Capitalization of capital gains taxes: Attention, Deadlines, and Media Coverage

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Abstract

We argue that the tax capitalization effect is affected by the attention of market participants. Market reactions are therefore not only driven by the announcement of tax events but also by factors influencing the dissemination of information, such as deadlines and media coverage. Analyzing the introduction date of the earlier-announced German capital gains tax reform of 2009 by triple-difference estimation, we find evidence of a strong market reaction shortly before and after the introduction deadline of the reform. Within the last two (five) trading days before the deadline, we observe a sharp increase in abnormal trading volumes of 150.3% (102.8%). The aggregate abnormal return of the German stock market in the last five trading days in 2008 was 11.5%. In the period before the introduction deadline, we find evidence that media reports on the 2009 tax reform had a positive impact on daily returns and trading volumes of the German market. Our results suggest that deadline and media coverage significantly affect trading activities of individual investors.

JEL classification: G02; G12; H24; M41

Keywords: Capital gains tax, tax capitalization, stock pricing, investor attention, tax awareness, deadlines, media coverage

1.   Introduction

The question of how taxes affect stock prices is a central aspect for asset management, firm valuation, and trading behavior. For instance, tax-loss selling is considered an important driver of the well-known turn-of-the-year effect (Starks et al., 2006; Sikes, 2014). It is

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therefore no surprise that theoretical considerations as well as empirical research suggest the anticipation of future capital gains taxes in current share prices (Amoako-Adu et al., 1992; Lang and Shackelford, 2000; Dai et al., 2008; Blouin et al., 2009). Existing empirical research is based on the assumption that market participants react immediately on the announcement of new relevant tax information. Hence, the focus of the literature is on the announcement of tax gains tax reforms.

Corresponding to behavioral finance research, trading may be affected by the attention of investors and information may not be incorporated in current share prices if investors are (temporarily) inattentive (Guiso and Jappelli, 2005; DellaVigna and Pollet, 2009; Pantzalis and Ucar, 2014; Itzkowitz et al., 2016). For example, Hirshleifer et al. (2009) provide evidence for a delayed market reaction to earnings news if attention has been distracted by other events. Empirical tax research finds stronger tax effects if taxes are salient and decision makers are tax aware (Chetty et al., 2009; Alstadsaeter and Jacob, 2013). Evidence of Hoopes et al. (2015) on taxpayer information search suggests further that taxpayers employ their attention rationally to react to tax deadlines and tax policy changes.

Combining these strands of literature, we argue that the capitalization of taxes in share prices is driven not only by the "true" tax burden, but also by the attention of market participants. Therefore, share prices should be affected not only by the announcement of upcoming tax reforms, but also by the dissemination of this information in the capital market. We focus on two channels of information dissemination. 1) In a world with costly information, agents will update their knowledge only if the marginal information benefit exceeds the corresponding cost (Sims, 2003; Reis, 2006). Regarding the deadline of an upcoming event like a tax reform deadline, we expect the marginal value of event-specific information to increase closely before the deadline and to become zero thereafter. Hence, we assume that deadlines attract the attention of investors (deadline effect). 2) Corresponding to empirical findings, media coverage plays an important role in the dissemination of information in capital markets

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(Tetlock, 2007). While existing research concentrates on firm-specific news in the media (Tetlock, 2011; Engelberg and Parsons, 2011; Dong and Ni, 2014; Liu et al., 2014, with further references), we extend the analysis to tax-related news affecting the German stock market as a whole.

We interpret a major German tax reform as a natural experiment to address the connection of tax capitalization effects, deadlines and media coverage empirically. Before the German capital gains tax reform of 2009 (CGTR 2009), capital gains on the shareholdings of individual investors were fully tax-exempt if the holding period exceeded one year (otherwise partially tax-exempt). In 2007, the German parliament implemented a tax reform with a flat tax rate of 26.38% on short-term and long-term capital gains on the shareholdings of individual investors acquired after December 31, 2008. The tax rules remained unchanged for institutional investors. The same holds for existing shareholdings of individual shareholders acquired before the CGTR 2009 deadline. This is a benefit for our analysis, since the reform did not increase the tax burden of stock sellers, creating a lock-in effect (Dai et al., 2008). By contrast, the tax reform provided a strong incentive for individual stock buyers to acquire "tax-free" stocks before the reform deadline at January 1, 2009.

While the CGTR 2009 had already been announced in 2007, market research by the Deutsche Bank (2008) and other institutions (e.g. GfK, 2008) suggests that the majority of affected German investors were not well-informed about the reform within the second half of 2008. Nevertheless, a majority of investors either planned to obtain better information and/or to adjust portfolios before the reform deadline. By the end of 2008, the subject had become a major issue in the media (with the following statements translated from German): *Handelsblatt'*s headline on December 11, 2008, was "Saving taxes at the last minute" and, on December 20, 2008, the *Frankfurter Allgemeine Zeitung* called for a "Final spurt for tax savers." Therefore, we expect a strong increase in investor attention on the CGTR 2009 by the end of 2008 resulting from 1) the deadline effect and 2) the media effect.

Our main target is the identification of market reactions close to the CGTR 2009 introduction date at the turn of the year 2008/2009 (TY 2008/2009) using a difference-in-difference-in-differences (triple difference) strategy.[1] The first difference compares the trading volumes, daily returns, and share prices of trading days surrounding the TY 2008/2009 with other trading days of the observation period (before and after the turn of the year). The second difference refers to unaffected financial markets as a control group (NYSE Euronext Paris and the London Stock Exchange). The third difference uses untreated pseudo-reform deadlines from control periods (the TY 2007/2008 and the TY 2009/2010). This identification strategy allows us to control for market–year fixed effects and seasonality effects (e.g., turn-of-the-year effects), which might otherwise result in biased or inconsistent regression results. In order to separate deadline effects and media effects, we also analyze the correlation between the number of daily news articles on the CGTR 2009 and stock market reactions (trading volumes and daily returns).

According to our estimates, the German trading volume in the last two (five) trading days of 2008 exceeded the regular volume by 150.3% (102.8%). The aggregate unexpected return within the last five trading days of 2008 can be estimated at 11.5%. We observe negative abnormal trading volumes and daily returns in the five trading days following the TY 2008/2009, which implies a shifting of share trades from 2009 to 2008 to avoid the taxability of future capital gains. We find further evidence that media reports on the CGTR 2009 significantly increased trading volumes and daily returns of the German stock market during the year 2008. Nevertheless, the deadline effect seems to have been the main driver of the strong stock market reactions at the TY 2008/2009.

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[1] We do not consider the announcement effects of the tax reform, which are hard to isolate and are addressed by Voeller and Müller (2011). As investors had sufficient time to react on that announcement, it might well be the case that prices and trading volumes adjusted smoothly over the announcement period of more than one year. In addition, the CGTR 2009 was announced as part of a broader reform package, which makes it challenging to separate the different reform measures from each other.

Addressing the heterogeneity of stock market reactions, we find a stronger CGTR 2009 impact for small capitalization stocks and "loser" stocks with a reduction of stock price in the previous year. In line with existing research this fits well with the observation that small capitalization stocks with a high price elasticity are more strongly affected by herding behavior (Barber et al., 2009; Hsieh, 2013) and market anomalies like the turn-of-the-year effect (Starks et al., 2006; Sikes, 2014).

Our paper contributes to the literature in three ways. First of all, extending the literature on tax capitalization effects, we are the first to argue and to provide empirical evidence that the capitalization of taxes in stock prices can be affected by the attention of market participants. An important implication of that outcome is that sole focus on the announcement date of an event might not be sufficient to capture all relevant market reactions resulting from that event. This holds for the announcement dates of tax reforms, which have been widely used for the identification of tax effects on asset prices (Amoako-Adu et al., 1992; Dai et al., 2008). In line with our empirical setting, the attention of investors should be especially relevant if a) investors have limited information processing capacities (e.g., uninformed individual investors), b) issues are complicated (e.g., tax policy), and c) attention is focused on a limited number of trading days.

