.

Anglo-Saxon accounting systems are “investor oriented” just like IFRS, since these two systems don’t have so many differences, countries with these principles generally consent unlisted companies to choose between IFRS and local GAAP. Still, “creditor protection oriented” countries commonly opted by maintain local GAAP at least for individual accounts (Guggiola, G. 2010)

After all the need of information for capital markets and the necessity for improving the quality of financial data (when local GAAPs are weak) pushed many other countries to voluntary adopt IFRS for consolidated and individual accounts of both listed and unlisted companies.

It is worth to notice that in countries with a stronger link between financial and tax report, the adoption of IFRS has been preferential adopted only for consolidated accounts (by obligation) and for individual accounts firms opted by local GAAP. What explains this phenomenon it’s the need of organized accounting, for individual accounts, based on local GAAP for fiscal purposes, namely tax estimation. Therefore, this would lead to an increased cost for firms to maintain two systems, ending up with the non-adoption of IFRS for individual accounts which turns full harmonization harder.

Despite of it, thanks to increased compliance costs due to the existence both local GAAP and IFRS (listed companies prepare their consolidated accounts using IFRS and needs to apply local GAAP to prepare individual accounts) and the reduced capability to compare companies’ performance among different countries and, within each country, between

listed and unlisted companies (Haller, 2002), some authors found an increased convergence between the two accounting systems after 2005 (Erickson et al., 2009).

C. Tax planning and earnings management: empirical cases

Although efforts to create an environment of conformity in a worldwide basis there are studies that emerged since the mid 1990's to the early 2000's showing that tax aggressiveness began to follow financial reporting aggressiveness (Lennox, Lisowsky and Pittman, 2013). Many authors enforce this theme by noticing book income shifting from taxable income, for example, Plesko (2000) found that between 1994 and 1998 pretax book income grew faster than current or deferred tax expense and he blame tax shelters and financial reporting aggressiveness.

Companies are increasingly facing more inspections (Cloyd 1995; Mills 1998; Badertscher, Philips, Pincus, and Rego 2008) and audits (Hanlon and Krishnan 2006), also there are more mechanisms to control tax planning and earnings management. Even so, it's known that, recently, firms have engaged in both tax planning and earnings management creating a number of scandals for fraudulent accounting practices and abusive tax shelter transactions in U.S., as Desai 2005 show in his study.

I'm going to analyse the case of three firms – **Enron, Tyco and Xerox**- that show us how tax planning can lead to manipulation of accounting profits and how increase book profits trigger tax avoidance (Desai, 2005).

Starting with one example used by **Enron**, it's called Project Teresa and started in 1997 with tax savings as the apparent purpose. However, with this strategy, Enron in 2000's ended up incurring in major tax obligations to achieve a greater increase of book income, which made us believe this project had as the main motivation financial benefits.

They made many transactions that would reduce federal tax obligations into future but ended up bringing current increases in accounting profits.

Briefly, this firm who had already guaranteed by the use of tax shelters that it would not pay taxes well into future, used special purpose vehicles to increase taxable basis of one of

its buildings, accomplishing a greater depreciation for a while, and consequently less taxes. Tax benefits generated by this transaction would not happen in the near future but accounting standards allowed recognising future reductions in tax expenses.

Enron between 1993 and 1997 also raised its instruments by approximately \$800 million considering these instruments as “debt” for tax purposes (to generate tax expense) and as “preferred equity” in accounting terms (to not decrease earnings per share). The company admitted the usage of strategies to avoid investors/creditors warnings signals “too much debt and dilution of their ownership rights” (U.S. Congress, 2003b, p. 323).

Same way, **Tyco** used tax avoidance to enhance financial performance by using intercompany loans to relocate profits and subsidiaries in tax heavens to serve as a destination of foreign pretax profits.

In 1997 Tyco acquired ADT Security Systems, which is located in Bermuda, as a reverse merger (the private company trades shares with the public shell in exchange for the shell's stock, transforming the acquirer into a public company) to guarantee corporate inversion. This corporation located in a tax heaven was used to avoid the U.S. tax treatment of foreign income.

Additionally, with help of some financial subsidiaries, (e.g. Tyco International Group (TIG) in Luxembourg) Tyco reallocated profits from the operating subsidiaries located in high-tax countries. Such relocation has been done through intercompany loans, so operating subsidiaries are highly levered and incur interest expense that reduces their taxable income in countries with high income tax rates.

This structure allows the company to shift income from high-tax countries to countries with no income taxes.

It is important to notice that the usage of tax planning strategies lead to earnings management by Tyco managers.

The complexity created by the tax avoidance strategies provided the opportunity for some managers, who were the only ones who actually understood the full workings and

complexity of Tyco, to use their advantage to cover other transactions and in order to gain authorization for a variety of transactions.

Also, the ambiguity of true tax obligations caused by pre-tax profit shifting to foreign source was used for managers to hide true firm- performance and profitability and so divert funds. “One specific example of the advantages of this ambiguity was the use of the balance sheet item “Accrued Federal Income Taxes” – otherwise used as a reserve account for taxes owed to U.S. tax authorities – to facilitate the concealment of \$41 million paid to executives as part of the TyCom bonus scheme. “- Desai, 2005.

Lastly, since subsidiaries were based in bank secrecy jurisdictions the sales of Tyco stock to subsidiaries made by managers, made it possible to hide those sales from investors until year-end, a fact that advanced the ability to conceal their fraudulent conduct from investors.

Finally, the analysis to **Xerox** shows that executives with the objective of reach short-term targets opportunistically re-characterized the timing of various transactions and opportunistically recognized earnings.

Stands out that at the same time CEO compensation upward essentially through exercises of stock options.

Their attempts not only to reach targets for earning manipulations but also they tried to reduce effective tax rate” on Xerox’s worldwide operations (Bandler and Maremont, 2001). To achieve this they made some changes such as consolidating employees in Ireland, transfer intellectual property and transfer leasing portfolios.

Thereby the increase volume of foreign activity that would have a lower tax taxation led to the wanted reduction on effective income tax rate. Hence, this helped them to report increased earnings per share which they wouldn’t have been able to otherwise.

As seen in an empirical way, aggressive tax and financial reports can both be done at the same time. We also have some authors that studied this case, with some of them defending the trade-off between these two types of aggressive reporting and others defending there is no such trade- off.

Erickson, Hanlon and Maydew (2004) suggest that some firms censured by SEC (Securities and Exchange Commission) deliberately pay more taxes to help dissimulate accounting fraud. Blaylock, Shevlin and Wilson (2012) found opposite evidence to Frank, Lynch and Rego (2009), this is, they found that firms with aggressive financial reports aren't more likely to join aggressive tax reports.

Otherwise, there is Frank, Lynch and Rego (2009) perspective which defends that firms can upward book income and downward taxable income. In agreement Desai (2005) and Desai and Dharmapala (2006) evidence that managers, with the excuse of diminishing taxes to create benefits for shareholders, use complex tax avoidance strategies (including tax shelters) to deviate corporate resources which later will be covered distorting financial statements. In fact these authors [Desai (2005) and Desai and Dharmapala (2006)] propose, "that timing the overstatement of accounting income to coincide with the understatement of taxable income provides cover that facilitates the diversion of corporate resources". Also Desai and Dharmapala (2009) sustain that engaging in tax shelter may reduce the marginal costs of diverting income.

