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Cost Stickiness as a Sign of Tax-Induced Earnings Management Across European Companies

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COST STICKINESS AS A SIGN OF TAX-INDUCED EARNINGS MANAGEMENT ACROSS EUROPEAN COMPANIES

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Biographical note

Pedro Filipe de Almeida Lopes was born in Vila Nova de Gaia, on the 27th of June of 1997. He joined the School of Economics and Management (University of Porto) in 2016 and graduated in Management in 2019, with a final grade of 16 (out of 20). In the same year, he started the Master in Finance and Taxation at the same University. Currently, in 2021, he is a candidate to obtain the master's degree.

On a professional level, Pedro started his professional career in January 2021, as a transfer pricing analyst at Deloitte Tax, S.A., where he is still working at the moment.

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Pedro Filipe de Almeida Lopes

Abstract

This study examines the relationship between corporate tax rate cuts and cost behaviour, through the empirical phenomenon of cost stickiness.

In the presence of a tax rate reduction, it is expected that managers will be willing to incur in more costs in higher tax rate periods, manipulating the intertemporal taxable income and consequently increasing results. This form of tax-induced Earnings Management materializes in a greater extension of asymmetrical behaviour of costs, hence fortifying the role of cost accounting to a clearer perception of the firm-value evolution.

The sample incorporates financial data from 76,794 firms established in 13 OECD European countries for the period of 2011-2019, where 14 tax reductions were identified.

The results show not only the income-decreasing cost behaviour before a tax rate cut on OECD European companies, but also that this phenomenon is reinforced in private companies and in companies established in lower tax compliance countries and/or with a weaker perception of government effectiveness.

Keywords: cost behaviour, cost stickiness, Earnings Management, tax-motivation, fixed-effects panel regression.

Resumo

Este estudo examina a relação entre reduções na taxa de imposto sobre o rendimento das sociedades e o comportamento de custos, através do fenómeno empírico do *cost stickiness*.

Na presença de uma redução da taxa de imposto, é esperado que os gestores estejam dispostos a incorrer em mais custos nos períodos de maior tributação, manipulando o lucro tributável intertemporal e, assim, aumentando os resultados. Esta forma de gestão de resultados induzida por motivações fiscais materializa-se numa maior extensão do comportamento assimétrico dos custos, fortalecendo o papel da contabilidade de custos para uma perceção mais clara da evolução do valor real da empresa.

A amostra incorpora dados financeiros de 76.794 empresas sedeadas em 13 países europeus da OCDE para o período de 2011-2019, onde foram identificadas 14 reduções de taxas de imposto.

Os resultados demonstram não só o comportamento mais assimétrico dos custos na presença de maior manipulação do rendimento tributável antes do corte da taxa de imposto sobre o rendimento das empresas europeias da OCDE, mas também que este fenómeno sai reforçado em empresas não cotadas e nas empresas presentes em países com menores níveis de *tax compliance* e/ou com uma perceção mais frágil da sua eficácia governamental.

Palavras-chave: comportamento dos custos, *cost stickiness*, gestão de resultados, motivação fiscal, estimação de dados em painel com efeitos fixos.

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1. INTRODUCTION

A growing stream of cost accounting research has been challenging the traditional theory that defines costs as variable or fixed. As there are many influences on the discretionary management decisions, this stream relies on the foundation that, under different scenarios, managers will be willing to make different decisions, that result in contrasting outcomes that affect cost behaviour. Latest research over this topic has shown evidence of the empirical phenomenon of cost stickiness, where the costs increase more with a positive change in sales rather than they decrease with a negative change by the equivalent amount.

The phenomenon is revealing himself as the cornerstone to a better comprehension on cost behaviour, that, on its hand, is strongly connected with the ability to perceive cost structure evolution. Furthermore, the ability to evaluate and predict a firm's cost structure allows stakeholders to have a better and more informed perception of the firm's performance.

Anderson et al., 2003 (hereafter, *ABJ*) documented evidence of asymmetrical cost behaviour, attributing it to deliberate managerial decisions in presence of adjustment costs, *i.e.*, proclaiming that cost stickiness arises as a consequence of optimal decisions regarding adjustment costs. As some costs move mechanistically with changes in output, others are determined by the resource's commitment decisions performed by managers.

It should be noted that cost stickiness is defined as a pattern, which means it is grounded on a dynamic optimisation problem – in the presence of adjustment costs, while predicting future factors, managers will be looking to commit resources intertemporally to achieve results maximisation. However, as managers begin to be more certain about the permanence of an activity decline, the cost stickiness pattern observed may reverse in near subsequent periods. Additionally, as the observation period gets wider, the phenomenon can get less pronounced, as it dissipates over time.

As there are many decisions that may justify the cost stickiness pattern, other than the optimal decisions with adjustment costs, this study aims to introduce tax-motivation as an explanatory variable of the phenomenon, following Haga et al. (2019). Facing a corporate tax rate cut, companies will have the incentive to incur in more costs in higher tax rate periods or to shift period costs from lower tax rate periods, minimising their taxable income in the year before the tax rate cut and transferring it to the year of its reduction, hence reducing their intertemporal tax expenses. In the presence of such incentive, companies are more likely to slow down cuts of slack resources in response to a sales reduction, which brings forth greater cost stickiness.

The purpose of this study is to measure cost stickiness in the presence of this tax-motivation, where higher persistence of the phenomenon implies tax-induced Earnings Management. Even though previous research provide evidence that companies shift income around tax rate changes, a limited number of them focuses on cost allocation decisions.

Using a sample of 14 tax reductions in 13 OECD European countries, income-decreasing cost behaviour before a corporate tax rate cut is expected, hence suggesting the managerial influence on cost accounting, seeking to maximise results.

In addition, looking to introduce further information that is useful to the financial information users, explanatory variables at firm- and country-value are tested, specifically quoted status, tax compliance measure from La Porta et al. (1999) and government effectiveness.

From a firm-specific perspective, public companies are expected to incur in less Earnings Management practices, since its behaviour is constantly monitored by its stakeholders, namely creditors and investors. In this regard, managers are less encouraged to conduct earnings manipulation, as it addresses unwanted attention and requires greater explanations on how these decisions are aligned with the several stakeholders' aspirations.

In what regards the tax compliant behaviour, it can briefly be defined as the propensity to taxpayers to cooperate with the country tax rules. As fiscal neutrality must be guaranteed in the companies' decisions, where its ambitions should target economic value creation, higher levels of tax compliance should reflect less significant Earnings Management practices, mirroring less pronounced cost stickiness in the year before the corporate tax rate cut.

Along the same line, a stronger government effectiveness level is likely to reflect higher tax compliant behaviour, where the government mechanisms are expected to decrease tax avoidance or tax evasion issues. However, government effectiveness has a broader dimension than tax compliance since it represents not only the ability to formulate and implement high-quality policies but also the trustworthiness on the government's commitment to implement and constantly adapt such policies to the contemporaneous issues. In this sense, not only it is expected the presence of compelling controls in the upstream, but also the ability to incentive the firm's economic purpose in the downstream, reducing manipulative and value destruction behaviour by managers.

Following similar research, the predictions are that *(i)* private companies, *(ii)* companies established in lower tax compliance countries, and *(iii)* companies established in countries with lower levels of government effectiveness all present less pronounced cost stickiness before a corporate tax rate cut, engaging in less Earnings Management.

This study contributes not only by inserting taxation as an important driver of asymmetrical cost behaviour, but also by underlying that (*i)* managerial income-decreasing decisions can affect cost behaviour, and (*ii)* macroeconomic factors also impact in cost behaviour. Note that the use of cost stickiness as a proxy to income-decreasing Earnings Management allows to perceive a prompter reversal process, as accounting accruals would not. The use of a sample of OECD European countries and the ability to study these features in a contemporaneous background (2011-2019) constitute additional contributions. Furthermore, the insertion of the company maturity (measured by the years of its existence) as an explanatory variable in the regressions performed also represents an innovative approach.

The paper is organised as follows. Section 2 contains a brief review of literature and describes the relationships between cost behaviour, taxation and Earnings Management; Section 3 describes the research methodology; and Section 4 reveals the empirical results. The conclusion is presented in Section 5.

2. LITERATURE REVIEW

In this section, topic-related literature is presented, where it is intended to dichotomise the relationship between corporate tax and cost behaviour. As both topics are expected to relate to Earnings Management, the theorical fundament will be that tax optimisation decisions will impact cost behaviour, in where it is anticipated it has a positive impact in results maximisation.

Bearing this purpose in mind, Section 2 is organized as follows: Section 2.1 develops the corporate tax affiliation with Earnings Management; Section 2.2 describes the impact of Earnings Management policies in cost behaviour; Section 2.3 matures the concept of cost stickiness; and Section 2.4 progresses the association between corporate tax and cost behaviour, where the study hypotheses are presented.

2.1. Earnings Management and Corporate Tax

Earnings Management and its main determinants have long been a focus of many different researchers and a concern to lawmakers. In the field of Management and Economics, it is a particularly studied topic since it severely affects the company's image to its stakeholders. Despite the common association between Earnings Management and the misleading of stakeholders or the influence of contractual outcomes (Healy and Wahlen, 1999) this is not exactly true. Baik et al. (2020) proved that high-ability managers incorporate more forward-looking information about cash flows into current earnings through income smoothing, hence developing the earnings informativeness and stock price informativeness about future cash flows. In this study, the definition of Earnings Management does not disentangle between the "good" and the "bad" Earnings Management.