Second, we contribute to the literature on media coverage. While existing research analyzes firm-specific media reports, we extend the analysis to tax-related media reports affecting the overall German stock market. Even more relevant, we provide additional evidence for a causal impact of media reports, being distinct from the provision of information. Regarding firm-specific media reports (e.g., earnings announcements) it is challenging to separate the "being in the media effect" as such from the additional information provided (Engelberg and Parsons, 2011; Liu et al., 2014). In our case, this should be unproblematic, as the CGTR 2009 had already been announced in 2007. Hence, media reports on the CGTR 2009 during the

year 2008 did not provide virtually new information. Our findings are consistent with overreactions of noise traders to stale information as suggested by Tetlock (2011).

A third important contribution is that deadlines may attract the attention of investors and can play an important role in the dissemination of information. To our knowledge such deadline effects have not been addressed yet by financial economics research. If an event attracts the attention of a significant number of investors (like in our case), the consequences of deadline effects might be herding behavior, mispricing and volatile market reactions. As suggested by our heterogeneity tests, such abnormal stock market reactions should be most relevant for small capitalization stocks and stocks with a tax loss in the previous year. Therefore, our findings should also be relevant for the literature on herding behavior (Barber et al., 2009; Hsieh, 2013) and stock market efficiency (Fama, 1970; Brooks et al., 2003, for a review see Lim and Brooks, 2011). If delayed market reactions can be anticipated, they provide opportunities for better-informed investors to generate arbitrage profits.[2]

Our paper proceeds as follows. Section 2 contains a brief overview of the CGTR 2009. Section 3 develops the theory and derives hypotheses for our empirical analysis. Section 4 documents our identification strategy and the data. Section 5 describes our empirical investigation and results. Section 6 concludes. Appendix A provides a list of variable definitions. Appendix B contains additional figures and regression cross checks.

2.   The German capital gains tax reform of 2009

While the CGTR 2009 was embedded in the more general 2008/2009 Business Tax Reform,[3] we focus on the reform of the taxation of capital earnings and capital gains. The introduction

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[2]   In the case of the CGTR 2009, an optimal strategy for institutional investors would have been to sell German shares exactly before the CGTR introduction date and to rebuy those shares about one week later. Regarding long-term investments of individual investors, an optimal strategy would have been to buy new shares about one week before the introduction deadline. Note that our regressions imply a steep but temporal average increase in share prices of about 11.5%, while CGTR tax law changes were not relevant for institutional investors.

[3]   This reform introduced major changes in the German taxation of companies, including the reduction of the corporate income tax rate from 26.38% to 15.83% (both including solidarity tax surcharge), the broadening of the income tax base for businesses (e.g., by a revision of thin capitalization tax rules), and coordinated tax

date of this reform (January 2009) differed significantly from the introduction date of the other reform measures of the 2008/2009 Business Tax Reform (January 2008).

The first media reports on a major German reform of business taxation date back to April 10, 2006. In June 2006, a draft paper published by the German Ministry of Finance suggested imposing a general withholding tax with a flat rate on the capital earnings (including interests and dividends) and capital gains of individual taxpayers. The governmental task force presented the concept in November 2006. In January 2007, the decision was taken to introduce the flat tax on the capital earnings and capital gains of individual taxpayers on January 1, 2009. In addition, it was decided to maintain the "old" capital gains tax rules for shares acquired before that introduction date. The final bill was presented in May 2007 and was approved shortly thereafter (May and July 2007). Figure 1 illustrates the described development process (for a more detailed review, see Voeller and Müller, 2011).

[Figure 1 about here]

For shares acquired before January 2009, the taxation of the capital gains of German individual investors depends on the holding period. If the holding period exceeds one year, investors may sell shares tax free. Otherwise (i.e., the holding period is less than one year), 50% of the capital gains are taxed with the regular progressive personal income tax rate (including the solidarity tax surcharge) ranging from 0% to 47.48%. Hence, the maximum effective capital gains tax rate on shares bought before January 2009 is 23.74%.

By contrast, capital gains realized from shares bought after December 2008 are taxable with the minimum of the regular progressive income tax rate and a flat rate of 26.38% (including the solidarity tax surcharge) on interests, dividends, and capital gains. After 2008, there is no discriminative tax treatment, which depends on the length of the holding period. Table 1 illustrates the taxation for shares acquired before and after the CGTR 2009.

[Table 1 about here]

reforms for partnerships, single businesses, and individuals. The main objective of the 2008/2009 Business Tax Reform was to enhance Germany's attractiveness for business investment.

Individual investors face a considerably higher tax burden on capital gains if shares were purchased after January 1, 2009.[4] For a holding period longer than one year, the tax burden (including the solidarity tax surcharge) increases by 26.38% for taxpayers with a personal income tax rate of at least 25% (excluding the solidarity tax surcharge). For a holding period shorter than one year, the additional tax burden increases inversely to the regular personal income tax rate. For example, at a regular tax rate of 26.38% (including the solidarity tax surcharge), the tax burden doubles from 13.19% for shares purchased before 2009 to 26.38% for shares purchased in 2009 and thereafter (both including the solidarity tax surcharge).

In spite of these tax incentives for individual shareholders and the early announcement date of the reform, a relevant part of the German population was not fully attentive to the upcoming tax law changes. According to GfK (2008), only 30% of the respondents felt well informed about the CGTR 2009 in July 2008, while 30% obtained limited information and 40% were uninformed. About two-thirds (even more for wealthy taxpayers) were planning to obtain better information about CGTR 2009 within the year 2008 and about 40% were planning to restructure their portfolios until the TY 2008/2009. According to a survey of the Deutsche Bank (2008) 100 days before the introduction date, only 11% considered the tax rate change in their trading decisions at that time, while 22% of the survey participants were planning to restructure their portfolios before the end of the year of 2008.

The CGTR 2009 was extensively discussed by the German media in December 2008 (all statements translated from German): *Die Welt* headlined "The stock market crisis as a benefit: Investors may use low share prices and save the new capital gains tax" on December 9 and *Börse Online* "The countdown for the capital gains tax is running" on December 18. Herrmann from *TAZ Online* pointed out on the morning of December 29, "Exactly two days are left for investors to stock up on shares on the capital markets, for which tax-free selling is

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[4] That holds also for taxpayers with a regular personal income tax rate below 25%. In these cases the capital gains are not taxed with 26.38%, but with the regular income tax rate plus solidarity tax surcharge in the new system, while in the old system either 0% (holding period > one year) or 50% (holding period ≤ one year) of capital gains are taxed with the regular personal income tax rate plus the solidarity tax surcharge.

possible after one year of holding." Even the *Tagesschau,* the most important daily news show on German television, reported about the CGTR 2009 on December 30.

Table 2 provides a monthly overview of the reports of the largest German daily newspapers in 2008 about the CGTR 2009. We find a maximum of articles in December, but also high numbers in March/April and October/November. The high number in March/April was pushed by rumors about plans for new capital gains taxation rules for certificates and funds. Nevertheless, the tax bill ultimately remained unchanged. Articles published in October/November typically described the new tax rules, while articles in December 2008 mostly recommended buying shares or undertaking a complete restructuring of portfolios before the end of the year of 2008. Table 2 documents the constant stream of information as well as the increasing number of articles close to the year-end.