Therefore, our first hypothesis of study arises:

H1: Firms with aggressive tax report tend to also be financial aggressive.

Once there are empirical cases of a positive relation between tax and financial aggressiveness and at same time there are efforts in Europe to achieve conformity, I propose to formalize the following hypothesis:

H2: The link between tax and financial aggressiveness is more significant before IFRS implementation.

Next chapter describes data, variables and models used to study this two hypothesis.

III. Methodology

Methodology is divided in two sections. The first one describes constitution of sample and the last one defines four models. The first two are used to measure financial and tax aggressiveness and respective variables that will be applied at the two final models and used to test correlation.

A. Data

This study uses data panel models. There are some advantages on the usage of this model such as: panel data can control for individual heterogeneity and allow identifying and measuring effects that are not detectable using other data models; reduce the collinearity and allow for more degrees of freedom while being more efficient. In this sense, through a panel data structure we can control for unobservable effects that are present in cross-section and time dimensions (Baltagi 2003).

When estimating with panel data there are usually two models used: fixed effects and random effects models. To determine whether to choose random or fixed effects (In all 4 models), I perform Hausman test and conclude that fixed effects model is more appropriate. Nevertheless, I do not use cross sectional fixed effects once I have to estimate equation 1 and 2 (described in this chapter, section B1 and B2, respectively) by year, so I choose Generalized Least Squares (GLS) cross-section weights with transformed model to estimate these two equations because Breusch-Pagan test shows heterocedasticity caused by total assets. For equation 3 and 4 I used OLS because there is a model with dummies, and so I choose not to use fixed effects.

For the study of the hypothesis presented above, I obtain my data from Worldscope Database (for Statutory tax rate I use information available at <https://tradingeconomics.com> accessed at 10/05/2017) and use a sample of public firms from Europe 15, which is the constitution of Europe in 2001 the first year of the sample. This means that I'm going to work with Germany, Austria, Belgium, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, United Kingdom and Sweden.

For my sample, I define the period of analyses between 2001 and 2015, obtaining a 15 years sample with information comprehended before and after the adoption of IFRS in Europe, with expectation of having a period of bigger conformity (2005-2015) and a period with less conformity (2001-2004).

I start with 4.981 firms (74.715 firm- years), then eliminate all firms with lack of data in all variables (keeping 4.004 firms), furthermore eliminate observations of regulated industries such as utilities (SIC code 49) and financial services (SIC codes 60-69) as these firms likely face different reporting incentives and regulatory scrutiny than other firms and end up with 2.790 firms (41.850 firm-years).

With this sample, I compute each of the measures of reporting aggressiveness, however, some additional observations have been lost because of lack of data necessary to compute financial reporting aggressiveness or tax aggressiveness, as I will demonstrate bellow for each model.

B. Models and variables

There are studies revealing that permanent tax planning was common in the second half of the 1990's and it's thought to be the most advantageous type of tax planning (Weisbach 2002; McGill and Outslay 2004).

For tax aggressiveness Mary Frank, Luann Lynch and Sonja Rego (2009) use discretionary permanent book-tax differences (DTAX) exactly like I'm going to, and they state **aggressive tax reporting** as downward manipulation of taxable income through tax planning that may or may not be considered fraudulent tax evasion.

To measure aggressive financial reporting I'm using discretionary accruals (DFIN) calculated by modified-Jones model (Dechow, Sloan, and Sweeney 1995), and I define this financial measure as Mary Frank, Luann Lynch and Sonja Rego (2009) did, this is, as the upward earnings management that may or may not be fraud.

I will consider, in an empirical way, aggressive financial reporting when firms have high discretionary accruals and aggressive tax reporting in cases when there's a high permanent book tax difference.

B1. Measure of aggressive tax report:

Many authors use book tax differences as a proxy to measure tax avoidance. Still, since taxable income is confidential (we can estimate it using observable financial report data), book tax differences are not directly observable to most researchers or investors (Desai and Dharmapala, 2009).

Comprix, Graham, and Moore (2011) estimate BTM (total BTMs) as the difference between net income and taxable income, scaled by average assets:

$$BTM = \frac{\text{net income} - \text{taxable income}}{\text{average assets}}$$

Where net income is measured as income before extraordinary items and average assets is the mean total assets. Taxable income is estimated by grossing up current tax expense:

$$\text{Taxable income} = \frac{\text{current tax expense}}{t} * (1 - t)$$

Current portion of the income tax expense is grossed up by t , the top statutory corporate federal tax rate. Current tax expense is the sum of current federal and foreign taxes or, if missing, total tax expense less deferred tax less current foreign tax less current state tax expenses (Mary Frank, Luann Lynch and Sonja Rego, 2009). Taxable income is multiplied by $(1 - t)$ to make it comparable to net income, which is measured after tax. Then estimate TEMP, the temporary component of total BTMs, by grossing up deferred taxes:

$$TEMP = \frac{\text{deferred tax expense}}{t} * \frac{(1 - t)}{\text{average assets}}$$

Deferred taxes are grossed up by t , multiplied by $(1 - t)$, and scaled by total assets, making it comparable in measurement to taxable income. Finally, they estimate PERM, the non-temporary component of total BTDs, as the difference between BTD and TEMP:

$$PERM = BTD - TEMP$$

Mary Frank, Luann Lynch and Sonja Rego (2009) estimate discretionary permanent differences (DTAX), a measure of tax aggressiveness. They regress total permanent differences on nondiscretionary items such as goodwill (INTANG), consolidation accounting (MI, UNCON), state taxes (CSTE) and change in net operating losses (NOL) once these items could cause permanent differences but are probably not related to tax aggressiveness.

I apply the same model (as Frank, Lynch and Rego 2009) to estimate DTAX but with some modifications specifically, once these authors use that measure for a U.S. sample they apply some variables that are not possible to use in Europe, such as Current Federal Tax that I'm going to substitute for total tax expense minus deferred tax expense minus current foreign tax minus current state tax expenses, as explained above. Also, I didn't control for change in net operating losses because the lack of data in the database I worked with.

I estimate equation (1) below by Fama-French 12 industries and fiscal year, using Panel EGLS cross-section weights, where all variables (including the intercept α_0) are scaled by beginning-of-year total assets (to remove firm size effect and control for heterocedasticity) and use the residuals (ε) from equation (1) as the measure of discretionary permanent differences (DTAX).

$$Permdiff_{it} = \alpha_0 + \alpha_1 INTANG_{it} + \alpha_2 UNCON_{it} + \alpha_3 MI_{it} + \alpha_4 CSTE_{it} + \alpha_6 LAGPerm_{it} + \varepsilon_{it} \quad (1)$$

Where:

$$Permdiff_{it} = \left\{ BI_{it} - \frac{[(TTE_{it} - DTE_{it} - CSTE_{it} - CFOR_{it}) + CFOR_{it}]}{STR_{it}} \right\} - \left(\frac{DTE_{it}}{STR_{it}} \right)$$

PERMDIFF it = Total book-tax differences less temporary book-tax differences for firm i in year t ,

BI it = Pre-tax book income for firm i in year t ,

TTE it = Total tax expense for firm i in year t ,

CFOR it = Current foreign tax expense for firm i in year t ,

DTE it = Deferred tax expense for firm i in year t ,

STR t = Statutory tax rate in year t .

