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Abstract

In this study, we investigate cost behavior of companies in Organisation for Economic Co-operation and Development (OECD) member countries before corporate tax rate cuts become effective. We consider such events to generate strong incentives for intertemporal cost shifting. We analyze the time period between 2011 and 2016, which includes 32 tax reductions. The results show that companies exhibit income-decreasing selling, general, and administrative cost behavior before tax rate cuts, and that the extent is proportional to the magnitude of the decrease in the tax rate. Furthermore, we find stronger evidence of this form of tax-induced earnings management in low tax compliance and code law countries, as well as for private companies.

Key words: cost behavior, earnings management, tax incentive, tax reform

1 Introduction

Following Anderson et al. (2003), a growing stream of accounting research examines cost behavior and the phenomenon of sticky costs. Cost stickiness arises when costs respond less to business activity decreases than to corresponding activity increases. As such, evidence of cost stickiness is inconsistent with the traditional cost model that assumes a mechanical and symmetric relation between activity and cost changes. Anderson et al. (2003) argue that adjustment costs play a central role in understanding cost behavior and that sticky costs arise because managers hesitate to cut slack resources when sales drops are expected to be temporary. Furthermore, Kama and Weiss (2013) provide evidence specific for the United States (US) that managers facing income-increasing earnings management incentives expedite downward adjustment of slack resources for sales decreases. Similarly, Dierynck et al. (2012) show that Belgian private companies meeting or beating the zero earnings benchmark have more symmetrical labor cost behavior than other private companies. In the current study, we build on this research and examine the cost behavior of companies in the Organisation for Economic Cooperation and Development (OECD) member countries when there is a strong earnings management incentive to decrease taxable income, and consequently, earnings.

From 2011 to 2016, the OECD countries introduced more than 30 corporate tax rate cuts, which reduced the average corporate tax rate from 25.4% to 24.4%. In response to these events, we expect companies to shift income from higher tax rate periods to periods with lower tax rates. Previous studies provide evidence that companies shift income around tax rate changes through accruals (Guenther, 1994; Maydew, 1997; Lopez et al., 1998; Roubi and Richardson, 1998), accelerated expense recognition and capitalization avoidance (Höglund and Sundvik, 2019), extensions of the fiscal year (Sundvik, 2017a), and real earnings management (Zeng, 2014). We extend this stream of previous research by examining the cost behavior of companies experiencing a tax reduction. Based on the intertemporal income shifting incentive, we expect companies to incur more costs in fiscal years before a tax rate cut. Facing this incentive, companies are likely to decelerate cuts of slack resources in response to a sales drop even if they expect the drop to last longer. These decelerated cuts of slack resources result in greater cost stickiness in the presence of tax incentives than in the absence of such incentives. Alternatively, companies may also shift period costs, such as selling, general, and administrative costs (SG&A), from low tax years to high tax years. This cost behavior increases the degree of cost stickiness before a tax reduction. In general, considering the intensified incentive to decrease tax expenses in years before national tax reductions, we expect more cost stickiness as a sign of tax-induced earnings management during these years.

Using a sample of 32 tax reductions in 33 OECD countries, our empirical findings are consistent with the prediction. Furthermore, our findings indicate that earnings management and cost stickiness in response to tax reductions is moderated internationally in environments characterized by high tax

compliance and common law. When comparing publicly listed companies and private companies, we find that stock market pressure is associated with less income-decreasing cost behavior.

Our paper provides important contributions to two important literature streams. First, while most studies on cost behavior examine isolated domestic settings, we contribute with an international cross-country examination of cost stickiness similar to that of Banker et al. (2013) by incorporating taxation as an important determinant of cost behavior. Furthermore, previous research investigating the influence of managerial incentives on cost behavior has primarily observed income-increasing incentive settings, such as to beat or meet earnings benchmarks. We contribute by highlighting that managerial income-decreasing incentives also influence cost behavior. Second, we contribute to the intertemporal income shifting literature on different responses to tax reductions by highlighting how companies react by adjusting costs. Thus, we extend prior studies that mainly focus on the use of accounting accruals. An advantage of analyzing cost stickiness is that we are able to observe a prompter reversal process, which suggests that our findings stem from earnings management. Our study is timely since there have been many significant corporate tax reductions in recent years, and others are currently under development or upcoming in future years worldwide.

2 Prior literature and hypotheses development

According to the definition of Anderson et al. (2003), costs are sticky when costs respond less to business activity decreases than to business activity increases. Anderson et al. (2003) argue that deliberate resource commitment decisions made by managers facing adjustment costs are the main reason for cost stickiness. For example, when managers expect activity decreases to be temporary, they retain some slack resources because the associated adjustment costs of cutting resources are too high. With a sample of industrial companies, Anderson et al. (2003) demonstrate that SG&A costs increase on average 0.55% per 1% increase in sales, but decrease only 0.35% per 1% decrease in sales. While this contradicts the traditional model of fixed and variable costs that envisions a mechanistic symmetric relationship between sales and concurrent costs, accounting research demonstrates that cost stickiness is pervasive across different companies and countries (e.g. Banker and Chen, 2006; Dierynck et al., 2012; Kama and Weiss, 2013).