[Table 2 about here]

3.   Theory and hypotheses

According to Lang and Shackelford (2000), the fair share price P_0 can be modeled as a function of constant free cash flows F, the cash dividend of the following period (with a constant growth rate in future periods) D_1, the constant dividend tax rate τ^d, the constant capital gains tax rate τ^c, and the constant discount rate r:

$$P_0 = \frac{D_1 \cdot \left(1 - \tau^d\right)}{r \cdot \left[\tau^c + \frac{D_1}{F} \cdot \left(1 - \tau^c\right)\right]}. \tag{1}$$

This model does not account for the attention of market participants. Amending the model by tax awareness parameters θ^c and θ^d for capital gains taxes and dividend taxes results in

$$P_0 = \frac{D_1 \cdot \left(1 - \tau^d \cdot \theta^d\right)}{r \cdot \left[\tau^c \cdot \theta^c + \frac{D_1}{F} \cdot \left(1 - \tau^c \cdot \theta^c\right)\right]}. \tag{2}$$

θ^c and θ^d can take values between zero (investor is tax unaware) and one (investor is fully tax aware). The marginal effect of capital gains taxes on share prices can then be described by

$$\frac{\partial P_0}{\partial \tau^c} = -P_0 \cdot \theta^c \cdot \frac{F - D_1}{\tau^c \cdot \theta^c \cdot (F - D_1) + D_1}.$$
(3)

As described by Lang and Shackelford (2000), derivative (3) is generally negative and higher expected capital gains taxes reduce the share price. However, this relation holds only for tax-aware investors. If θ^c approaches zero, we obtain $\displaystyle \lim_{\delta\theta^c \to 0} \frac{\partial P_0}{\partial \tau^c} = 0$. Hence, tax-unaware investors will not react to capital gains taxation.

Abstracting from lock-in effects[5] and interpreting equation (2) as a representation of the equilibrium price from a buyer perspective, higher capital gains taxes will shift the demand curve and reduce average demand. Our model reflects this well-known tax capitalization effect by accounting for the attention of market participants. If the number of tax-aware investors is high, capital gains taxes will be capitalized in the equilibrium price (Dai et al., 2008). However, if a significant fraction of market participants is tax-unaware, the capital gains tax will not be fully considered. In the following we consider the impact of deadlines and media coverage on the attention of market participants.

Sims (2003) and Reis (2006) provide a theoretical framework that rational agents may be temporarily inattentive. Due to limited information capacity (Sims, 2003) and information costs (Reis, 2006), infrequently updating information can be a utility-maximizing strategy. In case of a deadline, decision-making becomes more urgent. Thus, compared to the cost of being uninformed (resulting in an uninformed decision), the marginal value of information increases. An inattentive decision maker then has an incentive to update information shortly before the date a final decision or action will be required. Analyzing data on taxpayer

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[5] The lock-in effect is valid if the seller demands a higher selling price to be compensated for unexpectedly high capital gains taxes. In our setting, capital gains taxes were only increased for shares purchased by individual investors after January 1, 2009. Thus, sellers of shares in the relevant period (December 2008 to January 2009) were not affected by unexpectedly high capital gains taxes. Hence, we take the reservation price of the sellers as fixed and assume that the supply curve will not be affected by the CGTR 2009.

information search, Hoopes et al. (2015) find that that taxpayer information search activities are focused on tax-relevant deadlines. Corresponding to psychological research (e.g., Ariely and Wertenbroch, 2002), deadlines affect decision-making and may concentrate the attention of decision-makers on a certain time window.

Evidence of the financial economics literature suggests further a positive impact of media coverage on investor attention and current stock prices. Tetlock (2007) finds that high media pessimism predicts downward pressure on market prices followed by a reversion to fundamentals, while unusually high or low pessimism predicts high trading volumes. Corresponding to Tetlock (2011) investors overreact to stale media information, leading to return reversals. Engelberg and Parsons (2011) as well as Liu et al. (2014) provide evidence for a causal impact of media reporting in addition to the impact of information content.

The CGTR 2009 introduction date provided a strong tax incentive for individual investors to buy shares before January 1, 2009. Shares acquired before that date were regarded as tax-exempt after a minimum holding period of one year, while shares acquired after that date were taxable with a flat tax of 26.38%. If all investors would have anticipated this early-announced event, market efficiency arguments (Fama, 1970) suggest no volatile pricing reactions at the TY 2008/2009.[6] As suggested by proponents of market efficiency, it "(…) is only new – and especially new and unpredictable – information that moves prices (…)" (Brooks et al, 2003).

However, market research in 2008 by order of the Deutsche Bank, Dresdner Bank and other institutions (e.g., Deutsche Bank, 2008; GfK, 2008) provide evidence that a significant fraction of individual taxpayers was not fully informed of the CGTR 2009, and had plans to obtain better information and adjust portfolios by the end of the year (= partial tax awareness). Such a behavior suggests a focus of investor attention to the tax-relevant deadline (deadline

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[6]   That holds at least for rational forward-looking investors being focused on fundamentals. It seems hard to justify that fundamental information of investors at the German stock market changed dramatically during the last trading days of December 2008, while other European stock markets remained unaffected by this new fundamental information.

effect) and fits well with the rational inattention framework of Sims (2003) and Rice (2006). In addition, the CGTR 2009 was widely discussed in the German media in December 2008 (see Section 2), who typically recommended an acquisition of shares before the TY 2008/2009. Corresponding to existing research (Tetlock, 2011; Engelberg and Parsons, 2011; Liu et al., 2014), this also implies an increase in the attention of individual investors closely before the CGTR 2009 deadline (media effect).

Regarding the impact of the CGTR 2009, the relevance of trading activities of individual investors for the German market is an important aspect. As stock market data is anonymized, we are not able to trace trading volumes to a specific investor type. According to statistics of the Deutsches Aktieninstitut (DAI, 2014; the German Institute for Shares), 11.2% of the shares on the German stock market in 2008 were directly held by German private households, while 4.4% were held by mutual funds. The aggregate fraction of stocks directly or indirectly held by individual investors was therefore about 15.6%.[7] Note that German tax law generally regards mutual funds as "transparent". As a result, the CGTR 2009 tax incentives of individual investors were virtually the same for retail share trades and investments in mutual funds. Regarding other stockholdings, 46.7% were held by institutional business investors, 10.2% by insurances, 7.2% by funds (excluding mutual funds), 5.4% by banks, 2.7% by the German government and 12.2% by foreign investors.

While individual investors were not the most relevant investor group in the German stock market, their direct and indirect stockholdings were approximately of the same size as stock holdings of German banks and insurances. In addition, the following aspects should be considered. 1) About 50% of German stocks were either held by the government or by strategic business investors. As corresponding stocks are typically not traded, their impact on

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[7]   When individual investors invest in mutual funds, they exert an indirect influence on the resources and the investment behavior of these funds. After receiving additional financial resources from the individual shareholder, the fund will invest corresponding to its policy. In the case of exchange-traded funds, the individual's investment in the mutual fund is, in fact, equivalent to an investment in the underlying assets of that fund (e.g., the stocks of the German DAX 30 index).

trading volume and price discovery should have been small. 2) Trading of one group of investors will typically result in secondary trading of other investor groups. 3) Even a relatively small group of investors can have strong impact on the market if trading activities are concentrated on a short time window. The literature on herding behavior provides evidence that transactions of retail traders may significantly affect financial markets (Barber et al., 2009; Hsieh, 2013).

We hypothesize that the deadline as well as the media reports in December 2008 attracted the attention of (relatively uninformed) individual investors to the TY 2008/2009. As a consequence, we expect a form of herding behavior resulting in a higher demand for shares and a higher willing to pay for "tax-free" shares closely before the CGTR 2009 deadline. This suggests a temporary increase in stock prices, daily returns and trading volumes closely before the TY 2008/2009. Hence, we will test the following hypotheses.