Control variables¹:

INTANG it = Goodwill and other intangibles for firm i in year t ,

UNCON it = Income (loss) reported under the equity method for firm i in year t ,

MI it = Income (loss) attributable to minority interest for firm i in year t ,

CSTE it ² = Current state income tax expense for firm i in year t ,

LAGPERM it = One-year lagged PERMDIFF for firm i in year t , and

ε it = Discretionary permanent difference (DTAX) for firm i in year t .

As I mentioned above permanent differences reveal that some parts aren't related to tax reporting aggressiveness, so like Mary Frank, Luann Lynch and Sonja Rego (2009) I use variables, explained bellow, to control for nondiscretionary permanent differences.

Goodwill and other intangible assets (**INTANG**) are included because there are differences in tax and accounting deductions of amortizations (these differences create permanent differences unrelated to tax aggressiveness).

¹ If MI, CFOR, UNCON, CTSE or INTANG are missing on database I set this value as zero (according Mary Frank, Luann Lynch and Sonja Rego (2009)).

² Once Europe is not organized by states I use as proxy for state expense, tax liability which is due within the normal operating cycle of the company.

Concerning to income or loss attributable to the equity method (**UNCON**) and to minority interests (**MI**), differences between accounting and tax raises due to equity interests treatment in less than 100 percent-owned entities.

I control for Current state tax expense (**CSTE**) once taxable income is reduced by this expense and book income is not.

Control for Lagged value of permanent book-tax differences (**LAGPERM**) avoid differences that persevere through time not related to tax aggressiveness (although that is not the intention LAGPERM also exclude some tax shelter activity).

DTAX (measure of aggressive tax report) excludes temporary differences which avoid earnings management, but also excludes tax shelter activities that create this type of differences (temporary), nevertheless DTAX catch tax shelter activity if produced both permanent and temporary differences (Mary Frank, Luann Lynch and Sonja Rego, 2009).

The authors even tested if this measure could capture potential tax sheltering activity and for that they used Graham and Tucker's (2006) sample of tax shelter firms to prove that its measure (DTAX) is positively related to tax shelter incidence and they did prove that. Still, Lisowsky (2010) studied the relation between DTAX and a large sample of firms indicated by IRS as having tax shelter activity and found no significant relation between both.

The fact they use discretionary permanent differences instead of permanent differences only helps to highlight tax planning positions that are not benign, this is that are opportunistically used by managers.

B2. Measure of aggressive financial report:

The differences between net income, cash flow from operations and cash flow from investment activities it's known as accruals (results that are part of profits but that not necessarily imply changes in financial availabilities). The true accrual represents an effective addition on equity independent of financial availabilities.

The problem is that the opportunistic manager increases or decreases these accruals with the objective of influencing profit. When appropriate, the "manager" may take the decision to increase or decrease accruals for reasons unrelated to the reality of the business, thus literature subdivide them into: discretionary accruals and non-discretionary accruals. The latter would be those required according to the reality of the business, the former would have the only purpose of "managing" the result, earnings management. That's why discretionary accruals are considered a proxy of earnings management. These could be either positive or negative depending if the firm wants to increase or decrease, respectively, its results.

So, as a proxy for financial reporting aggressiveness I'm going to use discretionary accruals, where calculation of this measure is based on the modified-Jones model (Dechow, Sloan, and Sweeney 1995). I had estimated equation (3) below by Fama-French 12 industries and fiscal year, using Panel EGLS (Cross-section weights), where all variables (including the intercept α_0) are scaled by beginning of year total assets (to remove firm size effect and control for heterocedasticity). Residuals (η) from equation (2) are the measure of discretionary accruals (DFIN).

$$TACC_{it} = \alpha_0 + \alpha_1(\Delta REV_{it} - \Delta AR_{it}) + \alpha_2 PPE_{it} + \omega_{it} \quad (2)$$

Where:

$$TACC_{it} = (EBEI_{it} + TTE_{it}) - [(CFO_{it} + ITP_{it})]$$

TACC it ³= Total accruals for firm i in year t,

EBEI it = Earnings before extraordinary items from the statement of cash flow for firm i in year t,

TTE it = Total tax expense for firm i in year t,

CFO it = Cash flow from operations for firm i in year t,

ITP it = Income taxes paid from the statement of cash flow for firm i in year t,

³ I did not include Extraordinary items and discontinued operations from statement of cash flow because all results obtained from database where zero.

ΔREV_{it} = Change in sales for firm i from year $t-1$ to year t ,

ΔAR_{it} = Change in accounts receivable for firm i from year $t-1$ to year t ,

PPE_{it} = Gross property, plant, and equipment for firm i in year t , and

η_{it} = Discretionary accruals for firm i in year t .

The original Jones Model assumes accruals should be a function of revenue growth (ΔREV) and tangible assets (PPE). Accruals that fit this model are normal accruals that are explained by normal business activities. Because of this, Jones uses these two variables as independent variables to predict the discretionary accruals.

However Jones model assumes that all the variances of revenue are non-discretionary, and it is known that managers could use credit sales to manage earnings, this way arises modified version of the Jones Model.

This last model deducts from revenue growth the variance of receivables (ΔREC) and so assumes that all changes in credit sales in the event period results from earnings management.

Thus, accruals that do not fit this model are discretionary accruals and are more likely to reflect earnings management. (Dechow, Sloan, and Sweeney 1995).

To avoid any inappropriate correlation between $DFIN$ and $DTAX$, the former one is calculated on a pre-tax basis (as Mary Frank, Luann Lynch and Sonja Rego (2009) and Hribar and Collins (2002)), that way if a firm increase its book income by reducing tax contingency it will not affect $DFIN$ (Mary Frank, Luann Lynch and Sonja Rego (2009)).

B3. Relation between financial and tax aggressiveness:

Now that measures of tax and financial aggressiveness are calculated (with residuals from equation 1 and 2, respectively), I test if firms with aggressive tax report tend to also be

financial aggressive (**H1**). First compute Pearson and Spearman correlations⁴ between measure of aggressive financial report (DFIN) and the measure of tax reporting aggressiveness (DTAX) and as evidenced for Frank, Lynch and Rego (2009) and empirical cases suggest, I expect to find a positive correlation between these two measures.

I calculate Pearson and Spearman correlations, before 2005 and after this year, to find evidence supporting that the link between tax and financial aggressiveness is more significant before IFRS implementation once there is less conformity in Europe and so firms could use more methods to join financial and tax aggressive strategies (**H2**).