Understanding how incentives shape cost behavior is of primary interest to accounting researchers. The recent stream of research documenting asymmetric cost behavior or cost stickiness illuminates this notion. For instance, Chen et al. (2012) find a positive association between SG&A cost stickiness and the incentive for managerial empire building. The authors also find that strong corporate governance can mitigate this association. Kama and Weiss (2013) document that managers facing incentives to avoid losses or earnings decreases expedite downward adjustment of slack resources for sales decreases. In other words,

they find that these earnings management decisions lessen the degree of cost stickiness. For Belgian private companies, Dierynck et al. (2012) provide evidence that executives' incentive to conduct earnings management affects labor cost stickiness. The authors find that to meet the goal of profit and to be able to pay dividends, management tends to manipulate labor costs and simultaneously decrease cost stickiness. Our study extends this line of research by examining the influence of a specific tax incentive to decrease earnings on cost stickiness.

During the past decade, several countries around the world made reductions in their corporate tax rates in order to boost business activity and increase tax attractiveness. In a German setting, Dobbins and Jacob (2016) show that these changes actually can increase corporate investment in domestic companies. Hemmelgarn and Teichmann (2014) provide international evidence that corporate tax rate cuts influence banks in terms of leverage and dividend policies, as well as earnings management. We build on these studies and focus specifically on earnings management responses to tax reductions in an international setting, similar to Sundvik (2017b).

Between the years 2011 and 2016, the OECD countries introduced many tax rate cuts, reducing the OECD average corporate tax rate from 25.4% to 24.4%. While there is a general incentive for companies to manage their earnings downwards to decrease their taxable earnings and tax expenses (Coppens and Peek, 2005), we expect that reductions in corporate tax rates create an even stronger incentive to decrease earnings. Namely, companies should prefer to move their earnings from higher tax rate periods to periods with lower tax rates because such actions will decrease total tax payments. Earlier research provides evidence that companies shift earnings around tax rate changes by utilizing accruals (Guenther, 1994; Maydew, 1997; Lopez et al., 1998; Roubi and Richardson, 1998), accelerating expense recognition and capitalization avoidance (Höglund and Sundvik, 2019), extending the fiscal year (Sundvik, 2017a), and using real earnings management (Zeng, 2014). Considering the strong incentive to decrease tax expenses by engaging in tax-induced earnings management, we expect that companies show income-decreasing cost behavior before a tax rate cut. Thus, we formulate the first hypothesis as follows:

H1: Cost stickiness is more pervasive in the year before a tax rate cut than in other years.

As a next step, we consider the findings of prior cross-country studies that tax avoidance and cost stickiness varies significantly across national borders (Atwood et al., 2012; Banker et al., 2013; Calleja et al., 2006) to formulate a set of second hypotheses. Specifically, we consider three factors that potentially mitigate the tax incentive effect on cost stickiness. First, we reason that the level of tax compliance in a country is one factor that affects the engagement in tax-induced earnings management, and consequently cost stickiness before a tax rate cut. On a general level, Riahi-Belkaoui (2004) finds that tax compliance is positively associated with economic freedom, important equity markets, effective competition laws, and

high moral norms. With respect to earnings management, Haw et al. (2004) highlight that higher tax compliance in a country has a great impact on reducing earnings management. In the context of our study, if companies overall execute earnings management through income-decreasing cost behavior before a tax rate cut, we expect the level to be lower in countries with higher tax compliance.

H2a: Cost stickiness before tax rate cuts is less pervasive in higher tax compliance countries than in lower tax compliance countries.

Second, we follow the finding of Calleja et al. (2006) that one major explanation for the cross-country differences in cost stickiness is the differences in legal systems. In a similar vein, Banker and Chen (2006) provide evidence of a lower level of stickiness for companies in code law countries than for companies in common law countries. At the same time, Leuz et al. (2003) find less earnings management in common law countries than in code law countries. Common law countries, such as the US, are commonly characterized as having well-developed capital markets and strong investor protection. Consequently, we argue that common law countries have less cost stickiness arising from tax-induced earnings management before a tax reduction. Thus, we formulate the following hypothesis:

H2b: Cost stickiness before tax rate cuts is less pervasive in common law countries than in code law countries.

Third, we explore the possible differences in the pre-tax rate change cost behavior between publicly listed and private companies. Private companies report mainly for taxation, dividend, and compensation purposes, whereas public companies report for a broader audience (Ball and Shivakumar, 2005). Overall, capital market forces create incentives for public companies to provide information that is useful for outsiders in assessing the economic performance (Burgstahler et al., 2006). In line with this, prior research suggests that private companies report with lower quality and manage earnings to a larger extent than public companies (Beatty and Harris, 1998; Coppens and Peek, 2005; Burgstahler et al., 2006; Hope et al., 2013). There is also evidence of a difference between private and public company engagement in real earnings management (Haga et al., 2018). Specifically regarding earnings management in response to tax reductions, Watrin et al. (2012) and Lin et al. (2014) show that private companies manage earnings more than public companies. Based on these findings, we expect that compared to public companies, private companies show a more income-decreasing cost behavior before a decrease in the tax rate. Our final hypothesis is as follows:

H2c: Cost stickiness before tax rate cuts is less pervasive in publicly listed companies than in private companies.

3 Data and methodology

The data used includes company financial statements as well as corporate tax rate and gross domestic product (GDP) data for the OECD countries. The period of analysis is 2011 to 2016, during which we identify 32 corporate tax rate cuts with the help of the OECD tax database. Out of the current OECD countries, we do not include Latvia and the Slovak Republic in our sample due to data restrictions.