H1a: *Trading volumes were abnormally high shortly before the CGTR 2009 deadline.*

H1b: *Daily returns were abnormally high shortly before the CGTR 2009 deadline.*

H1c: *Share prices were abnormally high shortly before the CGTR 2009 deadline.*

While the CGTR 2009 should have resulted in a short-run increase in share demand by the end of 2008, we expect a reversal at the beginning of 2009. The argument for this hypothesis is a demand-side bring-forward effect. As the tax reform increased the relative attractiveness of shares bought in 2008, we expect a shifting of trades from 2009 to 2008. In addition, higher capital gains taxes reduced the attractiveness of share trades in 2009. After the CGTR 2009, theory therefore implies a decreasing demand for shares and a decreasing willingness of individual investors to pay for shares. We expect abnormally low returns up to the point that stock prices reached their normal level. This suggests still abnormally high share prices but negative abnormal returns in the period shortly after the introduction date.

H2a: *Trading volumes were abnormally low shortly after the CGTR 2009 deadline.*

H2b: *Daily returns were abnormally low shortly after the introduction of the CGTR 2009.*

H2c: *Share prices were still abnormally high shortly after the introduction of the CGTR 2009.*

While the hypotheses H1a to H2c test stock market reactions close to the CGTR 2009 deadline, they do not identify media effects directly. Therefore, we analyze CGTR 2009 media reports before the deadline. Following the literature, media coverage increases investor attention (Tetlock, 2011; Dong and Li, 2014). In line with equation (3), this increases the willingness to pay for "tax-free" shares and results in a higher demand for shares before the TY 2008/2009. As stock prices are non-stationary, it does not seem to be appropriate to analyze the correlation between the number of CGTR 2009 articles and current stock prices. Therefore, we focus on trading volumes and daily returns.

H3a: *The number of articles on the CGTR 2009 is positively correlated with trading volume in 2008.*

H3b: *The number of articles on the CGTR 2009 is positively correlated with daily returns in 2008.*

We also rely on H3a and H3b to disentangle the deadline effect from the media effect. If the impact of the CGTR 2009 on the German stock market is not only driven by discussions in the media, the hypotheses H1a and H1b should still hold if we control for media coverage.

Our theoretical considerations suggest that stock market reactions resulting from the CGTR 2009 were driven by individual retail investors. However, since data on share ownership are not available on a daily or even monthly basis, we are not able to directly observe trading activities of individuals. Therefore, we follow the literature on herding behavior (Bhattacharya, 2001; Barber et al., 2009; Hsieh, 2013) and interpret small trades as an indicator for trading activities of retail investors. Theory suggests that individual investors

with relatively small stock holdings compared to institutional investors have smaller average trading volumes per transaction as well as a smaller attention to capital markets. If market information is costly (Reis, 2006) and the information cost does not depend on the number of purchased stocks in a given transaction, it is more valuable for investors with large stock holdings and transaction volumes to invest in stock market information. Under these conditions, institutional investors and wealthy individual investors with high trading volumes per transaction should be better informed about capital markets and market-related tax issues. Therefore, market activities of individual investors with a relatively low level of tax awareness should be negatively correlated with the average trading volume per transaction (= aggregate transaction volume in local currency of a stock divided by the number of executed transactions of that stock) in the market. We expect higher trading activities of individual investors closely before the CGTR 2009 introduction deadline (deadline effect) as well as in weeks with a high number of media reports on the CGTR 2009 (media effect). Hence, we hypothesize:

H4a: *The average trading volume per transaction was smaller closely before CGTR 2009 introduction deadline.*

H4b: *The number of articles on the CGTR 2009 is negatively correlated with the average trading volume per transaction in 2008.*

4. Identification strategy and data

4.1. Identification strategy

A common strategy to identify the pricing effects of capital gains taxes relies on a hypothesized differential impact of capital gains taxes on dividend-paying stocks and non–dividend-paying stocks (Amoako-Adu et al., 1992; Lang and Shackelford, 2000). This approach is based on the fact that returns from non–dividend-paying stocks only result from capital gains, while returns from dividend-paying stocks also result from dividends. If investors capitalize taxes rationally, capital gains taxes will have a stronger impact on non–

dividend-paying stocks. A major assumption of this approach is that assets are priced rationally by investors who are well informed about tax issues. For that reason, this identification strategy does not seem to be feasible for our analysis of partially or temporarily tax-unaware individual investors.[8] In heterogeneity tests (see Table 9, model 3 and 6), we do not find clear evidence for a differential impact of the CGTR 2009 on dividend-paying stocks and non–dividend-paying stocks.

We use an alternative identification strategy that relies on comparisons between treated and non-treated stocks. In our baseline model, we interpret the introduction of the CGTR 2009 as a natural experiment, which can be analyzed by a comparison between the treatment group and the control group. Considering the home bias of individual investors (Van Nieuwerburgh and Veldkamp, 2009; Jacobs and Weber, 2012), we expect that tax law changes in Germany will have a stronger impact on shares of the German market. Jochem and Volz (2011) show that German investors hold slightly more than 50% of their shares on the German stock market. In the case of individual investors, this fraction should be even higher. Therefore, shares of other European stock markets should be an appropriate control group for our analysis.

A potential problem of our analysis is that the turn-of-the-year effect (Poterba and Weisbenner, 2001; Starks et al., 2006) of the German stock market might be structurally different from that of other stock markets. To control for corresponding differences in turn-of-the-year effects between the German market (treatment group) and other markets (control group), we consider not only observations from the period 2008–2009, but also observations of the preceding and following turn-of-the-year periods. Hence, we account for the last 30 trading days of the German stock market before and after the TY 2008/2009 (treatment

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[8] Taking into account the complexity of the correlation between share prices, capital gains taxes, and dividends, this argument holds even in the case of a temporary increase in tax awareness by the end of 2008. A careful analysis of the German investor news of that period does not reveal any evidence that individual investors were advised to buy non–dividend-paying stocks in response to the CGTR 2009.

period), as well as for corresponding trading data for the TY 2007/2008 and the TY 2009/2010 (control periods).

Using a control group as well as control periods, our estimation strategy may be denoted as triple-difference estimation. This approach has a number of advantages. By considering a control group, we account for general market developments close to the TY 2008/2009. By including control periods, we consider Germany-specific effects that do not vary significantly between turn-of-the-year periods but might bias more simple difference-in-difference regressions, which have been tested as cross checks. We further include a comprehensive set of control variables, e.g., stock fixed effects, industry–year fixed effects, and structural variables, such as market value, and book value.

4.2. Data

Taking into account that the German stock market[9] is one of the biggest in Europe, we select the major Western European stock markets as the control group, namely, those of the United Kingdom (the London Stock Exchange) and France (the Paris Stock Exchange, part of NYSE Euronext). This can be justified as follows: 1) London and Paris are geographically close to the German trade center Frankfurt and are – apart from Frankfurt – the most relevant European trade centers. 2) France and the United Kingdom are culturally and politically closely related to Germany. 3) The United Kingdom, France, and Germany are similar countries in terms of population size, land area, and economic development. 4) The London Stock Exchange can be interpreted as a leading trading place affecting other European stock markets. 5) There were no major tax reforms implemented in the United Kingdom or France during the treatment period or the control periods.

We rely on stock market and financial statement information using the Datastream database from Thomson Reuters. While information on share prices and trading volumes for each stock is available for each trading day, financial statement data are based on annual business

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[9] The main stock exchange in Germany is the Frankfurt Stock Exchange. We also consider data from stocks listed at other German stock exchanges, such as in Berlin, Munich, and Stuttgart.

reports. For our primary analysis, we use information on all officially listed stocks in Germany, France, and the United Kingdom for 30 trading days before the turn of the year and after the turn of the year for each period, plus observations for Christmas and New Year's Eve, which are only relevant for France and the United Kingdom.[10] This leaves us with 267,582 stock–day observations.