There may be numerous reasons to manage earnings. Healy and Wahlen (1999) refer to these motivations as threefold – Capital Market, Contracting and Regulatory motivations. Latest research developed the specific roles of Corporate Governance structure, CEO compensation, CEO characteristics and audit fees (Neifar et al., 2016), intrinsic versus extrinsic managers' motivations (Achilles et al., 2013), equity issuances (Wang and Hagigi, 2019), reliance on external financing (Zhang et al., 2020) and national corporate income tax (Sundvik, 2016) on Earnings Management. These findings provide evidence that Earnings Management involves many aspects of any company and, therefore, a handful of decisions. Consequently, managers should have a holistic vision in this topic to fully evaluate its impacts in the company's sustainability and profitability to assure they make the best decisions.

However, those reasons affect differently the managers behaviour since it can rather justify an income-increasing or an income-decreasing conduct. This investigation will focus on the impact of corporate tax variations in this behaviour, in the conviction that the role of corporate tax in the managerial discretion[1] will not only justify the total magnitude of Earnings Management, but also the timing of Earnings Management activities (Wang and Hagigi, 2019)[2].

In the specific case of tax reductions, there will be a significant motivation for managing earnings downwards. Companies will have the incentive to transfer their earnings from higher tax rate periods to lower tax rate periods, decreasing the global amount of tax paid through time, as comported by the joint analysis of the investigations from Coppens and Peek (2005) and Haga et al. (2019). Earlier research provides evidence of the intertemporal earnings shifting around tax rate changes through accruals and real earnings management (Zeng, 2014), extended fiscal year recognition (Sundvik, 2017) and accelerated expense recognition and capitalisation avoidance (Höglund and Sundvik, 2019).

[1] The use of term "managerial discretion" is not random. The purpose is to acknowledge the importance of this theory in tax-motivation - managers will not necessarily be driven by shareholders' interests but to pursue their own objectives (Williamson, 1963).

[2] Despite Wang and Hagigi (2019) focus on the timing of Earnings Management in subsequent seasoned equity offerings, it provides a strong belief that it can be extended to Earnings Management in general and to tax-motivation.

Additionally, Sundvik (2016) studied the direct impact of these tax reductions in Earnings Management practices around Swedish private companies. Since Sweden went through two recent tax reforms (2009 and 2013), his study is particularly relevant as it allows to evaluate their effect and its persistence. In fact, he did not only found evidence of downward Earnings Management, but also that there was a pattern in the two periods before both tax reforms. These results show that this motivation may overcome the upwards Earnings Management motivations of constantly showing an image of financial health with higher results, enhancing the role of taxation in business activity.

A final topic that deserves to be highlighted is the impact that corporate tax avoidance and Earnings Management both have on firm value. Yorke et al. (2016) perceive in their investigation that the interaction between these two variables will be decisive in this subject. Considering the effect of tax avoidance in the absence of Earnings Management, firm value will increase – as Christensen and Murphy (2004) proclaim in their investigation, tax minimisation is a prime responsibility of directors on behalf of stakeholders, since it will maximise after tax cash flows - tax avoidance, *per se*, will create value.

The problem is when this form of evasion requires manipulation that must be shielded from tax authorities (Desai and Dharmapala, 2009) and that, consequently, will reduce the ability of stakeholders to monitor managers' behaviour (Desai and Dharmapala, 2006). Yorke et al. (2016) conclude that this protection of the managers' behaviour will provide them a window of opportunity to benefit privately at the detriment of stakeholders. This kind of opportunistic behaviour is not, according to the authors, value enhancing since it increases the unseemliness of Earnings Management. The authors conclude that this global impact can only be positive in the presence of an effective Corporate Governance environment. Therefore, it is expected (with considerable reliability) that companies will continue to exploit the tax-motivation, with the mindfulness of offsetting, simultaneously, the opportunistic behaviour of managers, boosting their firm value.

2.2. Cost Behaviour and Earnings Management

Firstly, it must be acknowledged that there are many ways of managing earnings. As Healy and Wahlen (1999) underline, managers can choose to anticipate or to postpone income and/or costs, to alternate between more aggressive or less aggressive amortisation and depreciation policies, and more. With the purpose of reducing taxable income intertemporally, managers will have diversified tools to assure they minimise the companies' results in higher-tax periods in detriment of bigger results in lower-tax periods, generating a global positive effect in tax avoidance.

Despite that, the decisions upon costs deserve particular attention since the managerial decisions influence cost behaviour, generating a perceivable asymmetric effect. The concept of asymmetric cost behaviour emerges from a recent literature stream that aims to expand not only our understanding of this topic and its implications, but also to identify its vital factors. Comprehending cost behaviour will allow to better understand earnings behaviour, which makes this research not only useful to cost accounting research but also to financial accounting topics that are supported on understanding or forecasting earnings behaviour (Bu et al., 2015).

This stream highlights that the traditional distinction between fixed costs and variable costs may not be enough to explain all costs' behaviour, introducing the concept of *"sticky costs"*. This subject requires special attention, and it will thereupon be developed in Section 2.3. Nonetheless, it is important to conceive now that (i) costs are *"sticky"* if they rise to a greater extent for sales increases than they fall for equivalent sales decreases and (ii) this category of costs provides evidence of asymmetric cost behaviour, driven by deliberate managerial decisions in the presence of adjustment costs[3] (*ABJ*), seeking to maximise resources.

[3] Adjustment costs are all the costs associated with making changes on the level of output – for example, hiring new employees. As all companies confront these costs, literature related to the topic show that desirable decreases in the output may be postponed by managers if it is expected to create high adjustment costs. However, and even though output increases may generate similar issues (for instance, a need to expand the business that requires an exponential growth on the companies' costs), such variation only occurs if there was a previous resource-expanding decision. The desire to allocate resources optimally through time justifies potential cost stickiness patterns.

However, cost behaviour is influenced by many other factors. For example, Banker and Byzalov (2014) assert that, in addition to the magnitude of resource adjustment costs, managerial expectations on future sales, slack resources carried over from the prior period and managerial incentives also have an impact on the degree of asymmetry in cost behaviour.

In what concerns the expectations, the key factor is the uncertainty of future events. For instance, given an uncertainty on future demand, managers tend to postpone the decisions about the dimension of the restructuration of resources until they have better information of the effective variation. Nevertheless, most decisions need to be made timely, which requires a prompt evaluation of the trade-off between guarantying the same volume of resources and supporting the operational costs of having unused capacity or incurring in the necessary resource adjustment costs. Despite the evidence that cost stickiness may be temporary, lower expectations about the stability of demand variations and/or greater adjustment costs (obligating more assurance in decisions) will increase its perseverance.

Another example of the role of expectations in cost behaviour focuses on the financial risk. Confronted with a potential future incapacity of honouring its financial commitments (*i.e.*, high financial risk), managers are more likely to make decisions that increase cost structure elasticity, strengthening their ability to cope with unexpected shocks.

Regarding the role of managerial incentives on cost behaviour, Dierynck et al. (2012) settled that private Belgian companies reporting a small profit have more symmetrical labour cost behaviour than other private companies, since their managers will have a stronger incentive to increase labour costs to a smaller extent when activity increases and to decrease those costs to a higher extent when facing activity decreases. Additionally, Kama and Weiss (2013) established that managers practicing income-increasing Earnings Management have a more likelihood of expedite downward adjustment of slack resources for sales decreases.

Banker and Chen (2006) showed that the incorporation of asymmetric cost behaviour in the earnings forecasts assures better results, guaranteeing that the model reflects a higher level of informativeness, lining up the results with the market's earnings expectations. To consider cost variability (and particularly cost stickiness) will improve the ability to evaluate earnings behaviour and the influence of managers in that behaviour.

These articles provide enough evidence not only of the asymmetry of costs, but also their role on comprehending earnings behaviour and, consequently, Earnings Management.

2.3. The phenomenon of cost stickiness

This section seeks to explain thoroughly the concept of cost stickiness. With that purpose in mind, it is pretended to *(i)* present and discuss the literature about its existence and occurrence, *(ii)* acknowledge its determinants and *(iii)* exploit the consequences of this phenomenon, following a similar approach as Riha Dedi Priantana (2020) in his paper on the review of cost stickiness research. It is also intended to reconnect this concept with Earnings Management, presenting the investigation of Silva et al. (2018), as a way of introducing the final chapter of the literature review that focuses directly on the main goals of this investigation.

Despite the recognition of disproportional cost emerged in the investigation of Noreen and Soderstrom (1997), the definition of cost stickiness was firstly coined by *ABJ* and it can be defined as a pattern of cost behaviour where costs increase more than decrease, despite equivalent amount of changes in the company's activity. These sticky costs present a unique and relative occurrence (Riha Dedi Priantana, 2020). As already acknowledge, cost stickiness follows changes in the companies' activity and, therefore, is according to the volume of activity that it is defined its persistence, which affects the global amount of costs. Also, and according to Banker and Byzalov (2014), cost stickiness happens in different circumstances of the firm, varying between different companies, industries, and countries. The authors concluded that this relativeness also occurs through time and between periods. This investigation looks to empirically observe the relationships before-mentioned and to fulfil the "gap" in investigation that exploits the temporal effect.

In what regards to its determinants, even though recent literature over this topic may have found a need to enrich or to review the prediction of cost stickiness, they all agree on *ABJ*'s fundamental insight of asymmetric managerial discretion. For instance, following a demand decrease, managers make a deliberate decision of retaining some slack resources rather than incur adjustment costs to fully remove such resources. However, when facing a demand increase, managers will have the incentive to add the required resources to fully meet that demand extension (Banker and Byzalov, 2014).

There are also endogenous and exogenous characteristics to the companies that explain the (non)existence of cost stickiness. For instance, Balakrishnan et al. (2004) showed that to work on full capacity causes sticky costs, while idle capacity does not. Another important determinant that deserves to be acknowledged is the impact of the type of industry on the level of cost stickiness. Bugeja et al. (2015) verified that manufacturing, services, and other industries present sticky cost behaviour, meanwhile resources, construction and retail industries do not.