The final sample is composed of 69,876 company-year observations from 33 countries. The country with the highest number of observations (14,748) is Japan. Our study includes several countries with less than 100 company-year observations (Czech Republic, Estonia, Hungary, and Slovenia). The final sample is derived using the following formation process. First, we collect financial statement data of private as well as public companies from the Orbis database of Bureau van Dijk. We delete observations with incomplete data for the variables we use in our tests. We also delete small company observations because such companies could introduce bias to our results due to irregular reporting and extreme growth. In other words, we follow standard European Union definitions of small and medium-sized enterprises and delete companies with total assets below 43 million euro or sales below 50 million euro.

To analyze cost behavior, we apply multivariate linear regression models based on the baseline cost stickiness model of Anderson et al. (2003) and the extended cost stickiness model of Banker et al. (2013). All models examine the relation between changes in sales and changes in SG&A costs. First, we examine cost behavior before a tax rate cut with the following model:

$$\Delta\ln(SG\&A)_{n,i,t} = \beta_0 + \left(\beta_1 + \gamma_1 DTAXDEC_{n,t} + \lambda_1 ASINT_{n,i,t} + \lambda_2 \Delta GDP_{n,t}\right) \cdot \Delta\ln(SALES)_{n,i,t} + (\beta_2 + \gamma_2 DTAXDEC_{n,t} + \lambda_3 ASINT_{n,i,t} + \lambda_4 \Delta GDP_{n,t} + \lambda_5 SUCDEC_{n,i,t}) \cdot DEC_{n,i,t} \cdot \Delta\ln(SALES)_{n,i,t} \quad (1)$$

where the dependent variable Δln(SG&A) equals the natural logarithm of SG&A costs divided by lagged SG&A costs. DTAXDEC is an indicator variable coded 1 for the year before a national tax rate cut, 0 otherwise. ASINT is asset intensity (the natural logarithm of total assets to sales). ΔGDP is growth in GDP. Δln(SALES) equals the natural logarithm of sales divided by lagged sales. SUCDEC indicates if sales decreased in the preceding year. To account for asymmetric cost behavior, we interact the variables in the model with an indicator variable (DEC) equaling 1 if sales decrease and 0 if sales increase. In other words, coefficient β_1 shows the percentage change in costs for a 1% change in sales and coefficient β_2 the asymmetry in cost behavior. A negative coefficient for β_2 indicates that costs are sticky, that is, when sales decline costs decrease slower than they increase when sales grow. We propose that a decreasing corporate tax rate creates an incentive to reduce earnings in the year preceding the reduction in the tax rate. Lower

earnings can be achieved by increasing costs faster when sales grow and by postponing cost reductions as sales decline. We test the impact of an upcoming tax reduction on cost stickiness with the interaction between Δln(SALES), DEC, and DTAXDEC. A positive value for coefficient γ_1 or a negative value for coefficient γ_2 indicates income-decreasing cost behavior before a tax rate cut. In an alternative version of Equation (1), we replace DTAXDEC with TAXDEC, which is the magnitude of the national tax rate cut. We add control variables following Banker et al. (2013) as well as controls for country, year, and industry. Table 1 provides the main variable definitions.

[TABLE 1 HERE]

To examine the second set of hypotheses we consider three factors that might moderate the cost stickiness effects before a tax reduction. For this purpose, we use the following model that is an extension of Equation (1):

$$\Delta\ln(SG\&A)_{n,i,t} = \beta_0 + \left(\beta_1 + \gamma_1 DTAXDEC_{n,t} + \gamma_3 FACTOR_{n,i,t} + \gamma_4 DTAXDEC_{n,t} \cdot FACTOR_{n,i,t} + \lambda_1 ASINT_{n,i,t} + \lambda_2 \Delta GDP_{n,t}\right) \cdot \Delta\ln(SALES)_{n,i,t} + (\beta_2 + \gamma_2 DTAXDEC_{n,t} + \gamma_5 FACTOR_{n,i,t} + \gamma_6 DTAXDEC_{n,t} \cdot FACTOR_{n,i,t} + \lambda_3 ASINT_{n,i,t} + \lambda_4 \Delta GDP_{n,t} + \lambda_5 SUCDEC_{n,i,t}) \cdot DEC_{n,i,t} \Delta\ln(SALES)_{n,i,t} \quad (2)$$

where FACTOR equals one of three factors that we predict have an impact on cost behavior. Our coefficient of primary interest in this model is γ_6, which captures the effect of the respective factor on cost stickiness before a tax rate cut. To test H2a, the first factor we use is the national tax compliance measure (TAXCOMPL) of La Porta et al. (1999) as used in Haw et al. (2004), which is based on the assessment of the level of tax compliance or tax evasion in a country. TAXCOMPL is scaled from 0 to 6, where higher scores indicate higher compliance. To test H2b, the second factor we use is the common law country indicator variable (COMMON) from La Porta et al. (1998) as used in Leuz et al. (2003). Finally, we test for the impact of stock market listing status (H2c) by using a company-level indicator variable for whether a company is publicly traded on a stock exchange (LISTED).

4 Results

4.1 Descriptive statistics

Table 2 provides descriptive statistics per country for the variables used in the regression models. Averages vary widely in the sample. For example, the average GDP growth is 7.3% in Ireland compared to –4.4% in Greece. The average Δln(SALES) is negative in Greece, corresponding to the negative GDP development. On average, we observe an overall OECD tax rate decrease from 25.4% to 24.4%, with the

largest cuts at 4.88% and 4.5% occurring in Japan and Finland, respectively. The United Kingdom (UK) has the highest number of individual tax reduction events, since the country decreased the tax rate from 28% to 20% in five steps during our analysis period. Countries such as Denmark and Japan also reduced the tax rate with a stepwise approach. There are countries such as the US and Australia that have no events of interest in our sample.