These raw data are adjusted in two ways. 1) We exclude all observations with missing information on share prices, trading volumes, or control variables. 2) We do not consider observations with negative book value.[11] Our final data are an unbalanced panel with 208,785 stock–day observations for the treatment period and two control periods: 60,871 observations from the German market, 80,400 observations from the French market (NYSE Euronext Paris), and 67,514 observations from the UK market (London Stock Exchange).

Descriptive statistics for our main variables of interest (share price, daily return, trading volume) and our most relevant control variables (market value, book value, EBITDA) are documented in Table 3. Share price is the average daily stock price as provided by Datastream. The daily return is the relative change of the actual share price compared to the share price of the last trading day in percentage points. The trading volume shows the number of shares traded per day (in 1,000's). The book value is calculated as the share price divided by the price-to-book ratio and multiplied by the number of shares. EBITDA are yearly earnings before interests, taxes, depreciation, and amortization. We use the realized EBITDA of the coming period (e.g., EBITDA 2009 for the period 2008–2009) as a proxy for expected profit. Share prices, market values, book values, and EBITDA are reported in local currency (in euros for Germany and France and in British pounds for the United Kingdom).

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[10] While stock markets in Germany are closed on Christmas and New Year's Eve, trading on these days is possible in France and the United Kingdom. Therefore, we consider 62 trading days in our control group and 60 trading days in our treatment group. Note that this effect is not only relevant for the period 2008–2009, but also for the preceding and following control periods. Thus, it should not bias our regression results. As a cross-check, we tested alternative regressions excluding observations of these additional trading days, with almost identical results.

[11] We exclude these observations, since the securities bankrupt firms could be affected by specific stock market reactions.

[Table 3 about here]

Table 3 documents that average stock prices are lower in the German stock market, which should be driven by the division of stocks into shares. The mean daily returns in all three stock markets are very small and statistically not different from zero. Trading volume is higher in the United Kingdom and somewhat lower in France, while average EBITDA, market volume, and book value are similar in all three markets. In conclusion, the market indicators of Table 3 reveal substantial similarities between the stock markets analyzed. Even more important, the graphical evidence in Section 5.1 clearly shows that the capital markets in London and Paris are well-suited as a control group for share prices, daily returns and trading volumes of the German stock market. For all three dependent variables we observe a strong correlation (common trend) between the treatment group and the control group before the CGTR 2009 introduction date as the relevant event. We consider stock fixed effects and stock market–year fixed effects in our regressions to account for differences between the three stock markets, which do not vary over the 60 trading days of the observation periods (e.g. differences in trading volumes as documented by Table 3).

5. Empirical analysis

5.1. Graphical evidence

Hoopes et al. (2015) provide evidence that the Google search behavior of taxpayers for capital gains taxes is closely related to tax-specific events, while Da et al. (2011) use Google searches as a measure for investor attention. Therefore, we report as a first step the frequency of Google searches for *Abgeltungsteuer* or *Abgeltungssteuer* (German words for the new flat tax on capital gains) in 2008. We rely on a normalized index from Google trends with a minimum value of 0 and a maximum value of 100. Figure 2 documents average weekly index values as well as changes of these averages between two consecutive weeks throughout the year 2008.[12]

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[12] As research activities on weekends may affect trading of the following week but not of the previous trading days, we treat Saturdays and Sundays as the first and the second day of a trading week. We do further not consider search activities on New Year´s Eve as information gathered on that day could not be used for stock

We find a considerable increase in the Google search index in the second half of 2008, which fits well with our hypothesis of higher tax awareness shortly before the reform deadline. The maximum average index has been reached at the end of the year 2008. This can be taken as a first indicator that the CGTR introduction date as well as media reports in December 2008 attracted the attention of individual investors. For a graphical analysis of stock market reactions close to the TY 2008/2009, we use the following regression to derive estimates for abnormal trading volumes, abnormal share prices, and abnormal daily returns at TY 2008/2009:

$$Y_{it} = \alpha + \delta \cdot C_{it} + \vartheta_{it} + \psi_{it} + \upsilon_i + u_{it}. \tag{5}$$

For the dependent variable Y_{it}, we use the logarithm of trading volume (measured in thousands of traded shares per day), the relative change of share prices for each trading day (daily return), and the logarithm of the share price in local currency (euros or British pounds). Regarding trading volume and share price, we choose a logarithmic specification to obtain estimates for relative changes (in percent) and to ensure linearity in variables.

Our vector of controls C_{it} accounts for the logarithm of market value, the logarithm of book value (all measured in millions of the local currency), and EBITDA per share. Regarding the market value, we do not account for changes closely before and after the TY 2008/2009. Thus, we rely on the average market value over the first ten trading days of each turn-of-the-year cycle for each stock. This is to avoid endogeneity, since the market value could be driven by the share price and not vice versa.

We consider the panel nature of our data by stock fixed effects υ_i. We also include stock market–year fixed effects ϑ_{it} (a set of dummy variables for each stock market–year combination) and industry–year fixed effects ψ_{it} (a set of dummy variables for each industry–

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trading in 2008 (stock market was closed yet).

year combination) to account for trends and exogenous shocks. Abnormal daily returns, share prices, and trading volumes for each stock–day observation are measured by the regression residual u_{it}. A graphical analysis for pseudo-reform years as well as an analysis of unconditional mean values (instead of regression residuals) is provided by Appendix B. Corresponding results support our baseline analysis.

In figures 3 to 5, we report average residuals for the treatment period (30 trading days before and after the TY 2008/2009 plus Christmas and New Year's Eve) regarding the treatment group (Germany) and the control group (France and the United Kingdom). The figures reveal that the regression residuals of the treatment group and the control group are closely correlated over the whole treatment period. This holds especially for share prices and daily returns and confirms the common trend assumption, which is a necessary requirement for difference-in-differences estimation. Therefore, our control group should provide us with an appropriate reference point for identifying the impact of the CGTR 2009.

[Figure 3 about here]

At the beginning of the observation period, abnormal trading volumes, as shown in Figure 3, are almost identical in the treatment group and the control group. However, beginning about five trading days before the TY 2008/2009, there is a strong deviation in abnormal trading volumes, with a maximum difference compared to those of France and the United Kingdom by the last trading day in 2008. Thereafter, we find a strong decline in German abnormal trading volumes, while the abnormal trading volumes of the control group are consistently higher. Considering estimates for our control group, our graphical evidence fits well with the interpretation that German investors abnormally increased their trades by the end of 2008 and shifted trades from 2009 to 2008 to avoid the flat tax on capital gains for shares bought after January 1, 2009.

[Figure 4 about here]

In line with our expectations, the abnormal daily returns (Figure 4) of the treatment group are higher before and lower after the introduction date. We also observe a temporary increase in share prices shortly before and after the TY 2008/2009 (Figure 5). Both observations can be taken as evidence that the CGTR 2009 introduction date resulted in a temporary increase in share prices until prices returned to their normal levels in the second trading week of 2009.