A final source that must also be considered and that requires special attention in this investigation is the managerial incentives. Apart from the contributions already mentioned (Banker and Chen, 2006; Dierynck et al., 2012; and Kama and Weiss, 2013), it is important to underline the impact of agency problems in the cost stickiness patterns. In particular, the managers *empire-building* behaviour. Chen et al. (2012) portrait this behaviour as the managers' desire to grow the company or the group to the highest extent, even if beyond its optimal size or if it requires the maintenance of unutilised resources, with the sole purpose of increasing personal utility, fully discarding the optimal planning of costs, and increasing cost stickiness.

Shortly, the need to adjust resources, the resource capacity usage, and managerial incentives are three different theories that can justify the emergence of cost stickiness.

Finally, the sticky behaviour upon costs has strict consequences. Weiss (2010) explained the impact of this phenomenon in earnings prediction, stating that companies with more sticky costs show a greater decline in earnings when activity falls, since this leads to smaller cost adjustment and, therefore, lower cost savings. On its turn, it causes a greater decrease in earnings, which leads to an increase of the variability of earnings distribution and results in less accurate earnings prediction. The major contribution of Weiss' research was the introduction of the concept *"anti-sticky costs"* – when costs increase less when activity rises than they decrease when activity falls on an equivalent amount.

However, Banker et al. (2014) went a step further, establishing when the *"anti-sticky costs"* phenomenon occurs - when managers are pessimistic about future sales, they are more willing to cut resources when sales decrease and more reluctant to add resources when sales increase – and concluding that cost stickiness causes earnings to behave asymmetrically for operational reasons. Bearing in mind that optimism leads to cost stickiness (since it increases the managers' willingness to acquire new resources while trailing sales increases or to not reduce slack resources when facing sales decreases), the authors recognise that misconception of these impacts will reduce the quality of estimations.

Ciftci et al. (2016) continued the investigation on the consequences of cost stickiness upon predictive analysis and were able to determine the role of positive and negative sales' shocks in equal amounts. The authors withdrew that systematic errors in predicting costs cause higher errors on predicting earnings in unfavourable rather than favourable scenarios, suggesting once more the pronounced managerial role in adverse situations (e.g., postponing cuts of slack resources) that arises cost stickiness.

These studies not only support that cost stickiness increases information asymmetry between managers and investors but has also raised other questions that are currently being developed on related investigation. For instance, Han et al. (2020) proposed that both management earnings forecasts and cost stickiness are influenced by managers' strategic choices. As already explained, optimism about future performance raises cost stickiness. The authors add that it also leads to the will to disclose the optimistic expectations through management earnings' forecasts. In other hand, they also inquire that these forecasts have the purpose to diminish the perceived information asymmetry raised by the cost stickiness perseverance. The study allowed to (*i*) positively associate firm-level cost stickiness with higher propensity to issue management earnings' forecasts and its frequency, and to (*ii*) positively associate cost stickiness with more favourable earnings news forecasted by management.

Other studies that relate managerial accounting with financial accounting are arising, ever since there has been the recognition of the managerial incentives' role on both cost structure and earnings (Han et al., 2020).

Having a complete view of the phenomenon, it is now possible to build a bridge that connects both cost behaviour and Earnings Management practices. Da Silva et al. (2018) analysed this direct connection upon Brazilian companies listed on *BM&FBovespa* between 2008 and 2017. They observed that accounting profit is affected by Earnings Management practices, being part of Earnings Management (described by the amount of accruals) explained by the sticky costs' behaviour. This underlines not only the importance of controlling cost stickiness effects in Earnings Management prediction models, but also the importance of considering sticky costs influence in discretionary accruals. Without this recognition, the measurement of Earnings Management practices would super evaluate the opportunistic behaviour of managers and, consequently, the agency conflicts between managers and shareholders.

In this investigation, it is intended to develop the stakeholders' comprehension on the dimension and the reasons that motivate Earnings Management (mitigating the commonly perceived standpoint that it only arises from opportunistic behaviour). Additionally, it looks to contribute to a better understanding of both cost and profit accounting; and to emphasise the need to consider cost stickiness impacts on firms' evaluation models that are based on earnings prediction.

2.4. Cost Behaviour and Corporate Tax

Until this point, it was seen that cost behaviour and corporate tax have, separately, strong roles in comprehending Earnings Management. This investigation looks to examine the correlation between these two variables, with the conviction that corporate tax will affect cost behaviour, ever since it alters the managerial decisions.

The Organisation for Economic Co-operation and Development (OECD) have suffered several tax reforms in the past years, hence revealing this investigation contemporary relevance, since it allows to evaluate the impact of recent fiscal reforms more accurately.

To conduct the study, it is first needed to acknowledge in which category of costs it is possible to perceive the magnitude of cost stickiness. In his research, *ABJ* discovered the sticky behaviour pattern upon *Selling, General and Administrative costs* (SG&A costs), showing that, on average, these costs increase 0,55% per 1% increase in sales and decrease only 0,35% per 1% decrease in sales. Chen et al. (2012) reenforces the prominence of this category of costs on business operations and, therefore, the close attention that practitioners have on controlling SG&A expenses.

According to Haga et al. (2019) and based on the intertemporal income shifting incentive earlier portraited, companies are willing to incur in more costs before a tax rate cut – for example, decelerating cuts on slack resources. Therefore, it is expected greater cost stickiness in the presence of tax incentives. They further add that managers can, as an alternative, transfer period costs (such as SG&A costs) from lower tax periods to higher tax periods, also generating a higher degree of cost stickiness before a tax rate reduction. Combining the effects from both behaviours, it is expected more cost stickiness in the previous year to the tax reduction as a sign of tax-induced Earnings Management. The first hypothesis is formulated as follow:

H1: There is greater cost stickiness in the year before a tax rate cut than in other years.

In what concerns the characteristics that may influence the degree of sticky behaviour upon costs, there have been numerous findings of the variability of tax avoidance (that impacts on cost behaviour) and directly of cost stickiness across companies, industries, and countries.

For instance, Atwood et al. (2012) found that, on average, higher required book-tax conformity, a worldwide approach (rather than a local approach) and stronger perception of tax enforcement all justify lower tax avoidance. Mappadang (2019) showed that an effective Corporate Governance mechanism not only has a negative effect on tax avoidance, but also impacts the firm value. All of this mitigates the tax incentive effect on cost stickiness.

In the direct impact on the dissemblance's of the cost stickiness presence, Calleja et al. (2006) studied the differences of the phenomenon in US, UK, French, and German firms. They conjecture that the higher pervasiveness of cost stickiness in French and German firms can be attributable to differences in systems of Corporate Governance, reenforcing the conclusions from Mappadang (2019). UK and US firms are subjected to a higher degree of external scrutiny and historically a more focused vision on the shareholder utility maximisation, reinforcing the less pronounced presence of the cost stickiness phenomenon.

Higher managerial oversight and firm-specific and industry characteristics have also a clear impact on the level of cost stickiness. Calleja et al. (2006) observed that a broader time horizon allows managers to have more information to act accordingly to the decline of activity they are facing. In addition, the ratio between cutting resources relative to the incremental cost of retaining slack resources becomes smaller over wider adjustment periods, making the adjustments of the level of resources a more possible way of action. Despite that, the tangible benefit that arises from the tax reduction does not allow this timeframe for managers to decide, fortifying the prominence of cost stickiness before reductions of corporate tax rate. Another important conclusion in their investigation concerns with the magnitude of activity. The authors showed that larger decreases in revenues lead to an outweigh of the cost of carrying surplus resources to the costs of adjusting the resources level, guiding to a significant reduction on cost stickiness. Finally, they also concluded that there are industry- and firm-specific factors that affect cost stickiness.

Banker et al. (2013), on the other side, not only proved the central proposition to cost stickiness that the phenomenon arises due to the managers consideration of adjustment costs when changing the level of resources, but also that this varies throughout countries. Using country-level employment protection legislation (EPL) provisions, a proxy for labour adjustment costs, to a sample of firms in 19 OECD countries, they found that the degree of cost stickiness at the firm level varies within the strictness of those provisions. Countries with stricter EPL exhibit a greater degree of cost stickiness.

Leading from the Banker et al. (2016) investigation, Makni Fourati et al. (2020) studied the influence of sticky cost behaviour on accounting conservatism across country groups and across industries.

Firstly, Banker et al. (2016) established that the empirical research on conditional conservatism was not considering, until the date, the effect of cost stickiness on the asymmetric pattern observed. Briefly, conditional conservatism may be defined as an asymmetric timing in the recognition of unrealised losses or earnings on the reported earnings. This arises due to the tendency for accounting to require a greater likelihood on the good news in order to recognise them, rather than on bad news. Although Basu (1997) was able to conclude that there is a greater timeliness in the recognition of bad news (measured by negative stock returns) regarding future cash flows than good news, sustaining the effect of conditional conservatism, Banker et al. (2016) recognised that this asymmetric relationship can also be grounded by cost stickiness. To obtain a better inference about the average and the extent of cross-sectional variation in conservatism, the authors developed new empirical tests that separate the role of conservatism from the cost stickiness effect.