With respect to the potentially mitigating factors and firstly tax compliance, Table 2 shows that Italy and Spain are on the lower end of the spectrum while New Zealand has the highest tax compliance of the OECD member countries. Furthermore, seven out of the 33 countries are common law countries. The percentage of public companies varies greatly in the sample. In some smaller countries, such as the Czech Republic and Estonia, no private companies with available data are large enough to be included in our analysis. On average, the percentage of public companies is 54.1%, which provides good variation for the purpose of our test of the impact of stock market listing status.

[TABLE 2 HERE]

4.2 Primary results

Table 3 reports the regression coefficients from Equation (1). Our control variables' coefficients have the expected signs (the interactions Δln(SALES)*ASINT, Δln(SALES)*ΔGDP, and Δln(SALES)*SUCDEC), consistent with prior studies (Anderson et al., 2003; Banker et al., 2013). We expect overall cost stickiness among the sample companies in regular years without specific incentives, and intensified cost stickiness before tax reductions because of tax-induced earnings management. During the years that do not precede tax rate cuts, the results indicate that costs increase with about 0.7% for each 1% increase in sales (coefficient β_1). The significant and negative β_2 coefficient indicates sticky cost behavior when sales decline. Before a tax reduction, we expect that costs increase faster with growing sales and decrease slower with declining sales. In Column (1) of Table 3, we find confirmation of this expectation since we observe a positive and significant coefficient γ_1 and a negative and significant coefficient γ_2. Before a tax rate cut, costs increase 0.13 percentage points faster when sales grow by 1% and decrease 0.20 percentage points slower when sales decline by 1%. With respect to cost stickiness, the predicted stickiness in a regular year is −0.104 (β_2). In comparison, the predicted cost stickiness is 66% higher when there is a tax reduction (($\beta_2 + \gamma_1 + \gamma_2$) = −0.173), since a more negative value indicates more sticky costs. We argue that the increase in cost stickiness mainly arises because companies shift costs from the year after the tax reduction to the year before. In Column (2), we replace the dichotomous variable with a continuous variable (TAXDEC) measuring the magnitude of the tax rate cut. The results are consistent with the results from Column (1) showing that for each percentage point reduction in the tax rate, costs increase by 0.022 percentage points faster when sales grow by 1% (coefficient γ_1) and decrease 0.044 percentage points slower

when sales decline by 1% (coefficient γ_2). In summary, Table 3 is supportive of H1, that companies exhibit a higher degree of cost stickiness before a tax reduction.

[TABLE 3 HERE]

4.3 Factors moderating cost behavior before tax rate cuts

In this section, we focus on three factors that we expect moderate the tax-induced earnings management we document in our main tests. Table 4 reports these results. First, we use tax compliance as the FACTOR variable in Equation (2). In Column (1) of Table 4, the three-way interaction coefficient γ_4 is negative and statistically significant simultaneously as the four-way interaction coefficient γ_6 is positive and statistically significant. This suggests that cost stickiness before a tax rate cut is decreasing with tax compliance. With other words, we observe less tax-induced earnings management in higher tax compliance countries. In Column (2) of Table 4, where we use the magnitude of the tax rate cut in the model, the four-way interaction again provides evidence that cost stickiness is less pervasive for higher tax compliance countries. These findings are consistent with H2a.

Second, we investigate whether the legal environment serves as a mitigating factor by using an indicator variable for common law countries as the FACTOR variable in Equation (2). Column (3) and (4) in Table 4 show strong indications that companies in common law countries engage in less tax-induced earnings management than code law countries. The four-way interaction of interest (coefficient γ_6) is positive and statistically significant. In years before tax reductions in common law countries, this coefficient indicates that costs decrease faster when sales drop than in code law countries. Furthermore, the three-way interaction (coefficient γ_4) is negative and statistically significant, which is a sign of slower cost increases when sales rise in common law countries. These results are fully consistent with our prediction in H2b.

Finally, we examine the difference in cost behavior between public and private companies by using an indicator variable for publicly listed companies as the FACTOR variable in the regression model. In regular years that do not precede tax rate cuts, public companies show slightly more cost stickiness than private companies in Column (5) of Table 4. However, the difference is insignificant (coefficient γ_5). Before tax rate cuts, on the other hand, public companies exhibit cost behavior that has a significantly smaller negative effect on earnings when compared to private companies (coefficient γ_6). Turning to Column (6) and the magnitude of the tax reduction, we continue to observe the expected sign on the coefficient of main interest. While we acknowledge that the latter result is insignificant, we conclude that the regressions in general provide evidence consistent with H2c. We also test the robustness of the moderating factors by including them all in one model. The (untabulated) findings show that the coefficients of interest for the

common law and the public company indicators remain significant, but that the effect from tax-compliance becomes insignificant.