Additionally, I examine the relation between financial and tax reporting aggressiveness after controlling for incentives for tax planning and earnings management, using OLS, similar to Mary Frank, Luann Lynch and Sonja Rego (2009), except I don't apply some variables due to lack of data on database I use, some others have been lost because the lack of sense in an European context. I also run this estimation before (2001-2004) and after IFRS adoption (2005-2015) to test if coefficients maintain signal prediction.

Due to the uncertain of causality between DFIN and DTAX Frank, Lynch and Rego (2009) estimate relation between DTAX and DFIN controlling for incentives changing dependent variable between both (DFIN and DTAX).

$$DTAX_{it} = \beta_0 + \beta_1 DFIN_{it} + \beta_2 PTROA_{it} + \beta_3 LEV_{it} + \beta_4 MTB_{it} + \beta_5 EM1_{it} + \beta_6 EM2_{it} + \beta_7 EM3_{it} + \beta_8 \Delta PTCFO_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (3)$$

$$DFIN_{it} = \beta_0 + \beta_1 DTAX_{it} + \beta_2 PTROA_{it} + \beta_3 LEV_{it} + \beta_4 MTB_{it} + \beta_5 EM1_{it} + \beta_6 EM2_{it} + \beta_7 EM3_{it} + \beta_8 \Delta PTCFO_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \quad (4)$$

⁴ Spearman rank correlation test does not make any assumptions about the distribution. The assumptions of Spearman correlation are that data must be at least ordinal and scores on one variable must be monotonically related to the other variable.

For the Pearson correlation, both variables should be normally distributed. Other assumptions include linearity and homoscedasticity. I run Jaque-Bera test and found both variables should be normally distributed.

Equations (3) and (4) control for incentives to tax planning (PTROA, LEV), incentives to manage earnings (MTB, EM1, EM2, EM3, Δ PTCFO), and firm size (SIZE).

LEV it = total debt for firm i at year t, divided by total assets at year t;

PTROA it = pre-tax income for firm i at year t, divided by total assets at year t-1;

SIZE it = natural log of total assets for firm i at year t.

MTB it = Market value of common equity for firm i at year t-1, divided by book value of common equity for firm i at year t-1;

Δ PTCFO it = change in pre-tax cash flow from operations for firm i in year t, divided by total assets for firm i at year t-1;

EM1 it = 1 if net income in year t, divided by the market value of common equity at year t-1, is greater than zero and less than or equal to 0.01 for firm i; 0 otherwise;

EM2 it = 1 if the change in net income from year t-1 to year t, divided by the market value of common equity at year t-2 is greater than zero and less than or equal to 0.01 for firm i; 0 otherwise;

EM3 it = 1 if firm i's actual earnings less the median analyst forecast for fiscal year t (as reported on I/B/E/S) is greater than zero and less than or equal to 0.01 ; 0 otherwise.

As mentioned, I apply a set of variables to control firm-specific characteristics, tax planning and earnings management.

Previous research has shown that **size**, **leverage** and **return on assets** variables are associated with tax aggressiveness (Chen et al. 2010; Atwood et al. 2012) and earnings management (Burgstahler et al. 2006).

To control for incentives to tax planning I use pre-tax return on assets (**PTROA**) and leverage (**LEV**).

Profitability:

With regard to the first (PTROA) which measures profitability has been selected because literature suggests proportionality between firm's tax liability and its profitability, once firm's wealth maximization relies also on firm's ability to reduce its tax liability (Ogundajo and Onakoya 2016). So I expect a positive and significant coefficient for this variable.

Leverage:

Relative to leverage (LEV) it has been widely studied in literature because it is expected that firms that have an higher debt-to-equity ratios are more efficient at minimizing corporate taxes as they use debt deductions to significantly decrease the amount of corporate taxes they pay and so it works as a substitute for tax planning (Graham and Tucker, 2006). Also, Kraft (2014) suggests restrictions imposed by lenders make it more difficult to divert value of projects to own benefit, still lenders expect efficiency that will result in less taxes. This way I believe that leverage can behave as a substitute for tax planning and expect a negative and significant coefficient.

Now, attending to control incentives to manage earnings I use market-to-book (**MTB**), capacity to achieve certain thresholds (**EM1, EM2, EM3**) and change in pre-tax cash flows from operations (**Δ PTCFO**).

Market-to-book:

Market-to-book is used as a proxy for growth opportunities of firm's operations, Dechow and Skinner (2000) suggest that market expectation of future growth could lead to manage earnings due to the pressure put on managers. In agreement with previous research (McNichols 2000, 2002) I expect a positive impact on accruals (DFIN) for growing firms.

Achieving thresholds:

There are several studies (Burgstahler and Dichev, 1997; Degeorge et al., 1999; Moehrl, 2002; Holland and Ramsay, 2003; Moreira and Pope, 2007; Jacob and Jorgensen, 2007; Lee, 2007; Charoenwong and Jiraporn, 2009; Caramanis and Lennox, 2008) that demonstrate firms could run into earnings management to achieve or exceed certain targets such as: zero earnings (**EM1**), last period's earnings (**EM2**), and analysts' earnings forecasts (**EM3**).

Some studies presented above test if, under the null hypothesis of no earnings management, the distributions of scaled earnings changes (EM2), surprises (EM3) and levels (EM1) are relatively smooth (they describe “smooth” as the difference between the actual number of observations and the expected number of observations on an interval, divided by the estimated standard deviation of the difference). They find graphical and statistical evidence (for all three threshold) that there is an unexpected low frequency in the section immediately to the left of zero and an unexpected high frequency in the section that includes zero, which leads us to conclude for earnings manipulation in order to achieve these thresholds and hence I expect positive and significant coefficients for all three variables.

Leuz, Nanda and Wysocki (2003) and Othman and Zeghal (2006), enhance the fact that most of these empirical works were focused on Anglo-Saxon countries characterised by outsider economies with relatively dispersed ownership, strong investor protection, and large stock markets.

Change in pre-tax cash flows from operations:

Change in pre-tax cash flows from operations it's included as a measure of current operating performance. Burgstahler and Dichev (1997) show that the usage of cash flow from operations to manage earnings as been widely suggested in literature.

According to, Roychowdhury (2006) studied the incentive of managers to manipulate real activities (“defined as management actions that deviate from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds”), which affects cash flows and in some cases accruals, to achieve certain earnings targets. He uses cash flow from operations (CFO) to capture the real activities manipulation around the zero earnings threshold and found evidence consistent with firms trying to avoid losses by offering price discounts to temporarily increase sales. In conclusion, I hope to find a positive and significant coefficient for changes in pre-tax cash flows from operations.

Lastly, I control for firm- specific characteristics with **Size** variable, measured as the natural logarithm of total assets. Hu, Cao and Zheng (2015) suggest that once larger firms are more complex (operating, financing, and investing), they have more opportunity to manage earnings. On the other hand, positive accounting theory (Watts and Zimmerman, 1978) argue that because of the high visibility and control, large companies will end up paying a higher tax burden. Consequently, I do not predict the sign for its coefficient.