Makni Fourati et al. (2020) went on a deeper analysis by studying the confounding effect of cost stickiness on conditional conservatism on a worldwide perspective. With a sample of listed companies from eighteen countries, using the Banker et al. (2016) model, they confirmed the persistence of cost stickiness and conservatism in the international context. Like Banker et al. (2016), the authors argue that the measure of conditional conservatism from Basu (1997) research was overstated, since it did not control for cost stickiness. The innovative factor of this investigation was the identification of differences in the association between cost stickiness and accounting conservatism in a global analysis. In a cross-country perspective, cost behaves asymmetrically in all groups of countries, but the conservatism is only allowed in the USA and in a few countries on the EU. On the other hand, in a cross-industry perspective, even though that stickiness and conservatism were not present in all industries, they are clearly present on the most representative industries - manufacturing. Therefore, cost stickiness changes across country groups and across industries.

A dimension that deserves to be underlined and that can profoundly justify the differences of the degree of cost stickiness between countries is deep-rooted in the country's culture (Kitching et al., 2016). Using firms from thirty-nine countries as sample, the authors found that cost stickiness is less pervasive in countries with (*i*) higher uncertainty-avoidance, (*ii*) lower masculinity, and (*iii*) a long-term orientation.

Firstly, higher uncertainty avoidance affects cost stickiness in two possible ways – not only will more uncertainty-avoidant managers be more concerned with avoiding losses for a likely worst-case scenario, leading to a more aggressive cost cut when confronting sales decreases in the current period; but also high uncertainty-avoidance cultures reduce the empire building-behaviour of managers, since it reduces the preference for compensation to individual performance (managers will be less attracted to have the additional risk of having a variable paying). Both effects reduce cost stickiness.

Furthermore, masculinity can affect cost stickiness through two different channels. Firstly, more masculine societies are probably less interested in the relationships, feeling less pressure to delay firing, reducing the adjustment cost related to dismissing employees and, consequently, cost stickiness; moreover, managers in those societies are more likely to obtain a higher personal utility from the empire-building behaviour, increasing cost stickiness. The results showed cost stickiness is less pronounced in more masculine countries, which sustains that the dominant effect of this variable relies on the psychological adjustment costs.

Finally, the last culture factor with explaining capacity on the differences of sticky cost behaviour is the long-term orientation. Long-term oriented societies have a strong propensity to save and invest, increasing the thriftiness of managers – more careful managers are more likely to reduce costs when there is a sale decrease – and, therefore, decreasing cost stickiness perseverance. Culture affects resource management decisions and, therefore, cost stickiness.

Taken in consideration the widely dimensions that affect the phenomenon perseverance in different countries, it is expected to exist specific factors that justify differences in cost stickiness arisen from tax motivations. In this research, it is intended to evaluate tax compliance and country-level governance impacts in this matter. In addition, at a firm-value perspective, quoted status (publicly listed companies versus private companies) is expected to also have an impact in the asymmetric cost behaviour.

In the first place, tax compliance has always been an important topic over the Earnings Management research. Over the specific topic of corporate tax reforms, Heinemann and Kocher (2013) investigated the effects of tax regime changes on the compliance measure. Their research allowed to consider the behavioural effects of tax reforms, identifying, on other conclusions, that the ones prejudicated by the reform tend to incur in more tax evasion after the reform. Das-Gupta et al. (2004) sustained that taxpayers disclosing higher income are incentivised to understate their income to avoid special assessment units, reenforcing the conclusion from Heinemann and Kocher (2013) research. On the other hand, Lamantia and Pezzino (2018) underline that tax reforms that may have been successful in reducing tax avoidance in some countries may produce different outcomes in others, depending on the initial conditions. Thus, the tax system features may justify different decisions on behalf of the economic agents, highlighting once more the influence of managers' behaviour in tax evasion.

Many other studies have focused on the factors that enriches corporate tax compliance, such as economic freedom, the level of importance of the equity market, effective competition laws, and high moral norms (Riahi-Belkaoui, 2004); stronger Corporate Governance mechanism (Mappadang, 2019); and the role of tax authorities, tax sanctions, tax audits and awareness of taxpayers in improving tax compliance (Lallo, 2019). Respecting Earnings Management, Liu et al. (2014) showed that different choices over accounting principles may justify earnings manipulation and, consequently, lower tax compliance. In the other direction, Haw et al. (2004) concluded that higher tax compliance in a country has a major role on diminishing Earnings Management. Mattei (2014) sustained that, even within a specific country, differences in the regional tax compliance affect the tax-motivated Earnings Management, highlighting how much country-level tax compliance differences upon different countries can justify higher level of cost stickiness when facing a future tax reduction.

H2a: There is greater cost stickiness before tax rate cuts in companies established in lower tax compliance countries than in other companies.

As seen, the tax compliance measure depends severely on the managers' behaviour. However, this behaviour must be followed and controlled by the government as that there is not only the obligation to develop appropriate laws, but also to predict and induce moral enterprise behaviour. For instance, Bergman (2003) showed that tax reforms may enhance tax compliance, but only when the new policy is able to reduce the entrenched evasion strategies of the taxpayers. Alabede et al. (2011) proved that the perceived tax service quality and the public government quality has a strong impact in the individual taxpayers' compliance behaviour.

Government effectiveness does not only affect the level of tax compliance, but also the business environment and entrepreneurship (Groşanu et al., 2015). Using the *World Bank Indicators*, his study allowed to reenforce the importance of comprehending the country-level governance differences for policymakers and for businesses.

In the Earnings Management topic, Memiş and Çetenak (2012) established that the efficiency of the legal system decreases the incentives of managing earnings. Sáenz González and García-Meca (2014), on the other hand, analysed the association between government effectiveness and Earnings Management behaviour, showing that the implemented controls that successfully strengthened the rule of law or improved the effectiveness of the government led to a reduction in firms' Earnings Management. Burgstahler et al. (2006) investigation already provided clear evidence that Earnings Management is more pronounced in countries with weaker legal systems and enforcement.

Another important dimension in the government ability to oversee Earnings Management practices relies on the political stability. Lemma et al. (2020) found that higher political stability attenuates accrual-based Earnings Management for a sample of thirty-nine countries. In the case of cost stickiness, Lee et al. (2020) showed that, while facing high political uncertainty, managers retain slack resources until they have the best information to make a well-grounded decision.

Companies based in countries with stronger government effectiveness, regulatory quality, enforcement of law and control of corruption engage in less tax avoidance (Zeng, 2019). Therefore, the country-level governance has a tremendous role on minimizing tax avoidance at the corporate level. In fact, Li et al. (2020) found that modern information technology improves corporate income tax compliance by enhancing third-party information reporting and tax enforcement capacity. They also noticed that modern information technology is an effective tool to reduce tax sheltering of high tax-avoidant and tax-evaders companies. Transposing these results to the cost stickiness effect, H2b is formulated as follow:

H2b: There is greater cost stickiness before tax rate cuts in companies established in lower government effectiveness countries than in other companies.

Finally, it is intended to explore the differences in the cost behaviour, prior to the tax rate reduction, between publicly listed companies and private companies. Firstly, as Ball and Shivakumar (2005) noticed, private companies mainly report for taxation, dividends, and compensation purposes. Contrarily, public companies report to a wider range of users of the financial information. That leads to lower quality report standards from private companies and, consequently, to a higher level of opportunity for these firms to manage earnings. Burgstahler et al. (2006) enhances this idea, concluding that public companies face higher capital market pressure to provide information that is aligned with their economic performance – *ad contrarium*, private companies have less pressure and, thereafter, a greater window of opportunity.

In recent research, the authors have been looking to establish a connection between market listing and Real Earnings Management (REM). This dimension deserves particular attention, because it is associated with value-destruction of the company and may have repercussions on the economics' well-being. Some REM examples are the reduction of advertising and R&D expenses or overproducing to reduce the cost of goods sold. Al-Amri et al. (2017) found that private firms incur in higher REM compared to public firms. However, Haga et al. (2018) found the exact opposite conclusion, sustaining that public firms' managers have higher incentives to assure positive earnings and, therefore, the dimension of REM is higher, in absolute terms and in relative terms (% of the total Earnings Management activities). However, this form of Earnings Management refers to structural decisions, rather than conjunctural ones. When facing tax-motivation in a near future, managers will only have the ability to resort to other forms of Earnings Management. Therefore, if REM is higher in public companies, private firms will easily resort to accrual-based Earnings Management (that impacts on cost behaviour) in the presence of tax-motivation. In fact, this conclusion is supported by the study of Kałdoński and Jewartowski (2019), in which the authors concluded that REM is a tax conforming form of inflating earnings, explained by strategic managers' behaviour to avoid unwanted scrutiny by tax authorities and external monitors.

In fact, in what regards to tax-induced Earnings Management, Ullmann et al. (2012) found that the assurance of high-quality in the financial statements offsets the benefits of paying lower taxes for public companies, but not for private companies. Lin et al. (2014) investigation reenforces this idea – the authors discovered that the private companies in China reported a higher volume of income-decreasing accruals than the public companies the year prior to the country's massive statutory tax rate reduction in 2008. The last hypothesis in this investigation is formulated as follow:

H2c: There is greater cost stickiness before tax rate cuts in publicly listed companies than in private companies.

3. RESEARCH METHODOLOGY

In this study, it is intended not only to empirically examine the relationship between cost stickiness and corporate tax, but also to confirm which characteristics may justify divergences in the degree of persistence of the phenomenon worldwide. Bearing this is mind, the chosen sample for this study were companies based on 13 OECD European countries[4], allowing to have a widespread overview, while guarantying a common background on the research setting that can avoid possible constraints and bias. The "ground-breaking" aspect of this research relies on the ability to evaluate the phenomenon on developed European economies, studying unique features (namely, being a publicly listed company *versus* a private company, tax compliance measure from La Porta et al. (1999) and government effectiveness) and allowing to fortify this contemporaneous stream of literature rooted on cost stickiness.