[TABLE 4 HERE]

4.4 Robustness tests

To ensure the robustness of our results, we perform several additional checks. First, we shift our focus from the last year with the higher tax rate to the first year with the lowered tax rate. Considering our hypothesis that companies increase SG&A costs before a tax rate cut to generate tax savings, these costs should revert to a normal level when the new tax rate is effective. Hence, if increased cost stickiness before the reduction is a sign of tax-induced earnings management, we expect decreased cost stickiness immediately after the reduction because of a decrease in the cost level. By replacing DTAXDEC in Equation (1) with a new indicator variable for the first year with the lowered tax rate (POST_DTAXDEC), we aim to validate that the primary results is an artifact of earnings management. In addition, we use the magnitude of the national tax rate cuts to provide further justification. Table 5 reports the results. Consistent with our expectation, we observe a negative and statistically significant coefficient γ_1 and a positive and statistically significant coefficient γ_2. In other words, the results are contrary to the ones presented in Table 4 and indicate a decrease in cost stickiness immediately after the tax rate cut. Furthermore, the results in Table 4 and Table 5 together suggest that the observed difference in cost stickiness is due to tax-induced earnings management. We reason that the earnings management we observe is executed by shifting SG&A costs from the first year with the lower tax rate to the year before the tax reduction. An alternative explanation to our main results in Table 3 is that companies respond to the improved business prospects generated by the tax rate cut and increase both short- and long-term investments, leading to increased costs and cost stickiness before the tax reduction. Such an explanation, however, is not supported by our results in Table 5. The observed reversal process of cost stickiness provides robust evidence of earnings management before tax reductions. Providing similar evidence with accrual earnings management is challenging because the reversal does not necessarily occur in the following period (Dechow et al. 2012; Sundvik 2017a).

[TABLE 5 HERE]

Second, we test the impact of two sample characteristics. Namely, our sample contains two dominant countries (Japan and the UK) and several instances with consecutive tax rate reductions within a country (e.g. the UK). We address these potential issues in Table 6. Column (1) and (2) of Table 6 reports our re-estimated results for a subsample without companies from Japan and the UK. Our primary result that

SG&A cost stickiness increases before a tax reduction remains robust, since the coefficient γ_2 is negative and significant. In addition to re-estimating the main results with this subsample, we examine the robustness of the three moderating factors and the reversal process described above. Qualitatively all (untabulated) results are robust, and the one change that occurs is that the tax compliance factor becomes insignificant. Moreover, Column (3) and (4) of Table 6 presents the results for a subsample containing only isolated tax reductions. To create this subsample, we exclude company-year observations with $DTAX_{t-1} = 1$ or $DTAX_{t+1} = 1$. After omitting these company-year observations, both columns show an increase in SG&A cost stickiness for DTAX years. We expect a larger effect on cost stickiness with isolated tax rate reductions, and the result in Column (4) of Table 6 supports this expectation. The γ_2 coefficient in Column (4), which accounts for the size of the tax reduction, is about twice as large as the corresponding coefficient for the full sample.

[TABLE 6 HERE]

Third, we recognize that Wong et al. (2015) document an income-increasing discretionary accrual reaction among Chinese companies in response to tax rate increases. Hence, we continue to study cost behavior around tax rate increases instead of tax rate cuts. We do so by replacing DTAXDEC with a dichotomous variable for tax rate increases in Equation (1). There are 14 tax rate increases in our sample. For example, Greece and Portugal increased the corporate tax rate in the aftermath of the European sovereign debt crisis. The untabulated regression results indicate that tax increases in our sample decrease the SG&A cost stickiness. However, the decrease in cost stickiness is not significant (t-stat 0.94). With respect to the economic magnitude, before a tax increase, costs decrease 0.11 percentage points faster when sales decline by 1%. Quantitatively, the size of this effect corresponds to approximately half of the effect for tax reductions.

Fourth, we run the regressions with company and year fixed effects. This is contrary to the main models that we run with year, industry, and country fixed effects. The results (untabulated) remain similar with this approach and the coefficients of interest have the same signs and significance levels. Overall, the results become somewhat stronger when the industry and country fixed effects are replaced with company fixed effects.

5 Conclusions

In this study, we examine the cost behavior of companies in OECD countries before tax reductions. The results show that companies exhibit income-decreasing cost behavior before tax rate cuts and that the extent of the income-decreasing cost behavior is proportional to the magnitude of the decrease in the tax rate.

Furthermore, we find three factors that moderate the degree of tax-induced earnings management in the sample. In terms of country characteristics, we observe less income-decreasing cost behavior in countries with higher tax compliance and in common law countries. When comparing publicly listed and private companies, we find that listed companies exhibit less income-decreasing cost behavior before tax rate cuts.

In general, shifting income from higher tax rate periods to lower tax rate periods results in a decrease in tax revenues. Our results show that regulators should consider the incentive to move earnings from a higher tax rate period to a lower tax rate period when planning tax reforms. We specifically highlight that the effects should be taken into consideration in certain economies, such as low tax compliance and code law countries, and in non-listed companies as they have fewer disincentives to present lower earnings. Besides regulators, our results are potentially interesting for various company stakeholders such as independent auditors, creditors, shareholders, and the tax authorities.

We acknowledge that our study is subject to a number of caveats. First, we use data from a limited number of countries. However, we use a sample from larger and smaller economies with large variations in country characteristics, which allow us to make inferences about a larger population of companies. Future research could perform within country analyses to ensure a better control for the legislative environment and ensure constant institutional characteristics. Second, we use an older measure of tax compliance in our test of factors that moderate cost behavior. Even though the measure has been used by other researchers and remains relatively constant over time, the results should be interpreted with caution. Third, our measure of tax-induced earnings management is not perfect. However, by using measures of cost stickiness, we are able to capture more real economic actions and cost behavior than studies relying upon various accrual models that have received plenty of criticism in prior research. Measuring cost stickiness furthermore allows us to pinpoint the earnings management behavior by showing increased cost stickiness before tax reductions and decreased cost stickiness immediately afterwards.