Next chapter will present results from estimation of all these models.

IV. Empirical results

This chapter presents results from estimation of tax and financial aggressive measures and results from correlation between these two measure before and after IFRS adoption. Additionally, shows the results from estimation of model 3 and 4 which relates DTAX to DFIN and controls for tax planning and earnings management incentives.

A. Measure of tax aggressiveness

As mentioned above, to measure **tax aggressiveness** I estimate discretionary permanent differences (DTAX), a measure of tax aggressiveness also used by Mary Frank, Luann Lynch and Sonja Rego (2009). I regress the total permanent differences (PERMDIFF) on nondiscretionary items such as goodwill (INTANG), consolidation accounting (MI, UNCON) and state taxes (CSTE) once these items could cause permanent differences. So I estimate equation (1) by Fama-French sic code (12 industries) and fiscal year using Panel EGLS cross-section weights, where all variables (including the intercept α_0) are scaled by beginning-of-year total assets and use the residuals (ε) from equation (1) as the measure of discretionary permanent differences (DTAX).

It is important to notice that some data has been lost in the estimation of DTAX because I require each firm to have at least 6 years observations, this way I end up with 2.291 firms (34.365 firm-years).

Table 1

Estimation of DTAX (discretionary permanent differences) by Fama-French 12 industries and fiscal year from 2001-2015

$$Permdiff_{it} = \alpha_0 + \alpha_1 INTANG_{it} + \alpha_2 UNCON_{it} + \alpha_3 MI_{it} + \alpha_4 CSTE_{it} + \alpha_6 LAGPerm_{it} + \varepsilon_{it}$$

n= 2291	DTAX		
	Coefficient	Std. Error	P-value
Intercept	-13,674	3,229	0,000
INTANG	0,004	0,001	0,000
UNCON	0,177	0,046	0,000
MI	0,679	0,031	0,000
CSTE	2,662	0,015	0,000
LAGPERM	0,292	0,004	0,000
R-squared	0,754		
Adjusted R-squared	0,754		

Variable Definitions (all variables are at year t unless stated otherwise):

$PERMDIFF$ = total book-tax differences - temporary book-tax differences = $\{BI - [((TTE-DTE-CSTE-CFOR) +CFOR) /STR]\} - (DTE/STR)$ divided by total assets at year $t-1$;

BI = pre-tax book income;

TTE = Total tax expense;

$CFOR$ =current foreign tax expense;

DTE =deferred tax expense;

STR = statutory tax rate;

$INTANG$ =goodwill and other intangibles divided by total assets at year $t-1$;

$UNCON$ = income (loss) reported under the equity method divided by total assets at year $t-1$;

MI = income (loss) attributable to minority interest divided by total assets at year $t-1$;

$CSTE$ = current state income tax expense divided by total assets at year $t-1$ (it's not divided by total assets when calculate $PERMDIFF$);

$LAGPERM$ = $PERMDIFF$ at year $t-1$ divided by total assets at year $t-1$.

As demonstrated by **table 1** all coefficients are significantly different from zero and, with exception of intercept (Frank, Lynch and Rego (2009) also obtain negative and significant coefficient for intercept), all coefficients are positive.

Although these variables are just to control for permanent differences caused by non-discretionary items, coefficient of $INTANG$ shows that differences in tax and accounting deductions of amortizations impact positively permanent differences. Frank, Lynch and Rego (2009) obtained a negative coefficient for this variable although it's not significant.

Also, **UNCON** and **MI** influence positively **PERMDIFF** which lead us to conclude that differences between accounting and tax raises due to equity interests treatment in less than 100 percent-owned entities create permanent differences. For **MI**, Frank, Lynch and Rego (2009) also obtained a positive coefficient but for **UNCON** they find negative coefficient, even so their coefficients aren't significant.

I control for Current state tax expense (**CSTE**) and as Frank, Lynch and Rego (2009) I found a positive coefficient (they do not found a significant coefficient for this variable) which is consistent with current state tax expense increasing permanent differences.

Similarly, **LAGPERM** shows a positive and significant coefficient (as in Frank, Lynch and Rego (2009)) demonstrating that there are differences that persevere through time and affect permanent differences although not related to tax aggressiveness.

Table 1 shows a high adjusted R^2 (0,754) which points that the model justifies a good part of **PERMDIFF** variation.

B. Measure of financial aggressiveness

To measure financial reporting aggressiveness I use discretionary accruals, where calculation of this measure is based on the modified-Jones model (Dechow, Sloan, and Sweeney 1995). I had estimated equation (3) below by Fama-French 12 industries and fiscal year, using Panel EGLS (Cross-section weights), where all variables (including the intercept α_0) are scaled by beginning of year total assets. Residuals (η) from this equation (2) are the measure of discretionary accruals (**DFIN**).

As well as in **DTAX** estimation some data has been lost in the estimation of **DFIN** because I require each firm to have at least 3 years observations, this way I end up with 1.722 firms (25.830 firm-years).

Table 2

Estimation of DFIN (discretionary accruals) by Fama-French 12 industries and fiscal year from 2001-2015

$$TACC_{it} = \alpha_0 + \alpha_1(\Delta REV_{it} - \Delta AR_{it}) + \alpha_2 PPE_{it} + \omega_{it}$$

n= 1722	DFIN		
	Coefficient	Std. Error	P-value
Intercept	-12,474	3,846	0,001
$\Delta REV - \Delta AR$	0,056	0,002	0,000
PPE	-0,027	0,001	0,000
R-squared	0,070		
Adjusted R-squared	0,069		

Variable Definitions (all variables are at year t unless stated otherwise):

$TACC$ = total accruals = $(EBEI + TTE) - (CFO + ITP)$ divided by total assets at year $t-1$;

$EBEI$ = earnings before extraordinary items from the statement of cash flow;

TTE = total tax expense;

CFO = cash flow from operations;

ITP = income taxes paid from the statement of cash flow;

ΔREV = change in sales;

ΔAR = change in accounts receivable;

$\Delta REV - \Delta AR$ is divided by total assets at year $t-1$;

PPE = gross property, plant, and equipment divided by total assets at year $t-1$.

From estimation of equation 2, I obtain significant coefficients for all variables.

Agreeing with Jones (1991) and Frank, Lynch and Rego (2009) intercept and PPE have negative signal and $\Delta REV - \Delta AR$ have a positive coefficient.

Modified Jones model assumes that the positive variations of revenue would bring growth of operating capital, causing a positive change in accruals (consistent with positive coefficient in table 2) and the depreciations on fixed assets would decrease the accruals (consistent with negative coefficient in table 2) (Peasnell, K. et al., 2000).

“This is based on the reasoning that it is easier to manage earnings by exercising discretion over the recognition of revenue on credit sales than it is to manage earnings by exercising discretion over the recognition of revenue on cash sales.” (Dechow, Sloan, and Sweeney 1995).

Finally, this table also shows a very low adjusted R^2 (0,07) which probably results from the small number of observations.

C. Relation between financial and tax aggressiveness

Once estimated DFIN and DTAX (residuals from equation 1 and 2, respectively), I run a correlation test and obtained results presented in the table below.