3.1. Sample

The initial sample was composed with annual data from companies based in the 13 OECD European Countries[5] and defined as *Public limited company* or *Private limited company* in the *Bureau van Dijk's Orbis* database ("Orbis"). In other words, non-profit organisations, public authorities, and other companies that are not suited with the profit maximisation purpose, are excluded from this investigation, ever since it is not expected for these to incur in Earnings Management. Financial firms were also eliminated from the sample, forasmuch as the scope of their activities is too distant from the non-financial organisations, which could make the sample severely heterogeneous. Moreover, Subramaniam and Watson (2016) demonstrated that only *Cost of Goods Sold* (CGS) were sticky in financial companies, rather than the *Selling, General and Administrative costs* (SG&A costs), the study's main variable of interest.

[4] As the initial purpose of this investigation was to embrace all the OECD European countries, the criteria applied in Orbis restricted the sample to 13 countries. Namely, the criterion that had a higher impact on data restriction was "Consolidation Code", in which only U1 coded companies were selected, in order to consider strictly unconsolidated company with no consolidated companion.

[5] Namely Austria, Belgium, Estonia, Finland, France, Germany, Iceland, the Netherlands, Poland, Portugal, Spain and Sweden.

Then, to properly filter the sample to the investigation in hands, the sample was restricted to the companies with available data for all key variables in the time horizon pretended to study (2011-2019).

The next step consisted in considering, as aforementioned, only the companies defined with consolidation code U1 in Orbis. This criterion relies on the recognition that unconsolidated financial statements are in better position to reveal what is actually happening in the company – *ad contrarium*, consolidated financial statements include non-comparable activities (e.g., a holding company has clearly a different *core business* that its subsidiaries – to discredit this would bias the investigation results.

Other important criterion employed was the consideration of only "*Big*" and "*Very Big*" accordingly to the Orbis definition[6], pondering that small companies could also bias the results due to irregular reporting or extreme growth, as recognised in the study of Haga et al. (2019). Some other treatments were applied, namely the disregard of islands and ultramarine possessions and the removal of the only Turkish company that was compliant with the restrictions above described.

Finally, to remove the effect of overstated observations, 1% outliers were discarded in the left and right tails for both dependent variables (*other operating expenses* and *other operating items*) and sales. Additionally, there was only the consideration of sales observations greater than zero, otherwise the sample would include companies that are unable to control their cost structure and would bias the results.

The final sample includes 663,934 observations for 76,794 firms in 13 OECD European countries for the period of 2011-2019. When conducting the regressions, the consideration of *other operating expenses* reduces the sample to a number of observations of only 21,611, for a total of 2,706 firms in 9 of the 13 OECD European countries[7]. To overcome this data restriction, the use of *other operating items* allows to assure a total sample of 555,112 observations for 64,263 firms all the 13 countries early mentioned.

[6] A large company is defined in Orbis when it matches one of the following conditions: *(i)* Operating revenue equal or greater than Euro 10 million, *(ii)* Total assets equal or greater than Euro 20 million, and *(iii)* Number of employees equal or greater than 150. As very large companies are also captured by these restrictions (even though clearly with higher benchmarks), listed companies are immediately considered very large companies.
[7] Belgium, Italy, Portugal and Spain do not present any observation regarding *other operating expenses*.

The descriptive statistics are reported in Table 3 and will hereupon be discussed in Section 4.2.

3.2. Variables

The indexes used in this investigation are *c* for country, *f* for firm, and *t* for year.

The key variable is *other operating expenses* (item OOPE of Orbis), defined as $OOE_{c,f,t}$, which consists of an approximation of the *Selling, General and Administrative costs* (SG&A costs) for firm *f,* country *c* and year *t*. Due to data restriction, it was not possible to directly extract the variable SG&A costs from Orbis. Secondly, in order to have a wider and more robust sample, the estimation relies on the variable *other operating items* (OOI, item OOPI of Orbis)[8], as it represents a more flexible measure, allowing to overcome possible accounting differences in the chosen sample.

In what concerns the explanatory variables, they were considered firm-level variables and country-level variables.

The first firm-value variable is $SALES_{c,f,t}$, representing the net sales for firm *f,* country *c* and year *t* (*item* TURN of Orbis). The other firm-value variable is $AGEYRS_{c,f,t}$, measuring the number of years since firm *f* in country *c* was established, representing the firm's maturity.

[8] As *other operating expenses* is defined as "all costs not directly related to the production of goods sold" in the database, *other operating items*, on its turn, is defined as "total amount of all other operating items not defined as Material Costs, Depreciation Costs, Cost of Employees and Research and Development Costs". Although *other operating expenses* may be the closest approximation of the SG&A costs, *other operating items* also captures mainly operating expenses. It must be also acknowledged that, since this is a dynamic study, there is a high likelihood that both variables vary in the same direction over time, both allowing to evaluate the cost stickiness phenomenon in the presence of tax-motivation.

On the country-level perspective, the main variable is $TAXDEC_{c,t}$, that represents the magnitude of cut in the national tax rate cut in country *c* for year *t*. Additionally, there is the insertion of two dummy variables, namely $DEC_{c,t}$ and $SUCDEC_{c,t}$, coded 1 if sales decrease and 0 otherwise, and coded 1 if sales decrease for two consecutive year and 0 otherwise, respectively. Other important variable on this domain is $GDPGrowth_{c,t}$, that represents the Real GDP growth for country *c* and year *t*, as defined by the World Bank Databank[9].

The interaction between *other operating expenses* (or o*ther operating items*) and sales represents the annual changes in costs to contemporaneous changes in sales revenue. In turn, the interaction between these two variables with the binomial variable that indicates sales decrease (DEC) demonstrates the measure of asymmetric cost behaviour. However, as these relationships are affected by other variables, there are used control variables (*i.e.,* variables that are held constant or limited in the research since, even though not representing this study interest, they could alter the outcomes).

For the estimation of the second model, that looks to study both country- and firm-value characteristics, there is also the inclusion of the variable $FACTOR_{c,f,t}$, that equals one of the three factors that it is predicted to have an impact on cost behaviour: *(i)* $TAX\_COMPLIANCE_{c,t}$, defined as the national tax compliance measure from La Porta et al. (1999); *(ii)* $GOVERNMENT\_EFECTIV_{c,t}$, coded accordingly to the *World Governance Indicator* "Government Effectiveness" extracted from the World Bank Databank; and *(iii)* $LISTED_{f,t}$, the only firm-value variable applied in this test, indicating if a company is listed on a stock exchange or not.

[9] GDP Growth is defined in the World Bank as the "annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources."

3.3. Econometric Models

Looking to the existing research on asymmetrical cost behaviour, that looks to defy the traditional theory of cost accounting, the approach on this investigation follows Haga et al. (2019)[10] procedures.

Recognizing that the traditional definition of costs does not capture the entire reality of cost behaviour, as previously discussed, it is intended to study at which dimension cost stickiness explains the atypical behaviour of some category of costs. As it is general expected that operational costs are variable costs, ever since they are closely related to the volume of activity of a company, the truth is that they capture many different categories of costs, with different behaviours in dissimilar environments, and that this recognition allows to better perceive the evolution of the structure of costs. Consequently, a full-extension perception of this reality allows to comprehend past and present cost behaviour and, consequently, estimate its future variation.

In this matter, it is used the growth rate of *other operating expenses* (or *other operating items*) as a proxy for asymmetrical behaviour of costs (when facing increased or decreased sales).

It is then included variables to control the macroeconomic environment that impacts on cost behaviour.

Using multivariate linear regression models to examine the relationship between changes in sales and changes in costs, it is intended to study cost behaviour before a tax rate cut using the following model (Model 1):

$$\Delta ln(OOE)_{c,f,y} = \beta_0 + \left(\beta_1 + \alpha_1 TAXDEC_{c,t} + \Phi_1 AGEYRS_{c,f,t} + \Phi_2 GDP_{GROWTH\,c,t}\right) * \Delta \ln (SALES_{c,f,t}) + \left(\beta_2 + \alpha_2 TAXDEC_{c,t} + \Phi_3 AGEYRS_{c,f,t} + \Phi_4 GDP_{GROWTH\,c,t} + \Phi_5 SUCDEC_{c,f,t}\right) * DEC_{c,f,t} * \Delta \ln (SALES_{c,f,t}) \quad (1)$$

[10] In this regard, it is important to highlight that the procedure from Haga et al. (2019) has followed the baseline of *ABJ* cost stickiness model and the extended cost stickiness model from Banker et al. (2013).

The main parameters are β_1, β_2, α_1 and α_2. Firstly, β_1 demonstrates the percentage change in costs for a 1% change in sales, while β_2 measures the asymmetry in cost behaviour. As it is the suggestion of this study that a corporate tax rate cut will incentive managers to reduce earnings in the year before the reduction, by increasing costs faster when sales increase and postponing cost decreases as sales decrease, $\alpha_1 > 0$ or $\alpha_2 < 0$ indicates income-decreasing cost behaviour before a decreasing corporate tax rate, hence validating H1.

Equations in parenthesis have important interpretations, representing an extension to the standard cost stickiness model of *ABJ*, where the control variables affect both the slope for sales increases (first expression in parenthesis) and the degree of cost stickiness (second expression in parenthesis). Even though these procedures are also performed by Banker et al. (2013) and Haga et al. (2019), this study introduces the pioneering factor of consider the companies maturity (measured by the years of its existence) as a control variable, with the belief that more experienced companies engage in more Earnings Management practices.

The model will be re-estimated using *other operating items* ($\Delta\ln(OOI)$) as the dependent variable. For this purpose, the results presented in Section 4 will present the estimation's outputs with the use of *other operating expenses* in Column (1) for each table, whereas the estimation's outputs with the use of *other operating items* will be shown in Column (2).