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Table 1
Variable Definitions.

Index / Variable	Definition
Indices	
n	Country index
i	Company index
t	Year index
Continuous variables	
Δln(SG&A)	Change in SG&A costs (=LN(SG&A $costs_t$ / SG&A$costs_{t-1}$))
Δln(SALES)	Change in sales (=LN($sales_t$ / $sales_{t-1}$))
ΔGDP	Change in $GDP_{n,t}$ (%)
ASINT	Asset intensity (=LN(total $assets_t$ / $sales_t$))
POST_TAXDEC	Magnitude of cut in percent if year after national tax rate cut and 0 for other years
TAXDEC	Magnitude of cut in percent if year before national tax rate cut and 0 for other years
TAXCOMPL	Tax compliance measure (0 to 6) from La Porta et al. (1999)
Dichotomous variables	
COMMON	1 if common law country and 0 otherwise, from La Porta et al. (1998)
DEC	1 if sales decrease and 0 if sales increase
DTAXDEC	1 if year before national tax rate cut and 0 otherwise
LISTED	1 if company is listed on a stock exchange and 0 otherwise, from the Orbis database
POST_DTAXDEC	1 if year after national tax rate cut and 0 otherwise
POST_DTAXDEC	1 if year after national tax rate cut and 0 otherwise
SUCDEC	1 if sales decrease for two consecutive years and 0 otherwise

Table 2

Summary Descriptive Statistics by Country.

Country	Number of observations	Average Δln(SG&A)	Average Δln(SALES)	Average ΔGDP	Average tax rate	Number of tax cuts	Average tax cut	Tax compliance	Common-law	Percentage of public companies
Australia	1,908	0.099	0.081	2.7	30.0%	0		4.6	1	89.4%
Austria	379	0.034	0.060	1.1	25.0%	0		3.6	0	64.6%
Belgium	455	0.048	0.038	1.3	34.0%	0		2.3	0	84.6%
Canada	593	0.128	0.058	2.4	26.6%	2	-1.5%	3.8	1	67.1%
Chile	246	0.112	0.130	5.7	21.3%	0		4.2	0	72.0%
Czech Republic	30	-0.017	0.017	1.9	19.0%	0		2.5	0	100.0%
Denmark	1,660	0.048	0.057	1.4	24.2%	3	-1.0%	3.7	0	21.0%
Estonia	55	-0.063	0.028	3.5	20.7%	1	-1.0%		0	100.0%
Finland	540	0.030	0.037	0.4	22.5%	2	-3.0%	3.5	0	87.6%
France	1,300	0.048	0.042	1.2	36.8%	2	-1.8%	3.9	0	95.6%
Germany	2,940	0.056	0.058	2.0	30.2%	1	0.0%	3.4	0	59.0%
Greece	558	0.016	-0.027	-4.4	24.5%	1	-4.0%	2.4	0	53.4%
Hungary	40	0.045	-0.018	1.8	19.0%	0		2.0	0	100.0%
Iceland	151	0.096	0.049	2.9	20.0%	0		2.6	0	32.5%
Ireland	768	0.070	0.078	7.3	12.5%	0		3.6	1	31.9%
Israel	826	0.116	0.099	3.2	25.3%	2	-1.3%	3.7	1	93.3%
Italy	896	0.040	0.020	-0.2	31.3%	0		1.8	0	93.3%
Japan	14,748	0.025	0.037	1.5	35.9%	3	-2.2%	4.4	0	89.2%
Luxembourg	162	0.075	0.070	4.2	24.2%	0		4.3	0	85.2%
Mexico	482	0.102	0.082	3.2	29.1%	0		2.5	0	86.3%
Netherlands	7,782	0.046	0.046	0.9	30.0%	1	-0.5%	3.4	0	6.3%
New Zealand	960	0.073	0.075	2.5	25.0%	1	-2.0%	5.0	1	35.7%
Norway	469	0.055	0.032	1.6	28.0%	2	-1.5%	4.0	0	95.5%
Poland	969	0.056	0.059	3.1	27.2%	0		2.2	0	72.3%
Portugal	156	0.013	-0.009	-0.7	19.0%	1	-2.0%	2.2	0	94.2%
Slovenia	67	-0.047	-0.029	0.7	30.3%	2	-1.5%		0	82.1%
South Korea	7,611	0.112	0.094	3.3	17.7%	0		3.3	0	59.8%
Spain	522	0.010	0.007	-0.1	28.8%	2	-2.5%	1.9	0	95.2%
Sweden	1,855	0.068	0.072	2.7	23.4%	1	-4.3%	3.4	0	50.7%
Switzerland	1,216	0.071	0.067	1.9	21.2%	0		4.5	0	64.6%
Turkey	906	0.050	0.054	7.2	20.0%	0		2.1	0	78.6%
UK	13,581	0.097	0.089	2.1	22.3%	5	-1.6%	4.7	1	21.4%
US	5,045	0.140	0.132	2.4	39.1%	0		4.5	1	51.2%
Overall	69,876	0.071	0.067	2.14	25.6%	32	-1.9%	3.9	33.9%	54.1%

Table presents summary descriptive statistics on the variables and tax rates for the sample. Sample averages are for all variables except GDP growth and tax rates, that present country averages. Tax rates are combined central and sub-central government rates.

Table 3

Estimates of the Relationship between Tax Reductions and SG&A Cost Stickiness.