Table 3			
Relation between financial and tax aggressiveness using firm-years from 2001-2015			
Panel A: Descriptive Statistics			
	Mean	Median	Nr. Observations
DFIN	0,0003	0,0027	14198
DTAX	0,0011	0,0041	14198
Panel B: Pearson and Spearman correlations			
	DTAX	DFIN	
DTAX		0,3379***	
DFIN	0,1911***		

Pearson correlations are tabulated in the upper diagonal. Spearman correlations are tabulated in the lower diagonal.

*** Significantly different from zero at p-value 0.01.

Variable Definitions:

DTAX residuals from model (1) in Table 1 estimated by industry and year of permanent differences on nondiscretionary items known to cause permanent differences and other statutory adjustments that are unrelated to tax planning activities; DFIN residuals from model (2) in Table 2 estimated by industry and year of discretionary accruals calculated by modified Jones model.

Table 3 panel A shows descriptive statistics from DFIN and DTAX with a mean of 0,0003 and 0,0011, respectively. These two means are very close to zero which is the result expected once these are residuals from equations. To run this correlation test, I eliminate firms that do not have observations for both DFIN and DTAX, so I end up with 14198 observations.

Table 3 panel B expresses a positive and significant correlation between DFIN and DTAX with both Spearman (0,1911) and Pearson (0,3379) correlation tests.

Analysing absolute value of correlation it's possible to conclude that with Pearson and Spearman tests resulted in weak correlations (far from one- perfectly correlated).

However, with this results I can conclude for the confirmation of **H1**, that firms with aggressive tax report tend to also be financial aggressive.

Although, I already proved the existence of positive relation between tax and financial aggressiveness, I additionally run equation 3 and 4 (using OLS) to estimate relation between DTAX and DFIN when controlling for firm size, earnings management and tax planning incentives (presented in **table 4**).

It is important to notice that these two equations are estimated with period of analysis between 2002 and 2015 because EM2 is defined with market value of common equity at year t-2, which made me lose EM2 values for 2001.

Table 4

Multivariate regression analyses of relation between financial and tax aggressiveness using firm-years from 2002-2015

Panel A: OLS regression of DFIN on DTAX and controls for tax planning and earnings management incentives (equation 4)

$$DFIN_{it} = \beta_0 + \beta_1 DTAX_{it} + \beta_2 PTROA_{it} + \beta_3 LEV_{it} + \beta_4 MTB_{it} + \beta_5 EM1_{it} + \beta_6 EM2_{it} + \beta_7 EM3_{it} + \beta_8 \Delta PTCFO_{it} + \beta_9 SIZE_{it} + \varepsilon_{it}$$

	DFIN		
n= 1457	Coefficient	Std. Error	P-value
Intercept	0,038	0,002	0,000
DTAX	0,043	0,005	0,000
PTROA	0,847	0,005	0,000
LEV	-0,003	0,001	0,000
MTB	0,000	0,000	0,922
EM1	-0,002	0,002	0,264
EM2	0,001	0,001	0,401
EM3	-0,002	0,001	0,113
$\Delta PTCFO$	-0,886	0,005	0,000
SIZE	0,000	0,000	0,018

Table 4 (continued)

R-squared 0,801
Adjusted R-squared 0,801

Panel B: OLS regression of DTAX on DFIN and controls for tax planning and earnings management incentives (equation 3)

$$DTAX_{it} = \beta_0 + \beta_1 DFIN_{it} + \beta_2 PTROA_{it} + \beta_3 LEV_{it} + \beta_4 MTB_{it} + \beta_5 EM1_{it} + \beta_6 EM2_{it} + \beta_7 EM3_{it} + \beta_8 \Delta PTCFO_{it} + \beta_9 SIZE_{it} + \varepsilon_{it}$$

DTAX			
n= 1457	Coefficient	Std. Error	P-value
Intercept	0,003	0,004	0,523
DFIN	0,144	0,017	0,000
PTROA	0,307	0,017	0,000
LEV	0,011	0,001	0,000
MTB	0,000	0,000	0,687
EM1	0,007	0,004	0,067
EM2	-0,012	0,002	0,000
EM3	0,022	0,003	0,000
$\Delta PTCFO$	-0,096	0,018	0,000
SIZE	-0,001	0,000	0,002
R-squared	0,264		
Adjusted R-squared	0,264		

Variable Definitions (all variables are at year t unless stated otherwise):

$DTAX$ =residuals from model (1) in Table1 estimated by industry and year of permanent differences on nondiscretionary items known to cause permanent differences and other statutory adjustments that are unrelated to tax planning activities;
 $DFIN$ =residuals from model (2) in Table 2 estimated by industry and year of discretionary accruals calculated by modified Jones model.

LEV = total debt divided by total assets at year t ;

$PTROA$ = pre-tax income divided by total assets at year $t-1$;

$SIZE$ = natural log of total assets;

MTB = Market value of common equity divided by book value of common equity at year $t-1$;

$\Delta PTCFO$ = change in pre-tax cash flow from operations divided by total assets at year $t-1$;

$EM1$ = 1 if net income in year t , divided by the market value of common equity at year $t-1$, is greater than zero and less than or equal to 0.01 for firm i ; 0 otherwise;

$EM2$ = 1 if the change in net income from year $t-1$ to year t , divided by the market value of common equity at year $t-2$ is greater than zero and less than or equal to 0.01 for firm i ; 0 otherwise;

$EM3$ = 1 if firm i 's actual earnings less the median analyst forecast for fiscal year t (as reported on I/B/E/S) is greater than zero and less than or equal to 0.01 ; 0 otherwise.

Table 4 panels A and B presents some similar results, such as DTAX and DFIN, both of these variables present positive and significant (at p-value 0.01) coefficients consistent with the conclusion of correlation test in table 3, that there is a positive relation between tax and financial aggressive reports and also according to Frank, Lynch and Rego (2009) assumptions and results.

In both panels PTROA has a positive and significant (at p-value 0.01) coefficient and Δ PTCFO has a negative and significant (at p-value 0.01) coefficient. These findings are consistent with profitability (PTROA) being proportional to firm's tax liability and so once wealth maximization relies also on firm's ability to reduce its tax liability (Ogundajo and Onakoya 2016). As expected and now proved firms who engage on both tax and financial aggressive reports to maximize profitability. Change in pre-tax cash flows from operations (Δ PTCFO) demonstrate a signal different to the predicted and is inconsistent with Roychowdhury (2006) who shows cash flow from operations (CFO) can capture the real activities manipulation around the zero earnings threshold and found evidence consistent with firms trying to avoid losses (e.g. by offering price discounts to temporarily increase sales). Coefficients estimated in table 4 for PTROA and Δ PTCFO are also in accordance with the ones estimated by Frank, Lynch and Rego (2009), with exception of Δ PTCFO when dependent variable is DTAX, which have positive and significant coefficient in their study.