[Figure 5 about here]

5.2.   Stock market effects at the TY 2008/2009

As described in Section 4.1, we interpret stock–day observations of the German stock market as the treatment group and corresponding observations in France and the United Kingdom as the control group. In addition, we use observations of the control periods 2007/2008 and 2009/2010 to control for structural differences in stock markets and turn-of-the-year effects. Hence, we use the regression model of equation (6) with the logarithm of trading volume (measured in thousands of trades per day), the daily return in percentage points, and the logarithm of the average daily share price in the local currency as the dependent variables Y_{it}

$$
\begin{aligned}
Y_{it} = \alpha &+ \beta_1 \cdot SBefore_{it} + \beta_2 \cdot SBefore\ Germany_{it} + \beta_3 \cdot SBefore\ 0809_{it} + \beta_4 \cdot SBefore\ DDD_{it} \\
&+ \gamma_1 \cdot SAfter_{it} + \gamma_2 \cdot SAfter\ Germany_{it} + \gamma_3 \cdot SAfter\ 0809_{it} + \gamma_4 \cdot SAfter\ DDD_{it} \\
&+ \delta \cdot C_{it} + \vartheta_{it} + \psi_{it} + \upsilon_i + u_{it}.
\end{aligned}
\tag{6}
$$

SBefore is a dummy variable with a value of one in a reference period <u>shortly</u> before the turn of the year. Taking into account the graphical evidence in Subsection 5.1., we choose two trading days before the turn of a given year (e.g., TY 2008/2009) as our standard reference period. *SBefore* is zero for all other trading days. That holds for observations of earlier trading days and for observations after the turn of the year. As alternative reference period, we use five trading days (*SBefore (5D)*). In this case, *SBefore (5D)* is one for observations of the last five trading days before the turn of the year and zero for all other observations.

The variables *SBefore Germany* and *SBefore 0809* are dummies controlling for structural differences of turn-of-the-year effects in the German stock exchange and in the 2008–2009

period. They are calculated as interaction term of *SBefore* and a dummy variable for Germany or for the period 2008–2009. To keep the notation short, we abbreviate this interaction as *SBefore* (e.g. *SBefore Germany*). The effect of the CGTR 2009 is captured by the triple-difference parameter *SBefore DDD*, which is an interaction term of *SBefore*, a dummy variable for Germany, and the dummy for 2008–2009. We expect that *SBefore DDD* is positively correlated with share prices, daily returns, and trading volumes.

Similar to *SBefore*, *SAfter* is a dummy variable with a value of one in a short reference period after the turn of a given year. We generally use the same time window for *SAfter* and *SBefore* (two trading days in the baseline case). The terms *SAfter Germany, SAfter 0809,* and *SAfter DDD* are calculated in the same way as the corresponding interaction terms of our *SBefore* dummy. We expect a positive correlation of *SAfter DDD* with the share price and a negative correlation of *SAfter DDD* with daily returns and trading volumes. The control variables conform to the regression model for our graphical analysis in equation (5). We estimate a simplified model including a limited set of controls (stock market–year fixed effects and stock fixed effects) and an extended model further including industry–year fixed effects as well as *Market value, Book value,* and *EBITDA*. An overview of the definition of regression variables is provided by Table A1 in Appendix A.

The estimation is executed by ordinary least squares (OLS). We use robust standard errors clustered for each stock to account for heteroscedasticity and the autocorrelation of standard errors. As documented by Petersen (2009), these clustered (Rogers) standard errors produce correct estimates and correctly sized confidence intervals in the presence of cross-sectional (firm effects) and time-series (time effects) correlations of standard errors and are more accurate than Fama–MacBeth estimates in the presence of firm effects. We report two measures for R-squared. While the "regular" R-squared describes the fraction of the overall variation explained by the whole model including stock fixed effects, within R-squared

focuses on the variation over time excluding stock fixed effects. Thus, within *R*-squared describes which part of the within variation is explained by the variables changing over time. The regression results for our baseline model with a reference period of two trading days are displayed in Table 4. In the models for daily returns, the regression coefficients of the dummy can be interpreted as a change in the daily return in percentage points. In the logarithmic models for share prices or trading volumes, our results can be interpreted as semi-elasticities. In this case, the estimated dummy-variable coefficients have to be recalculated to determine the relative effect on the dependent variable. As shown by Kennedy (1981), the relative change can be approximated by $\exp\left(\hat{\beta}_i - \frac{1}{2} \cdot Var\left(\hat{\beta}_i\right)\right) - 1$ with the estimated regression coefficient $\hat{\beta}_i$ and the variance $Var\left(\hat{\beta}_i\right)$, which is defined as the squared estimated standard error of $\hat{\beta}_i$.

[Table 4 about here]

The regression results for our primary variables of interest (*SBefore DDD* and *SAfter DDD*) confirm our hypotheses. We focus on the extended models with a higher number of control variables. Confirming H1a, the average daily trading volume of the German stock market in the period 2008–2009 unexpectedly increased by about 142.0% before the introduction of the capital gains tax (*SBefore DDD*). While Table 4 does not provide significant evidence of lower trading volume after the reform (*SAfter DDD*), our hypothesis on a shifting of trading volumes (H2a) is supported for a longer reference period of five trading days (Table 5). We further find a strong effect of *SBefore DDD* and *SAfter DDD* on daily returns and share prices. In line with H1b and H2b, the daily return is 2.66 percentage points higher before the turn of the year and 1.92 percentage points lower thereafter. Regarding H1c and H2c, we can state a share price level about 5.6% (4.8%) higher before (after) the reform. All in all, Table 4 suggests an unexpected trading volume at the TY 2008/2009, resulting in a strong but temporary increase in abnormal share prices and a return to their normal levels thereafter.

We tested an extended number of control periods, an extended control group, and a "normal" difference-in-difference specification instead of our triple difference model (Appendix B, tables A2, A3, and A4). The results of these cross checks confirm our baseline regressions. While the "normal" difference-in-differences specification suggests an even stronger CGTR 2009 impact on trading volumes at the TY 2008/2009, this is driven by structural differences between the treatment group (Germany) and the control group, which can also be observed for placebo tests in the control periods (2007/2008, 2009/2010). Therefore, our triple difference identification strategy seems be an appropriate way to overcome this weakness of a "normal" difference-in-difference specification. Unreported cross checks further include the exclusion of observations on Christmas and New Year's Eve, the exclusion of observations with negative EBITDA, and a longer reference period, with almost identical results. More information on cross checks is provided by Eichfelder and Lau (2015).

Pantzalis and Ucar (2014) find empirical support that the attention of market participants to earnings news can be preoccupied by religious holidays. On Christmas as well as on weekends and New Year's Eve, the German financial market is closed. As a result, there were only two trading days left between Christmas 2008 and New Year's Eve 2008. Since Christmas celebrations should have absorbed the attention of market participants, we expect an especially strong market reaction in the last two trading days in 2008 (December 29 and December 30) compared to a five-day period.

Therefore, we re-estimate the model including variables for two different reference periods (two days and five days). Within these regressions, the variables *SBefore DDD (5D)* and *SAfter DDD (5D)* measure the average effects for a reference period of five days and *SBefore DDD* and *SAfter DDD* measure the additional effects for the shorter reference period of two days. Hence, the total effects for two days can be calculated as the sum of the effects for five days and the additional effects for two days. The results are provided in Table 5. We abstain

from reporting the results for regression controls, which are almost identical to those in Table 4. That holds also for the calculations in the following subsections.

Confirming H1a to H1c, we find that share prices, daily returns, and trading volumes are significantly higher in the last two days compared to the average of the last five days <u>before</u> the TY 2008/2009. This result holds especially for the effect on share prices, which is not significant in the five-day reference period if we account for regression controls (model 2). The results of Table 5 provide us with a more accurate estimate of market reactions. Combining the results on all relevant variables and focusing on the models with a higher number of controls, the average abnormal increase in trading volumes is 102.8% within the first three days of the last trading week of 2008 and 150.3% in the last two trading days. The aggregate abnormal return for the last five trading days of 2008 can be calculated by grossing up the abnormal daily returns over the whole period (1.85 percentage points in the first three days; 2.73 percentage points in the last two days). Compared to the control group, share prices of the German market therefore increased by about 11.5% within the last five trading days of 2008. Thus, late investors paid a high mark-up to avoid future capital gains tax payments. Considering that the observed temporary increase in share prices was restricted to a very short period before the reform (especially the last two days),[13] this mark-up could easily have been avoided by tax-aware investors.