Δln(SG&A)	Coeff.	Exp. Sign	Column (1)	Column (2)
Δln(SALES)	β_1	+	0.690***	0.733***
			(32.33)	(37.50)
Δln(SALES)*DTAXDEC	γ_1	+	0.126***	
			(5.50)	
Δln(SALES)*TAXDEC	γ_1	+		0.022***
				(2.58)
Δln(SALES)*ASINT	λ_1	-	-0.024*	-0.022*
			(-1.90)	(-1.73)
Δln(SALES)*ΔGDP	λ_2	-	-0.006	-0.008
			(-1.21)	(-1.61)
DEC*Δln(SALES)	β_2	-	-0.104**	-0.158***
			(-2.48)	(-3.90)
DEC*Δln(SALES)*DTAXDEC	**γ_2**	**-**	**-0.195*** **	
			(-4.30)	
DEC*Δln(SALES)*TAXDEC	**γ_2**	**-**		**-0.044** **
				(-2.34)
DEC*Δln(SALES)*ASINT	λ_3	-	-0.000	-0.002
			(-0.02)	(-0.08)
DEC*Δln(SALES)*ΔGDP	λ_4	+	0.016	0.017
			(1.53)	(1.64)
DEC*Δln(SALES)*SUCDEC	λ_5	+	0.139***	0.139***
			(3.84)	(3.85)
INTERCEPT	β_0		-0.012	-0.015
			(-1.13)	(-1.49)
Industry Fixed Effects			Yes	Yes
Country Fixed Effects			Yes	Yes
Year Fixed Effects			Yes	Yes
R-squared			0.211	0.211
Number of observations			69,876	69,876

All variables are described in Table 1. Coefficient estimates are provided with t-statistics in parentheses. The t-statistics are estimated using robust firm-clustered standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 4
The Effect of Mitigating Factors on the Relationship between Tax Reductions and SG&A Cost Stickiness.

			FACTOR = TAXCOMPL		FACTOR = COMMON		FACTOR = LISTED	
Δln(SG&A)	Coeff.	Exp. Sign	Column (1)	Column (2)	Column (3)	Column (4)	Column (5)	Column (6)
Δln(SALES)	β_1	+	0.583***	0.603***	0.665***	0.707***	0.673***	0.735***
			(6.96)	(7.83)	(29.38)	(31.60)	(24.70)	(30.75)
Δln(SALES)*DTAXDEC	γ_1	+	0.891***		0.270***		0.155***	
			(4.32)		(7.15)		(4.74)	
Δln(SALES)*TAXDEC	γ_1	+		0.142*		0.044***		0.017
				(1.79)		(5.10)		(0.99)
Δln(SALES)*ASINT	λ_1	-	-0.025*	-0.024*	-0.022*	-0.026**	-0.024*	-0.022*
			(-1.92)	(-1.85)	(-1.71)	(-2.05)	(-1.88)	(-1.73)
Δln(SALES)*ΔGDP	λ_2	-	-0.004	-0.007	-0.003	-0.008*	-0.006	-0.008
			(-0.94)	(-1.45)	(-0.69)	(-1.74)	(-1.29)	(-1.59)
DEC*Δln(SALES)	β_2	-	0.008	0.050	-0.049	-0.091**	-0.087*	-0.171***
			(0.05)	(0.35)	(-1.13)	(-2.10)	(-1.69)	(-3.56)
DEC*Δln(SALES)*DTAXDEC	γ_2	-	-0.973***		-0.368***		-0.275***	
			(-3.05)		(-5.96)		(-4.29)	
DEC*Δln(SALES)*TAXDEC	γ_2	-		-0.288**		-0.085***		-0.053*
				(-2.40)		(-4.24)		(-1.73)
DEC*Δln(SALES)*ASINT	λ_3	-	-0.000	0.000	0.005	0.009	-0.002	-0.002
			(-0.00)	(0.02)	(0.20)	(0.41)	(-0.07)	(-0.11)
DEC*Δln(SALES)*ΔGDP	λ_4	+	0.015	0.015	0.017	0.021**	0.017	0.017
			(1.41)	(1.43)	(1.61)	(1.99)	(1.59)	(1.61)
DEC*Δln(SALES)*SUCDEC	λ_5	+	0.138***	0.141***	0.132***	0.133***	0.142***	0.142***
			(3.80)	(3.89)	(3.61)	(3.64)	(3.91)	(3.91)
Δln(SALES)*FACTOR	γ_3	-	0.029	0.033*	0.083**	0.103***	0.034	-0.002
			(1.36)	(1.81)	(2.16)	(3.47)	(1.28)	(-0.10)
Δln(SALES)*DTAXDEC*FACTOR	γ_4	-	-0.180***		-0.251***		-0.056	
			(-3.84)		(-4.77)		(-1.45)	
Δln(SALES)*TAXDEC*FACTOR	γ_4	-		-0.029		-0.092***		0.007
				(-1.60)		(-4.12)		(0.40)
DEC*Δln(SALES)*FACTOR	γ_5	-	-0.031	-0.054	-0.271***	-0.288***	-0.034	0.024
			(-0.79)	(-1.55)	(-3.45)	(-4.50)	(-0.70)	(0.55)
DEC*Δln(SALES)*DTAXDEC*FACTOR	**γ_6**	**+**	**0.185****		**0.426*****		**0.165****	
			(2.50)		**(4.12)**		**(2.04)**	
DEC*Δln(SALES)*TAXDEC*FACTOR	**γ_6**	**+**		**0.060****		**0.196*****		**0.017**
				(2.14)		**(3.83)**		**(0.45)**
INTERCEPT	β_0		-0.013	-0.015	-0.007	-0.007	-0.013	-0.015
			(-1.31)	(-1.45)	(-0.65)	(-0.73)	(-1.29)	(-1.49)
Industry Fixed Effects			Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects			Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects			Yes	Yes	Yes	Yes	Yes	Yes
R-squared			0.212	0.211	0.212	0.211	0.212	0.211
Number of observations			69,754	69,754	69,876	69,876	69,876	69,876

All variables are described in Table 1. Coefficient estimates are provided with t-statistics in parentheses. The t-statistics are estimated using robust firm-clustered standard errors. *, **, and *** indicate significance at the 10%, 5% and 1% level.