To test H2a, H2b and H2c, it is introduced the variable *FACTOR*, with the interactions described above (Model 2):

$$\Delta ln(OOE)_{c,f,y} = \beta_0 + \left(\beta_1 + \alpha_1 TAXDEC_{c,t} + \alpha_3 FACTOR_{c,ft} + \alpha_4 TAXDEC_{c,t} * FACTOR_{c,f,t} + \Phi_1 AGEYRS_{c,f,t} + \Phi_2 GDP_{GROWTH\,c,t}\right) * \Delta\ln(SALES_{c,f,t}) + \left(\beta_2 + \alpha_2 TAXDEC_{c,t} + \alpha_5 FACTOR_{c,ft} + \alpha_6 TAXDEC_{c,t} * FACTOR_{c,f,t} + \Phi_3 AGEYRS_{c,f,t} + \Phi_4 GDP_{GROWTH\,c,t} + \Phi_5 SUCDEC_{c,f,t}\right) * DEC_{c,f,t} * \Delta\ln(SALES_{c,f,t}) \quad (2)$$

In this model, the main parameter relies on α_6, in where the four-way interaction between $TAXDEC$, $FACTOR$, DEC and $\Delta\ln(SALES)$ allows to measure each factor effect on cost stickiness before a tax rate cut.

The main variable definitions, both for Model 1 and Model 2, are presented in Table 1.

Table 1 - Variable Definitions

Variable	Definition
Δln(OOE)	Change in OOE (=ln(OOE_t/OOE_{t-1}))
Δln(OOI)	Change in OOI (=ln(OOI_t/OOI_{t-1}))
Δln(SALES)	Change in sales (=ln($Sales_t/Sales_{t-1}$))
GDP_{GROWTH}	Change in $GDP_{c,t}$ (%)
AGEYRS	Age, in years, of company *c*.
TAXDEC	Magnitude of cut in percent if year before national tax rate cut and 0 for other years
TAXDEC_POST	Magnitude of cut in percent if year after national tax rate curt and 0 for other years
DEC	1 if sales decrease and 0 otherwise
SUCDEC	1 if sales decrease for two consecutive years and 0 otherwise
TAX_COMPLIANCE	Tax compliance measure (0 to 6) from La Porta et al. (1999)
GOVERN_EFECTIV	Government Effectiveness measure (-2.5 to 2.5) from World Bank Databank
LISTED	1 if company is listed on a Stock Exchange and 0 otherwise

The estimation method applied is ordinary least squares (OLS). Also, some control variables are added, namely GDP_{GROWTH}, *AGEYRS* and *SUCDEC*.

Note that the use of log-linear models represents several advantages over linear models, not only since log variables are more comparable across firms, but they also moderate heteroskedasticity problem, improving estimations efficiency. In addition, they provide a clearer interpretation, as a 1% change in the explanatory variables symbolizes a *x* percentage point variation in the dependent variable.

It is important to highlight that several experiments were performed in EViews to determine possible problems associated with heteroscedasticity and autocorrelation in the use of dynamic effects. The more robust model appeared to be the one where it was inserted fixed effects for both year and company. For that reason, it was the model chosen to perform the tests.

On the other hand, looking to support the study's main results, a robustness test is performed, as presented in Section 4.4.

4. EMPIRICAL RESULTS

This section presents the empirical results obtained by the estimation of Model 1 and Model 2, as well as additional regressions. Quantity and quality analysis are performed to evaluate the truthfulness around the hypotheses developed in previous sections.

Section 4 is organized as follow: Section 4.1 presents a sanity test to evaluate cost stickiness persistence in the selected sample; Section 4.2 introduces some relevant descriptive statistics of the main variables, as well as the correlation between those variables; Section 4.3 describes the multivariable analysis performed and the assessment of the theorical core of the study; and Section 4.4 introduces an additional test to infer the robustness of the results.

4.1. Sanity Test

Before presenting the univariate results, as this study is heavily relying on the foundation that there is a sticky cost behaviour upon the category of costs chosen to conduct the study, it was performed a sanity test, with simpler regressions. As it undoubtedly does not allow to catch the full dimension of the phenomenon, it does allow to speedily evaluate on whether cost stickiness is present or not in the sample used.

To conduct these sanity checks, the following regressions are used:

$$\Delta ln(OOE)_{c,f,y} = \beta_0 + \beta_1 \Delta \ln (SALES_{c,f,t}) + \beta_2 DEC_{c,f,t} * \Delta \ln (SALES_{c,f,t})$$

$$\Delta ln(OOI)_{c,f,y} = \beta_0 + \beta_1 \Delta \ln (SALES_{c,f,t}) + \beta_2 DEC_{c,f,t} * \Delta \ln (SALES_{c,f,t})$$

Coefficient β_1 captures the percentage of costs' increase for a 1% increase in sales, whereas coefficient β_2 translates the cost stickiness persistence. In result, $\beta_1 > 0$ and $\beta_2 < 0$ are expected, as costs should have a positive relationship with sales changes, but less pronounced when facing a decrease on sales.

The results obtained are provided in Table 2.

Table 2 - Sanity Test Results

Coefficient	Expected Sign	Column (1)	Column (2)
β_0		0.025 (6.30) ***	0.023 (39.60) ***
β_1	+	0.347 (22.86) ***	0.452 (222.37) ***
β_2	-	-0.101 (-3,66) ***	-0,153 (-41.06) ***
Cross-section fixed effects		Yes	Yes
Temporal fixed effects		Yes	Yes
R-squared		0,138	0,269
# of observations		18,899	489,908

Column (1) presents the output considering $\Delta\ln(OOE)$ *as the dependent variable. Column (2) presents the output considering* $\Delta\ln(OOI)$ *as the dependent variable.*

*Coefficient values are listed on the first row and t-statistics are in parentheses. The symbol * demonstrates that the variable is significant at 10% level, whereas the symbols ** and *** represent that the variable is significant at 5% level and 1% level, respectively.*

Observing Column (1), the results indicate that costs increase with about 0,35% for a 1% sales increase during the year and decrease 0,10% slower when sales decrease 10%, implying cost stickiness overall.

Column (2) presents equivalent results, where costs increase just over 0.45% for a 1% sales boost but only drop about 0,30% (0,15% slower) for a 1% sales reduction, also sustaining the cost stickiness perseverance.

4.2. Univariate Analysis

Towards the study of the main aspects of the sample, Table 3 presents some high-level summary statistics, divided in Panel A and Panel B, recognizing respectively the measures from key variables and from control and factor variables. On its turn, Table 4 presents Pearson's and Kendall-Tau's correlations coefficients between the dependent variable and the independent variables.

Table 3 – Summary Statistics

Table 3 Panel A: Key variables

Country	# of Obs.	% of Obs.	Average Δln(OOE)	Average Δln(OOI)	Average Δln(SALES)	Average tax rate	# of tax cuts	Average tax cut
Austria	14,367	2.14%	0.073	0.140	0.042	25.00	0	
Belgium	53,122	7.93%	n.a.	0.043	0.037	32.88	1	-5.00 p.p.
Estonia	7,271	1.09%	0.071	0.072	0.085	20.44	1	-1.00 p.p.
Finland	755	0.11%	0.014	0.053	0.062	21.38	2	-3.00 p.p.
France	174,765	26.09%	-0.026	0.055	0.053	33.03	3	-0.79 p.p
Germany	25,652	3.83%	0.024	0.030	0.034	29.69	0	
Iceland	651	0.10%	0.093	0.058	0.068	20.00	0	
Italy	224,108	33.45%	n.a.	0.059	0.059	28.91	1	-7.40 p.p.
Netherlands	2,145	0.32%	0.030	0.071	0.038	25.00	0	
Poland	156	0.02%	0.126	0.145	0.096	19.00	0	
Portugal	34,801	5.19%	n.a.	0.057	0.066	22.54	2	-2.00 p.p.
Spain	117,142	17.49%	n.a.	0.081	0.069	27.55	2	-2.50 p.p.
Sweden	8,999	1.34%	0.014	0.015	0.013	22.45	2	-2.45 p.p.
Total	**669,936**	**100%**	**0.047**	**0.057**	**0.056**	**29.47**	**14**	**-2.55 p.p.**

Table 3 presents summary descriptive statistics on the key variables and tax rates for the sample. Sample averages are for all variables except for GDP Growth, Tax Compliance, Government Effectiveness and tax rate, that present country averages.

From the analysis of Table 3 Panel A, it is seen that the number of observations is substantially different per country, where Italy, France and Spain represent a total of 77.03% of the sample. On the other direction, Finland, Iceland and Poland have less than 1,000 observations, incorporating a total percentage of only 0.23%.

Having a closer look to the costs' variables, as predicted, *other operating items* represent a higher average on the logarithmic first difference (*i.e.*, approximate growth rate) than *other operating expenses*, ever since it embraces a more extensive category of costs. Δ*ln(SALES)* presents a similar variation to both variables. However, as perceived in Table 4, *other operating expenses* has a smaller correlation to sales variation, implying superior cost stickiness.

Looking to the corporate tax rate evolution, France has the highest number of individual tax reductions, reducing the tax rate from 33.33% to 31.00% in three steps during the analysis period. Several countries have also implemented tax reforms on a stepwise approach. However, the highest average cuts were performed in one sitting, namely from Belgium (-5.00 percentual points in 2017) and Italy (-7.40 percentual points in 2018).