5.3. Deadline effect and media effect

In this section, we test hypotheses H3a and H3b suggesting a positive impact of media reports on the CGTR 2009 on the logarithm of trading volumes (measured in 1,000 euros) and the daily return in percentage points. Furthermore, we test if H1a and H1b still hold when we control for media coverage.[14] Our models are based on the triple difference approach of

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[13] We conducted a number of unreported cross-checks for alternative longer reference periods with weak and insignificant tax effects on the price level. Hence, according to our evidence, tax effects are focused on the last five trading days of the German stock market in 2008.

[14] With regards to media coverage, we abstain from performing regressions on the logarithm of stock price as dependent variable. This is due to the fact that stock price is non-stationary. While this seems to be a smaller

equation (6). However, we extend our observation period to increase the power of our tests and the variation in our measure for media coverage. We consider 60 observations before and after the TY 2008/2009 resulting in an unbalanced panel of 1,313 stocks and 411,869 observations.

We measure media coverage by the weekly number of articles on the CGTR 2009 (*Articles*) provided by Table 2. Saturdays and Sundays are regarded as the first two days of the following week. Since stock markets are closed on weekends, an increase in attention on these days could affect trading behavior on the following days (Monday to Friday) but not on the current day. In line with our triple difference setup, we further include interaction terms of *Articles* with the German market (*Articles Germany*) and the year 2008 (*Articles 2008*). Thus, we use *Articles* not as a measure for the media coverage of the CGTR 2009, but as a variable for trends in media interest affecting the treatment group and the control group in all periods. For example, it might well be the case that news on the CGTR 2009 is correlated to seasonal effects (e.g., turn-of-the-year effect) or other events in the year 2008. To account for that aspect, *Articles* is matched to all other observations of the same month and day (from the control group and the control periods). The impact of media reports on the German market is identified by the triple difference identifier *Articles DDD*, which is an interaction term of *Articles*, a dummy variable for the German market and a dummy variable for the year 2008. Therefore, *Articles* itself controls for general trends affecting the treatment group and the control group for all control periods (e.g. seasonality effects of media information related to capital markets), while *Articles Germany* and *Articles 2008* control for corresponding effects in the German market and the year 2008.

Regression results are provided by Table 6. Control variables and estimation procedures conform to tables 4 and 5. In models 1 and 5, we do not control for deadline effects at the TY 2008/2009. As expected we find a positive and significant effect of the number of articles

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problem for a singular event like the CGTR 2009 introduction deadline, it gets more troublesome in case of the variation of variables over time like for the number of weekly articles on the CGTR 2009.

(measured by *Articles DDD*) on daily returns and trading volumes. That outcome holds if we include triple difference dummy variables for two trading days (model 2, 6) or two and five trading days (models 3, 7). We abstain from reporting the triple difference control variables (*Before*, *Before Germany*, *Before 0809*, *After*, *After Germany*, *After 0809*) as well as the other regression controls (*EBITDA*, *Market value*, *Book value*). Controlling for a full set of dummy variables for the CGTR 2009 deadline (models 3 and 7), we find that one additional article on the CGTR 2009 increases the daily return by about 0.4 basis points (= 0.004 percentage points) and the trading volume by about 0.5 %. While the estimated impact on daily return is small, 20 articles would increase trading volume by 10% (daily return by 0.08 percentage points).

An interesting implication of Table 6 is that media effects in December 2008 are captured by *Articles DDD*. Thus, we may interpret the combined regression coefficients of *SBefore DDD* and *SBefore (5D)* as rough estimates for the "pure" deadline effect in the last two and five trading days before the TY 2008/2009. A problem for that interpretation is that articles in December recommended to buy shares and, therefore, might have a stronger impact on trading volumes and daily returns compared to media reports in previous months. Therefore, we include *Articles DDD DEC* in models 4 and 8 being defined as an interaction term of *Articles DDD* and a dummy for December 2008. This variable measures if there had been a different impact of articles at the end of the year 2008. Regression results suggest that articles in December 2008 had a stronger impact on daily returns and a smaller effect on trading volumes. Nevertheless, the inclusion of *Articles DDD DEC* does not have a strong impact on our estimates for the deadline effect captured by *SBefore DDD* and *SBefore DDD (5D)*.

Considering Kennedy (1981), our regression results of the models 4 and 8 for *SBefore DDD (5D)* (average effect in the last 5 days) and *SBefore DDD* suggest that the deadline effect increased average trading volume by 116.0% in the last two trading days and resulted in an

abnormal aggregate return of 9.9 percentage points. As these models control for media effects, they can be regarded as a vague estimate for the "pure" deadline effect.

Comparing these estimates with the results of an (unreported) regression using the same specification but excluding the control variables for media coverage (*Articles*, *Articles Germany*, *Articles 2008*, *Articles DDD*, *Articles DDD DEC*) provides us with an approximation of the explanatory power of deadline effect (model controlling for media effects) compared to the aggregate sum of the media and deadline effect at the TY 2008/2009 (model not controlling for media effects). Our calculations suggest that about 83.2% (89.0%) of stock market reactions at the TY 2008/2009 on trading volumes (daily returns) result from the deadline effect. While corresponding estimates should be interpreted with caution, they seem plausible if we consider the very small coefficient of Articles DDD in the regressions on daily returns. Overall, the findings of Table 6 provide evidence for our hypotheses 1a, 1b, 3a, and 3b. They further suggest that market reactions at the TY 2008/2009 are mainly caused by the deadline effect, while the impact of media coverage should have been less relevant.

[Table 6 about here]

5.4. Tests on trading volume per transaction

While theory suggests that the strong stock market reactions at the TY 2008/2009 are driven by tax-induced trading of individual investors, our data base does not allow for a direct identification of the stock purchases of this investor type. Following the literature (Bhattacharya, 2001; Barber et al., 2009), we interpret small trading volumes as a proxy for trading activities of individual investors and rely on the hypotheses H4a and H4b as empirical tests. We expect a reduction of trading volume per transaction closely before the CGTR introduction deadline (H4a) as well as in weeks with high media coverage on the CGTR 2009 during the year 2008 (H4b).

Since Datastream does not contain information on the average trading volume per market transaction, we gathered additional information on the daily number of market transactions[15] for each stock of the main stock indexes in Germany (DAX 30), France (CAC 40), and the United Kingdom (FTSE 100). We consider the composition of these indexes as of December 31, 2008. For that reason, our database is smaller than for our baseline regressions and we do not control for industry–year fixed effects. The market transactions are all sell and buy transactions performed on a trading day for each stock.

As dependent variable, we use the natural logarithm of the daily average trading volume per transaction for each stock. This variable is calculated as the daily transaction volume in the local currency (number of shares traded multiplied with the daily average share price) divided by the daily number of market transactions for the corresponding stock. Using this information, we perform regressions as described by equation (6) with the dependent variables logarithm of trading volume (*Trading volume*) and logarithm of the daily average trading volume per transaction (*Trading volume per transaction*). As in Table 4, we focus on the last two trading days in 2008 (*SBefore DDD*). We expect that *SBefore DDD* has a positive and significant effect on *Trading volume* and a negative and significant effect on *Trading volume per transaction.*

[Table 7 about here]

In models 1 to 3, we find that the unexpected trading volume increased by 44.7% in the last two trading days in 2008. This estimate is somewhat smaller than in our baseline regressions, which suggests a weaker impact of the CGTR 2009 on large capitalization stocks and is consistent with our heterogeneity tests in Section 5.5. Confirming H4a, models 4 to 6 provide evidence of a decrease of about 11% in the average trading volume per transaction. Our results therefore support the assumption that the increase in trading volumes and share prices at the end of 2008 was at least partially driven by individual investors with low trading

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[15] We are thankful to Bloomberg for the provision of the additional data.

volumes per transaction and a (likewise) low degree of tax awareness. We also performed the regressions of Table 7 for a longer reference period of five trading days with almost identical results (not reported).