Table 5
Estimates of the Relationship between the Year after Tax Reductions and SG&A Cost Stickiness.

Δln(SG&A)	Coeff.	Exp. Sign	Column (1)	Column (2)
Δln(SALES)	β_1	+	0.758***	0.748***
			(38.13)	(37.88)
Δln(SALES)*POST_DTAXDEC	γ_1	-	-0.207***	
			(-4.32)	
Δln(SALES)*POST_TAXDEC	γ_1	-		-0.068**
				(-2.11)
Δln(SALES)*ASINT	λ_1	-	-0.017	-0.017
			(-1.24)	(-1.18)
Δln(SALES)*ΔGDP	λ_2	-	-0.007	-0.006
			(-1.08)	(-1.00)
DEC*Δln(SALES)	β_2	-	-0.215***	-0.201***
			(-5.26)	(-4.95)
DEC*Δln(SALES)*POST_DTAXDEC	**γ_2**	**+**	**0.357*** **	
			(5.25)	
DEC*Δln(SALES)*POST_TAXDEC	**γ_2**	**+**		**0.137*** **
				(3.71)
DEC*Δln(SALES)*ASINT	λ_3	-	-0.001	-0.001
			(-0.03)	(-0.05)
DEC*Δln(SALES)*ΔGDP	λ_4	+	0.023*	0.023*
			(1.87)	(1.88)
DEC*Δln(SALES)*SUCDEC	λ_5	+	0.131***	0.130***
			(3.46)	(3.42)
INTERCEPT	β_0		0.002	0.006
			(0.15)	(0.44)
Industry Fixed Effects			Yes	Yes
Country Fixed Effects			Yes	Yes
Year Fixed Effects			Yes	Yes
R-squared			0.202	0.202
Number of observations			60,623	60,623

All variables are described in Table 1. Coefficient estimates are provided with t-statistics in parentheses. The t-statistics are estimated using robust firm-clustered standard errors. *, **, and *** indicate significance at the 10%, 5% and 1% level.

Table 6
Robustness Tests of the Relationship between Tax Reductions and SG&A Cost Stickiness.

			Excluding Japan and the UK		Isolated tax reductions	
Δln(SG&A)	Coeff.	Exp. Sign	Column (1)	Column (2)	Column (3)	Column (4)
Δln(SALES)	β_1	+	0.679***	0.732***	0.672***	0.692***
			(27.56)	(32.76)	(26.65)	(27.58)
Δln(SALES)*DTAXDEC	γ_1	+	0.199***		0.182***	
			(5.59)		(4.41)	
Δln(SALES)*TAXDEC	γ_1	+		0.033		0.056***
				(1.37)		(2.97)
Δln(SALES)*ASINT	λ_1	-	-0.018	-0.011	-0.029	-0.027
			(-1.07)	(-0.68)	(-1.57)	(-1.50)
Δln(SALES)*ΔGDP	λ_2	-	-0.001	-0.004	-0.002	-0.003
			(-0.18)	(-0.82)	(-0.40)	(-0.58)
DEC*Δln(SALES)	β_2	-	-0.089*	-0.158***	-0.057	-0.070
			(-1.75)	(-3.24)	(-1.08)	(-1.32)
DEC*Δln(SALES)*DTAXDEC	**γ_2**	**-**	**-0.317*** **		**-0.200*** **	
			(-4.32)		**(-2.78)**	
DEC*Δln(SALES)*TAXDEC	**γ_2**	**-**		**-0.075***		**-0.085*** **
				(-1.75)		**(-2.74)**
DEC*Δln(SALES)*ASINT	λ_3	-	-0.005	-0.011	-0.008	-0.008
			(-0.18)	(-0.37)	(-0.25)	(-0.25)
DEC*Δln(SALES)*ΔGDP	λ_4	+	0.008	0.011	0.001	-0.000
			(0.78)	(0.97)	(0.11)	(-0.04)
DEC*Δln(SALES)*SUCDEC	λ_5	+	0.134***	0.134***	0.126**	0.128***
			(2.81)	(2.81)	(2.56)	(2.60)
INTERCEPT	β_0		-0.007	-0.008	0.010	0.010
			(-0.62)	(-0.73)	(0.84)	(0.89)
Industry Fixed Effects			Yes	Yes	Yes	Yes
Country Fixed Effects			Yes	Yes	Yes	Yes
Year Fixed Effects			Yes	Yes	Yes	Yes
R-squared			0.192	0.191	0.209	0.208
Number of observations			41,547	41,547	37,283	37,283

All variables are described in Table 1. Coefficient estimates are provided with t-statistics in parentheses. The t-statistics are estimated using robust firm-clustered standard errors. *, **, and *** indicate significance at the 10%, 5% and 1% level.