Table 3 Panel B: Control and FACTOR variables

Country	# of Obs.	% of Obs.	Average GDP Growth	Average Companies Age	Tax Compliance	Government Effectiveness	# of public companies
Austria	14,367	2.14%	1.521	39.64	3.60	1.53	27
Belgium	53,122	7.93%	1.438	36.07	2.27	1.38	27
Estonia	7,271	1.09%	3.855	24.20		1.07	
Finland	755	0.11%	0.937	25.57	3.53	2.00	
France	174,765	26.09%	1.316	33.36	3.86	1.41	195
Germany	25,652	3.83%	1.683	35.82	3.41	1.65	192
Iceland	651	0.10%	3.460	27.55	2.62	1.49	
Italy	224,108	33.45%	0.109	31.10	1.77	0.44	24
Netherlands	2,145	0.32%	1.375	39.50	3.40	1.82	
Poland	156	0.02%	3.580	116.00	2.19	0.70	156
Portugal	34,801	5.19%	0.745	32.58	2.18	1.15	9
Spain	117,142	17.49%	1.164	30.19	1.91	1.09	
Sweden	8,999	1.34%	1.197	43.47	3.39	1.84	7
Total	**663,934**	**100%**	**0.919**	**32.41**	**2.55**	**1.03**	**637**

Table 3 presents summary descriptive statistics on the key variables and tax rates for the sample. Sample averages are for all variables except for GDP Growth, Tax Compliance, Government Effectiveness and tax rate, that present country averages.

As seen in Table 3 Panel B, in the period of 2011-2019, the global economic has evolved positively, as perceived in the average GDP growth of 0.92% for the countries in the sample.

Looking to the other country-level variables, France and Austria are on the higher tail in the tax compliance indicator of the sample scope (3.86 and 3.60, respectively), where Spain and Italy have the lowest values (below 2 on a scale from 0 to 6). Finland, Sweden and the Netherlands present a high level of government effectiveness (both over 1.80), unlike Italy and Poland, where the variable is smaller than 1 (within the range of -2.5 to 2.5).

Table 4 – Variable Correlation

	Δln (OOE)	Δln (OOI)	Δln (SALES)	GDP GROWTH	AGEYRS	TAX_ COMPL	GOVERN EFECTIV	LISTED
Δln(OOE)	1							
Δln(OOI)	0.836	1						
Δln(SALES)	0.243	0.199	1					
GDP$_{GROWTH}$	0.043	0.035	0.058	1				
AGEYRS	-0.010	-0.006	-0.021	-0.003	1			
TAX_ COMPL	-0.039	-0.019	-0.038	-0.340	-0.012	1		
GOVERN_ EFECTIV	-0.045	-0.033	-0.048	-0.170	-0.208	0.656	1	
LISTED	0.004	0.005	0.010	-0.020	0.252	0.097	-0.233	1

The values presented are obtained through Pearson's correlation, with the exception for the last line, where it is applied the Kendall's Tau correlation, since it represents a truer relationship in the interactions with the dummy variable LISTED.

The most relevant results resulting from the analysis of Table 4 are: *(i)* the high and positive correlation between the costs' variables, which implies that both can capture the same effect, being both variables virtuous approximations of the SG&A costs, *(ii)* the positive yet small correlation between the costs' variables and sales, which implies cost stickiness, and *(iii)* the high and positive correlation between government effectiveness and tax compliance, which suggests that countries with a stronger perception of its government authority have a higher tax compliant behaviour of the taxpayers.

4.3. Econometric Analysis

Models 1 and 2 were estimated using OLS method with fixed effects (cross-section and period), as the use of fixed effects diminishes the potential sources of biases in the estimations, such as the non-consideration of an important yet omitted variable. Table 5 provides the main results.

Table 5 - Multivariate regression analyses of the relationship between corporate tax reductions and cost stickiness

Δln(OOE) /Δln(OOI)	**Coefficient**	**Expected Sign**	**Column (1)**	**Column (2)**
Δln(SALES)	β_1	+	0.400 *** (7.000)	0.502 *** (119.781)
Δln(SALES)*TAXDEC	$\boldsymbol{\alpha_1}$	**+**	**3.499 *** (1.207)**	**0.535 *** (17.320)**
Δln(SALES)*AGEYRS	Φ_1	-	0.002 ** (2.501)	-0.001 *** (-7.279)
Δln(SALES)*GDP_{GROWTH}	Φ_2	-	-0.016 (-1.172)	0.005 *** (4.337)
DEC*Δln(SALES)	β_2	-	-0.670 *** (-6.462)	-0.286 *** (-31.950)
DEC*Δln(SALES)*TAXDEC	$\boldsymbol{\alpha_2}$	**-**	**-6.088 *** (-2.997)**	**-0.010 (-0.209)**
DEC*Δln(SALES)*AGEYRS	Φ_3	-	-0.000 (-0.227)	0.003 *** (12.110)
DEC*Δln(SALES)*GDP_{GROWTH}	Φ_4	+	0.100 *** (3.722)	0.001 (0.416)
DEC*Δln(SALES)*SUCDEC	Φ_5	+	0.373 *** (6.349)	0.074 *** (12.902)
INTERCEPT	β_0		0.008 (1.459)	0.024 (36.782)
Cross-section fixed effects			Yes	Yes
Temporal fixed effects			Yes	Yes
R-squared			0.175	0.301
# of observations			10,670	396,151

*Coefficient values are listed on the first row and t-statistics are in parentheses. The symbol * demonstrates that the variable is significant at 10% level, whereas the symbols ** and *** represent that the variable is significant at 5% level and 1% level, respectively.*

The results in each model using *other operating expenses* or *other operating items* do not differ significantly. However, looking at the R-squared on Model 1 and Model 2, *other operating items* presents a clearly higher value, where over 30% of the dependent variable is explained with the model in hands (versus 17,5% using *other operating expenses*). Nevertheless, as the R-squared cannot be used to determine whether the coefficient estimates are biased, neither does it indicate if a regression model provides an adequate fit to the data used, it does not imply significant information to this research.

In what concerns the regressions *per se,* and looking at the control variables' coefficients, the interactions $\Delta ln(SALES)*AGEYRS$ and $\Delta ln(SALES)*GDP_{GROWTH}$ present differ signs respecting Column (1) and Column (2). However, in both regressions, the coefficients present reduced values. On its hand, the interaction $DEC*\Delta ln(SALES)*SUCDEC$ has the expected sign in both regressions.

Focusing on Column (1), coefficient β_1 provides evidence that, during the years that do not proceed a corporate tax rate cut, costs increase about 0.4% for a 1% sales increase. Moreover, β_2 presents a negative and significant value a 1% level, hence inferring the presence of cost stickiness when sales decline.

Finally, observing the main coefficients of interest, α_1 provides a positive and significant value, indicating that costs increase 3.5 percentage points faster when sales grow by 1%, as α_2 demonstrates that costs decrease 6.1 percentage points slower when sales decline.

Combining the results abovementioned, it is possible to observe that predicted cost stickiness in a regular year is -0.67 (β_2). With the inclusion of the tax-motivation in Earnings Management, cost stickiness arises to a total of -3,43 ($\beta_2 + \alpha_1 + \alpha_2$), supporting H1 - companies exhibit a higher degree of cost stickiness in the year preceding a tax reduction.

Note that, in what regards Column (2), this relationship does not appear to be stronger in a year before a tax reduction, as, in module, α_2 is smaller than α_1 (representing simultaneous a not significant value). However, as early proclaimed, *other operating items* is a more embracing category of costs, in which it was already predicted it would not capture the persistence of the phenomenon in the same extension as *other operating expenses*. Nevertheless, as both coefficients have the expected sign, it does imply income-decreasing behaviour before a tax rate cut, supporting the tax-induced Earnings Management.

From the evaluation of the three factors by which this behaviour is expected to be moderated, namely tax compliance, government effectiveness and quoted status, Table 6 presents the results from the regressions carried out. It is important to highlight that, as *other operating items* incorporates a clearly wider sample, and since it is also the objective of this study to evaluate the perseverance of the phenomenon across companies, only the regression considering this category of costs in the dependent variable was performed.

Table 6 - Multivariate regression analyses on the effect of mitigating factors on the relationship between corporate tax reductions and cost stickiness

Δln(OOI)	**Coefficient**	**Expected Sign**	**FACTOR = TAX_COMPLIANCE**	**FACTOR = GOVERN_EFECTIV**	**FACTOR = LISTED**
Δln(SALES)	β_1	+	0.288 *** (36.873)	0.380 *** (61.000)	0.504 *** (118.631)
Δln(SALES)*TAXDEC	α_1	+	1.094 *** (7.238)	0.467 *** (5.937)	0.536 *** (17.359)
Δln(SALES)*AGEYRS	Φ_1	-	-0.001 *** (-7.580)	-0.001 *** (-7.709)	-0.001 *** (-7.646)
Δln(SALES)*GDP_{GROWTH}	Φ_2	-	-0.010 *** (-7.580)	-0.014 *** (-9.422)	0.005 *** (4.433)
DEC*Δln(SALES)	β_2	-	-0.256 *** (-17.067)	-0.257 *** (-21.477)	-0.309 *** (-33.757)
DEC*Δln(SALES)*TAXDEC	α_2	-	-0.993 *** (-4.000)	-0.136 (-1.041)	-0.012 (-0.241)
DEC*Δln(SALES)*AGEYRS	Φ_3	-	0.003 *** (10.199)	0.003 *** (10.538)	0.004 *** (14.938)
DEC*Δln(SALES)*GDP_{GROWTH}	Φ_4	+	-0.002 (-0.697)	-0.010 *** (-2.917)	0.002 (0.768)
DEC*Δln(SALES)*SUCDEC	Φ_5	+	0.067 *** (11.692)	0.068 *** (11.748)	0.070 *** (12.214)
Δln(SALES)*FACTOR	α_3	-	0.084 *** (32.734)	0.134 *** (25.666)	0.049 (0.3083)
Δln(SALES)*TAXDEC*FACTOR	α_4	-	-0.455 *** (-5.835)	-0.258 ** (-2.303)	0.529 (0.298)
DEC*Δln(SALES)*FACTOR	α_5	-	0.004 (0.832)	0.012 (1.242)	-0.611 *** (-7.945)
DEC*Δln(SALES)*TAXDEC*FACTOR	α_6	**+**	**0.519 *** (4.009)**	**0.121 (0.627)**	**6.759 *** (2.976)**
INTERCEPT	β_0		0.025 (38.019)	0.025 (38.254)	0.024 (37.006)
Cross-section fixed effects			Yes	Yes	Yes
Temporal fixed effects			Yes	Yes	Yes
R-squared			0.312	0.305	0.302
# of observations			390,734	396,151	396,151