Table 4 panel A also shows that firms with aggressive financial report are usually bigger (SIZE) and are less levered (LEV), otherwise **table 4 panel B** express contradictory coefficients for these variables, suggesting that firms with aggressive tax report tend to be smaller (SIZE) and are more levered (LEV). All these results are significantly different from zero (at p-value 0.01). Relative to SIZE I did not predict any signal due to the multiplicity opinions in literature with some authors suggesting that once larger firms are more complex they have more opportunity to manage earnings (Hu, Cao and Zheng 2015), and others arguing that because of the high visibility and control, large companies will end up paying a higher tax burden (Watts and Zimmerman, 1978). Regard to LEV, the result obtained in **table 4 panel A** it's consistent with the predicted, this means that earnings

management and leverage are negatively related (Burgstahler et al. 2006) although Frank, Lynch and Rego (2009) found positive coefficient for this variable on both equations. The positive coefficient obtained in **table 4 panel B** could suggest that leverage it's a product of earnings shifting according with empirical cases studied above in chapter II section C and also with Huizinga, Laeven and Nicodème (2006) who suggests that debt-shifting is an important occurrence in Europe and found that national tax features and international differences in taxes are reflected in corporate debt policy.

Table 4 panel B also denotes significant coefficients (at 10% for EM1 and at 1% for EM2 and EM3) for all variables representing achieve of certain thresholds.

The empirical evidence obtained corroborate the findings of Burgstahler and Dichev (1997), who found that managers are involved in earnings management to avoid losses (EM1) and Degeorge et al. (1999) who provides evidence of account manipulation that might allow for avoiding negative earnings surprises (EM3).

However, results are not consistent with achieved by the works of Burgstahler and Dichev (1997), Degeorge et al. (1999), Brown and Caylor (2003) and Jacob and Jorgensen (2007), which confirm earnings management to avoid earnings decreases (EM2).

Even so results obtained for EM1 and EM2 agree with Frank, Lynch and Rego (2009) evidence.

Although not significant MTB presents a positive coefficient in both panels (A and B) of table 4, in agreement with predicted results and Dechow and Skinner (2000) and McNichols 2000, 2002 who suggests that market expectation of future growth could lead to manage earnings due to the pressure put on managers.

Finally, analysing adjusted R^2 from both equations (3 and 4) I found a much smaller result for equation 3 (0,264) than for equation 4 (0,801) which can in part be explained by integration of more control variables for earnings management (related with DFIN) than for tax planning (related with DTAX).

D. IFRS adoption: relation between financial and tax aggressiveness

Table 5

Correlation between financial and tax aggressiveness before and after IFRS adoption in Europe

Panel A: Pearson and Spearman correlations before IFRS adoption in Europe (2001-2004)

n= 1921	DTAX	DFIN
DTAX		0,4264***
DFIN	0,2425***	

Panel B: Pearson and Spearman correlations after IFRS adoption in Europe (2005-2015)

n= 12277	DTAX	DFIN
DTAX		0,3194***
DFIN	0,1828***	

Pearson correlations are tabulated in the upper diagonal. Spearman correlations are tabulated in the lower diagonal.

*** Significantly different from zero at p-value 0.01.

Variable Definitions:

DTAX residuals from model (1) in Table 1 estimated by industry and year of permanent differences on nondiscretionary items known to cause permanent differences and other statutory adjustments that are unrelated to tax planning activities; DFIN residuals from model (2) in Table 2 estimated by industry and year of discretionary accruals calculated by modified Jones model.

To test the link between tax and financial aggressiveness before IFRS and after IFRS implementation I ran the same tests as to prove the relation between tax and financial aggressiveness but I delimitate analysis in two periods, before IFRS adoption (2001-2004) and after that (2005-2015).

As shown in **table 5** correlation between DFIN and DTAX it's stronger and significant (at 1%) before IFRS adoption, either for Pearson or Spearman correlation tests. These results corroborate predictions made in this study and confirm **H2**.

Therefore, these results indicate IFRS adoption in Europe is related with a deterioration in the link between financial and tax aggressiveness.

This result it's not consistent with Van Tendeloo and Vanstraelen (2005) evidence, who discover that due to scarce enforcement and investor protection, adopting IFRS seems to have increased the magnitude of earnings management and also Jeanjean and Stolowy (2008) who found IFRS adoption has not reduced earnings management practices.

Same way I did in Section C of this chapter, I additionally ran equation 3 and 4 (using OLS) to estimate relation between DTAX and DFIN in the period before and after IFRS adoption when controlling for size, earnings management and tax planning incentives (presented in **table 4**).

Also, period of analyses fits between 2002 and 2015 because EM2 is defined with market value of common equity at year t-2, which made me lose EM2 values for 2001.

Table 6

Multivariate regression analyses of relation between financial and tax aggressiveness before and after IFRS adoption in Europe

Panel A: OLS regression of DFIN on DTAX and controls for tax planning and earnings management incentives before and after IFRS adoption in Europe

$$DFIN_{it} = \beta_0 + \beta_1 DTAX_{it} + \beta_2 PTROA_{it} + \beta_3 LEV_{it} + \beta_4 MTB_{it} + \beta_5 EM1_{it} + \beta_6 EM2_{it} + \beta_7 EM3_{it} + \beta_8 \Delta PTCFO_{it} + \beta_9 SIZE_{it} + \varepsilon_{it}$$

	Before IFRS		After IFRS	
	Coefficient		Coefficient	
Intercept	0,052	***	0,036	***
DTAX	0,084	***	0,038	***
PTROA	0,818	***	0,855	***
LEV	-0,023	***	-0,002	***
MTB	0,000		0,000	
EM1	0,001		-0,003	
EM2	0,001		0,000	
EM3	0,000		-0,003	*
$\Delta PTCFO$	-0,887	***	-0,890	***
SIZE	0,001	*	0,000	***
R-squared	0,876		0,797	
Adjusted R-squared	0,875		0,796	
n	456		1453	

Panel B: OLS regression of DTAX on DFIN and controls for tax planning and earnings management incentives before and after IFRS adoption in Europe

$$DTAX_{it} = \beta_0 + \beta_1 DFIN_{it} + \beta_2 PTROA_{it} + \beta_3 LEV_{it} + \beta_4 MTB_{it} + \beta_5 EM1_{it} + \beta_6 EM2_{it} + \beta_7 EM3_{it} + \beta_8 \Delta PTCFO_{it} + \beta_9 SIZE_{it} + \varepsilon_{it}$$

Table 6 (continued)

<i>n</i> = 1457	DTAX	
	Before IFRS	After IFRS
	Coefficient	Coefficient
Intercept	0,002	0,003
DFIN	0,487 ***	0,123 ***
PTROA	0,062	0,319 ***
LEV	0,048 ***	0,011 ***
MTB	0,000	0,000
EM1	0,013	0,007
EM2	-0,016 ***	-0,011 ***
EM3	0,001	0,024 ***
Δ PTCFO	0,234 ***	-0,117 ***
SIZE	-0,003 ***	-0,001 ***
R-squared	0,376	0,253
Adjusted R-squared	0,371	0,252
n	456	1453

*** / ** / * Significantly different from zero at p-value 0.01 / 0.05 / 0.1 respectively.

Variable Definitions (all variables are at year *t* unless stated otherwise):

DTAX =residuals from model (1) in Table1 estimated by industry and year of permanent differences on nondiscretionary items known to cause permanent differences and other statutory adjustments that are unrelated to tax planning activities;
DFIN =residuals from model (2) in Table 2 estimated by industry and year of discretionary accruals calculated by modified Jones model.