*Coefficient values are listed on the first row and t-statistics are in parentheses. The symbol * demonstrates that the variable is significant at 10% level, whereas the symbols ** and *** represent that the variable is significant at 5% level and 1% level, respectively.*

The first factor under analysis relies on the tax compliance measure from La Porta et al. (1999), that varies from 0 to 6, where a country with a higher number has, on average, a higher predisposition of its taxpayers to comply with tax legislation and regulations. As the three-way interaction coefficient (α_4) has a negative and statistically significant value and, simultaneously, the four-way interaction coefficient (α_6) has a positive and statistically significant value, these results suggest that cost stickiness before a tax rate cut is decreasing with greater values of tax compliance, hence supporting H2a. This is easily perceived when comparing both coefficients with α_1 and α_2, respectively, where the opposite effect justifies the moderating effect of this factor.

In what regards the government effectiveness indicator from the World Bank Databank, where the lower and higher tails are, in turn, -2.5 and 2.5, a higher value represents a higher governance performance. Even though α_4 is once more negative and significant at a 1% level, α_6 is not statistically significant. However, as it represents the expected sign, it symbolizes the strong belief that government effectiveness can also moderate the effect of the cost stickiness perseverance, in which it is possible to proclaim that, in general, the regression provides evidence consistent with H2b.

Finally, it was examined the difference in cost behaviour between public companies and private companies, using a dummy variable coded 1 when the company is listed in any stock market, and 0, otherwise. As the three-way interaction coefficient does not provide a statistically significant value, α_5 shows that, in regular years, public companies exhibit a higher degree of cost stickiness than private companies. In addition, before tax rate cuts, public companies do show signs of a significant smaller negative effect on earnings when compared to private companies (as provided by the positive and statistically significant value of α_6), endorsing H2c.

4.4. Robustness test

Looking to ensure the robustness of the results obtained, the research is extended to the period after the corporate tax rate cut. Considering that it rises from the original hypothesis that companies increase period costs before a tax rate cut, it is only natural that these costs revert to a normal level when the tax reform becomes effective.

On other words, as a higher perseverance of the phenomenon was expected and verified in the period before a tax rate cut, it is expected a decrease upon the sticky cost level immediately after the tax reform. In order to validate this assumption, the magnitude of the cut, in percent, was measured in the year *after* the corporate national tax rate cut (introduction of the variable *TAXDEC_POST*). Table 7 provides this additional test results.

Table 7 - Multivariate regression analyses of the relationship between the year after corporate tax reductions and cost stickiness

Δln(OOE) /Δln(OOI)	**Coefficient**	**Expected Sign**	**Column (1)**	**Column (2)**
Δln(SALES)	β_1	+	0.255 *** (4.538)	0.476 *** (99.322)
Δln(SALES)*TAXDEC_POST	α_1	**-**	**-3.224 *** (-5.858)**	**0.385 *** (12.251)**
Δln(SALES)*AGEYRS	Φ_1	-	0.001 *** (2.588)	-0.001 *** (-5.290)
Δln(SALES)*GDP_{GROWTH}	Φ_2	-	0.004 (0.267)	-0.006 *** (-2.989)
DEC*Δln(SALES)	β_2	-	-0.213 ** (-2.225)	-0.253 *** (-29.320)
DEC*Δln(SALES)*TAXDEC_POST	α_2	**+**	**6.004 *** (7.953)**	**0.157 *** (3.236)**
DEC*Δln(SALES)*AGEYRS	Φ_3	-	-0.002 (-1.601)	0.003 *** (12.806)
DEC*Δln(SALES)*GDP_{GROWTH}	Φ_4	+	0.007 (0.267)	0.002 (0.621)
DEC*Δln(SALES)*SUCDEC	Φ_5	+	0.377 *** (7.928)	0.058 *** (12.108)
INTERCEPT	β_0		0.009 (1.854)	0.021 (35.280)
Cross-section fixed effects			Yes	Yes
Temporal fixed effects			Yes	Yes
R-squared			0.153	0.272
# of observations			11,635	422,287

*Coefficient values are listed on the first row and t-statistics are in parentheses. The symbol * demonstrates that the variable is significant at 10% level, whereas the symbols ** and *** represent that the variable is significant at 5% level and 1% level, respectively.*

Firstly, analysing Column (1) main coefficients, α_1 describes a negative and statistically significant value, as α_2 shows a positive and statistically significant value. From the comparison of this results to the ones presented in the Column (1) from Table 5, and as expected, α_1 and α_2 present opposing coefficients, hence demonstrating the reverse effect predicted.

As it could initially be proclaimed that cost stickiness before a corporate tax rate cut could arise from structural managerial decisions, rather than to manage earnings in the short-term, the joint analysis from Table 5 and Table 7 show clear evidence of the reversal process, sustaining the tax-induced Earnings Management in the year before the tax reform.

Finally, the results presented in Column (2) do not allow to extrapolate the same conclusions at first, as α_1 does not present the negative value initially expected. However, not only recognising the limitations aforementioned on the use of *other operating items* to infer H1, but also noticing that α_1 decreases and that α_2 shows the expected positive and statistically significant value, it is possible to affirm with a high likelihood that Earnings Management strategies are implemented before a corporate tax rate cut.

5. CONCLUSION

The new theory of cost stickiness predicts that some costs arise from the deliberate managerial decisions, hence demonstrating that the traditional theory of costs does not cover the full dimension of cost behaviour. As a future corporate tax rate cut encourages managers to reduce results in the ongoing period, incurring in more costs in the current fiscal year, this conduct increases cost stickiness perseverance. Bearing this in mind, this study examined the cost behaviour upon OECD European countries before tax reductions, where a higher level of cost stickiness allows to infer tax-induced Earnings Management.

The sample includes 663,934 observations for 76,794 active firms with unconsolidated financial data for the period of 2011-2019. This firms are established in 13 OECD European countries (namely, Austria, Belgium, Estonia, Finland, France, Germany, Iceland, Italy, the Netherlands, Poland, Portugal, Spain and Sweden). The estimations are performed with the use of a panel data structured with fixed effects.

The results obtained are robust and support this prediction, where it was possible to show the income-decreasing cost behaviour before corporate tax rate cuts, engendered by cost allocation decisions performed by managers to capitalise on results.

Moreover, this study extends the analysis to the moderating effects on the degree of tax-induced Earnings Management, namely tax compliance, government effectiveness and quoted status.

Countries with higher levels of tax compliance and government effectiveness present less significant levels of cost stickiness, where the income-increasing motivations seem to overshadow the benefit of paying less taxes. Additionally, taxpayers in these environments are usually more predisposed to respect tax laws and regulations, in which statutory enforcement power is normally more perceived and efficient in diminishing tax evasion.

On the other direction, private companies exhibit higher levels of cost stickiness than public companies, *i.e.*, higher levels of Earnings Management in the presence of a tax-motivation. Managers of these companies have a more reduced number of stakeholders to whom to report when compared to managers of publicly available companies. In addition, financial statements in these entities are commonly more restricted to the general financial information users, incentivizing Earnings Management policies.

The acknowledge of the deliberate resources' commitment decisions made my managers can have a serious impact on a variety of stakeholders, from auditors, creditors and tax authorities to the shareholders and other users of the financial information. The traditional theory of cost behaviour would not only overestimate the responsiveness of costs to activity's decreases but would also overestimate its responsiveness to activity's increases, which could generate inefficiencies in the policies from both internal and external stakeholders. In this matter, cost accounting is revealing itself as an important branch of management accounting, as guaranteeing high-quality gathering of quantitative cost information provides the basis to an efficient interpretation of accounting information that can be used to help managers make informed operational decisions.

It must be recognised that the study is subject to a number of limitations. First, the use of approximations to the *Selling, General and Administrative costs* (SG&A costs) of the companies does not allow to fully evaluate the impacts on this category of costs, where higher cost stickiness was predicted. Additionally, a reduced number of countries was available to perform a global study of the moderating effects. As it allowed to guarantee a common background to have a better control from possible other factors that could bias the results, a within country analysis upon future research would fortify this study results. Other limitation regards the reduced number of publicly available companies, where it was not possible to establish a perfectly homogeneous sample to study the quoted status impact. However, it was a limitation early recognised and accepted, as the use of private company data is an innovative and important feature in the study of the phenomenon of cost stickiness.

Future research in cost stickiness may encourage other issues, namely measuring its perseverance upon different economic activities (*e.g.*, using NACE Rev. 3 activity codes to divide the sample) or with the use of a worldwide approach, confronting larger and smaller economies with several different country characteristics that could enrich this topic. Furthermore, expanding the recognition on how the different category of costs present sticky behaviour upon different scenarios may represent an important development to the existing literature. Finally, the last suggestion regards the identification of different motivations that justify higher degrees of the phenomenon (for instance, identifying the role of agency problem in the amplification of cost stickiness persistence).

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