LEV = total debt divided by total assets at year *t*;

PTROA= pre-tax income divided by total assets at year *t*-1;

SIZE= natural log of total assets;

MTB= Market value of common equity divided by book value of common equity at year *t*-1;

Δ *PTCFO*= change in pre-tax cash flow from operations divided by total assets at year *t*-1;

EM1= 1 if net income in year *t*, divided by the market value of common equity at year *t*-1, is greater than zero and less than or equal to 0.01 for firm *i*; 0 otherwise;

EM2= 1 if the change in net income from year *t*-1 to year *t*, divided by the market value of common equity at year *t*-2 is greater than zero and less than or equal to 0.01 for firm *i*; 0 otherwise;

EM3= 1 if firm *i*'s actual earnings less the median analyst forecast for fiscal year *t* (as reported on I/B/E/S) is greater than zero and less than or equal to 0.01 ; 0 otherwise.

Table 6 panel A demonstrates exactly the same results as **table 5 panel A** for before IFRS adoption, so the analyses is presented in section C of this chapter. Also, for after IFRS adoption the only change presented is on EM3 coefficient, which indicates a negative coefficient inconsistent with Degeorge et al.(1999, 2007), Brown and Caylor (2003, 2005) and Lee (2007), who showed that avoiding negative earnings surprises is not an important achievement for managers.

Table 6 panel B, evidence before IFRS adoption, shows the same results as **table 5 panel B** but PTROA, EM1 and EM3 coefficients are not significant and Δ PTCFO shows a positive and significant coefficient (at 1%) corroborating with Roychowdhury (2006) who shows cash flow from operations (CFO) can capture the real activities manipulation around the zero earnings threshold and found evidence consistent with firms trying to avoid losses (e.g. by offering price discounts to temporarily increase sales). Coefficient estimated from Δ PTCFO in table 6 panel B also agrees with the estimated by Frank, Lynch and Rego (2009) PTCFO when dependent variable is DTAX and with prediction made in this study chapter III section B3.

Table 6 panel B, evidence after IFRS adoption only changes from **table 5 panel B** in EM1 coefficient that in the former table mentioned (table 6 panel B) do not have a significant coefficient.

So with these results I conclude that, before IFRS adoption financial aggressive firms tend to be tax aggressive (DTAX), are less levered (LEV), have less positive changes in cash flow from operations (Δ PTCFO), are bigger (SIZE) and are more profitability (PTROA). After IFRS adoption these firms have the same characteristics but are also less likely to avoid negative earnings surprises (EM3).

On the other hand, tax aggressive firms before IFRS tend to be financial aggressive (DFIN), more highly levered (LEV), have more positive changes in cash flow from operations (Δ PTCFO), are smaller (SIZE) and are less likely to avoid decreases in earnings (EM2). After IFRS adoption remain almost with the same results changing the fact that firms have less positive changes in cash flow from operations (Δ PTCFO), and add that firms are more profitable (PTROA) and more likely to avoid negative earnings surprises (EM3).

V. Conclusion

The aim of this study was to analyse whether tax and financial report aggressiveness have a positive relation. Thus I investigated and prove two hypothesis, the first denotes that “Firms with aggressive tax report tend to also be financial aggressive” and the second suggests that “The link between tax and financial aggressiveness is more significant before IFRS implementation”.

To run this study I chose a sample of public firms constant in Worldscope Database, over the period of 2001 to 2015, to the EU-15 countries. After eliminated all the firms with lack of data in all variables, regulated industries such as utilities (SIC code 49) and financial services (SIC codes 60-69), the final sample consists of 2790 firms. However, additional observations had been lost in each model estimation because of the lack of data necessary to compute equations.

To test the first hypothesis, I calculated measures of tax (DTAX) and financial (DFIN) aggressiveness. For the first one I used Frank, Lynch and Rego (2009) model of discretionary permanent book tax differences and for DFIN calculated the discretionary accruals with Modified Jones model (Dechow, Sloan, and Sweeney 1995). After determining DFIN and DTAX, I ran a Pearson and Spearman correlation test to prove H1 and it confirms with significance that tax aggressive firms tend also to be financial aggressive. Additionally, I used a model (equations 3 and 4) with control variables for analysis of firm size, incentives for earnings management and tax planning. With this test I conclude that financial aggressive firms tend to be tax aggressive (DTAX), are less levered (LEV), have less positive changes in cash flow from operations (Δ PTCFO), are bigger (SIZE) and are more profitability (PTROA). And tax aggressive firms tend to be financial aggressive (DFIN), more highly levered (LEV), have less positive changes in cash flow from operations (Δ PTCFO), are smaller (SIZE), are more profitability (PTROA), are less likely to avoid decreases in earnings (EM2) and more likely to avoid negative earnings surprises (EM3) and losses (EM1).

To test if the link between tax and financial aggressiveness is more significant before IFRS implementation (H2) I analysed Pearson and Spearman correlation before (2001-2004) and after (2005-2015) IFRS adoption and found evidence that confirms H2.

Additionally, I estimated the same model (eq.3 and 4) with control variables for analysis of incentives for earnings management and tax planning for both periods before and after IFRS adoption and found similar results to the ones revealed above.

Before IFRS adoption financial aggressive firms tend to be tax aggressive (DTAX), are less levered (LEV), have less positive changes in cash flow from operations (Δ PTCFO), are bigger (SIZE) and are more profitability (PTROA). After IFRS adoption these firms have the same characteristics but also are less likely to avoid negative earnings surprises (EM3).

On the other hand, tax aggressive firms before IFRS tend to be financial aggressive (DFIN), more highly levered (LEV), have more positive changes in cash flow from operations (Δ PTCFO), are smaller (SIZE) and are less likely to avoid decreases in earnings (EM2). After IFRS adoption the firms remain almost with the same results changing the fact that they have less positive changes in cash flow from operations (Δ PTCFO), and add that firms are more profitability (PTROA) and more likely to avoid negative earnings surprises (EM3).

Both tests (correlation and estimation of equation 3 and 4) corroborate the two hypothesis proposed, giving evidence that in Europe public firms (with exclusions described above) who are tax aggressive tend also to be financial aggressive and this link between aggressive reports gets weaker after IFRS adoption in Europe.

However this paper reveals some limitations such as reduced number of observations and the fact that I am assuming that same models are able to measure tax and financial aggressiveness when I chose to analyse countries that before IFRS adoption had different local GAAP and different tax obligations.

Since this topic is current, as future research suggestions, would be of interest to study the subject with other models and compare the results and also make a comparison within Europe countries. Additionally, it would also be relevant to include other independent variables as control variables, including whether the company is audited or not by a Big 4.

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