In order to increase the power of our test for H4b, we expand the analysis to the whole year 2008. Hence, we test if articles on the CGTR 2009 throughout the year 2008 are negatively correlated with the daily average trading volume per transaction on the German capital market. As we consider the whole year, we do not account for observations from previous and following years (control periods). We measure media coverage by the weekly number of articles (*Articles*) and identify the impact on the German market by the interaction term *Articles Germany* (*Articles×Germany*). Thus, *Articles* controls for general trends affecting the treatment group and control group. The OLS model can be described by

$$Y_{it} = \alpha + \beta_1 \cdot Articles_{it} + \beta_2 \cdot Articles\ Germany_{it} + \delta \cdot C_{it} + \vartheta_{it} + \psi_{it} + \upsilon_i + u_{it} \,. \tag{7}$$

We use almost the same specifications as in our previous regressions. As our measure for *Market value* would be captured by the firm fixed effect in a normal difference-in-difference setting (and therefore drop out), we use the logarithm of the daily market capitalization in millions of local currency instead of an average value for the whole period.[16] In addition, we include *SBefore* and *SBefore DD* as variables to control for Germany-specific effects within the last two trading days of the year (as identified by our baseline regressions). Since (7) does not account for control periods, *SBefore DD* is a simple difference-in-differences estimator.

The regression results in Table 8 confirm our expectations. We obtain a significant and positive coefficient for the interaction term *Articles Germany* on trading volume and a negative and significant effect of *Articles Germany* on trading volume per transaction. The results hold if we control for the introduction date of the CGTR 2009 by including *SBefore DD*. The regression coefficients of *SBefore DD* fit well with our previous findings (see Table

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[16] This seems to be unproblematic as share price and daily return are not used as dependent variables. Thus, endogeneity concerns should be less relevant.

7). In models 3 and 7 of Table 8, we also tested for an exclusion of observations from December, with similar results. Therefore, the observed correlation between trading behavior and tax awareness measures is not only driven by trading in December 2008 but is also valid for the whole year 2008. All in all, the regression results of tables 7 and 8 provide empirical support that the market reactions at the TY 2008/2009 are driven by individual investors.

[Table 8 about here]

5.5.   Heterogeneity of stock market effects at the TY 2008/2009

In the following, we address the heterogeneity of stock market reactions closely before and after the TY 2008/2009 with regard to three dimensions: (1) small capitalization and large capitalization stocks, (2) winner and loser stocks, and (3) dividend-paying and non–dividend-paying stocks. Existing research provides evidence for stronger market reactions of non–dividend-paying stocks to capital gains taxes (Amoako-Adu et al., 1992; Lang and Shackelford, 2000). In addition, market capitalization and stock price losses during the last year might be related to stock price elasticity.

The heterogeneity effect for a certain stock property (market capitalization, loser stock, non–dividend-paying stock) is identified by an interaction term of our *DDD* variables and the corresponding property variable *P* (*SBefore DDD×P* and *SAfter DDD×P*). We generally refer to our basic reference period of two trading days, as in Table 4 and consider the stationary dependent variables *Daily return* and *Trading volume*. However, we also tested regressions for a reference period of five trading days and *Share price* with similar results (not reported). Including further DD interaction terms as control variables, we can write a generalized form of the regression model as

$$
\begin{aligned}
Y_{it} = \alpha &+ \beta_1 \cdot SBefore_{it} + \beta_2 \cdot SBefore\ Germany_{it} + \beta_3 \cdot SBefore\ 0809_{it} + \beta_4 \cdot SBefore\ DDD_{it} \\
&+ \beta_5 \cdot SBefore \times P_{it} + \beta_6 \cdot SBefore\ Germany \times P_{it} + \beta_7 \cdot SBefore\ 0809 \times P_{it} + \beta_8 \cdot SBefore\ DDD \times P_{it} \\
&+ \gamma_1 \cdot SAfter_{it} + \gamma_2 \cdot SAfter\ Germany_{it} + \gamma_3 \cdot SAfter\ 0809_{it} + \gamma_4 \cdot SAfter\ DDD_{it} \\
&+ \gamma_5 \cdot SAfter \times P_{it} + \gamma_6 \cdot SAfter\ Germany \times P_{it} + \gamma_7 \cdot SAfter\ 0809 \times P_{it} + \gamma_8 \cdot SAfter\ DDD \times P_{it} + P_{it} \\
&+ \delta \cdot C_{it} + \vartheta_{it} + \psi_{it} + \upsilon_i + u_{it}.
\end{aligned}
\tag{8}
$$

The regression is performed in the same way (standard errors, control variables C_{it}) as in the previous subsections. The results for interaction terms related to market capitalization (*SBefore DDD×Market value*, *SAfter DDD×Market value*), loser stocks (*SBefore DDD×Loser*, *SAfter DDD×Loser*) and dividend-paying stocks (*SBefore DDD×Dividend*, *SAfter DDD×Dividend*) are documented in Table 9. The variable *Loser* is a dummy with a value of one in the case of a reduction in the share price during the last year. The change in the share price is defined as the average share price at the end of the current year minus the average share price at the end of the previous year.[17] *Dividend* is a dummy variable for a dividend-paying stock. For brevity, we abstain from reporting results for control variables (e.g., *EBITDA*), and control dummy variables (*SBefore, SBefore Germany, SBefore 0809, SBefore x Market value, SBefore Germany x Market value*, etc.).

[Table 9 about here]

The coefficients of *SBefore DDD×Market value* and *SAfter DDD×Market value* in the models 1 and 4 have the opposite sign as the coefficients of our identification variables *SBefore DDD* and *SAfter DDD* and are significant, with one exception (*SAfter DDD×Market value* for trading volumes; *SAfter DDD* is not significant as well). This outcome suggests that the trading volumes and prices of stocks with a large market capitalization reacted to a smaller degree to the CGTR 2009 deadline. We find further evidence that the daily returns of loser stocks were more strongly affected by the CGTR 2009 (models 2 and 5). Note that almost the whole effect on daily returns before the reform is captured by *SBefore DDD×Loser*, while our baseline interaction term *SBefore DDD* is not significant. However, we do not find significant effects for trading volumes. While existing research would imply a smaller tax effect for dividend-paying stocks, the relevant interaction terms are not significant for daily returns (model 3). Only for *SAfter DDD×Dividend* do we find a significant and negative coefficient

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[17] To calculate the average price, we consider observations of the second to last trading week (i.e., last six to 10 trading days) of a given year. We do not account for the last five trading days, as this week is strongly affected by the pricing effects of the CGTR 2009 at the TY 2008/2009, which could bias our results.

for trading volume, which might suggest a stronger shifting of trades from 2009 to 2008 for dividend-paying stocks (contrary to expectations). However, the coefficient of *SBefore DDD×Dividend* is not significant for trading volume. Overall, we find no evidence for a stronger pricing reaction of non–dividend-paying stocks before the TY 2008/2009.

Table 9 implies stronger stock market reactions for small capitalization stocks, stronger pricing reactions of loser stocks and ambiguous effects for dividend-paying stocks. This fits well with the interpretation that the CGTR 2009 introduction deadline especially affected stocks with a higher price elasticity to demand shocks. While small capitalization stocks on average have smaller trading volumes and lower liquidity (Sikes, 2014), they also seem to be more strongly affected by the turn-of-the-year effect (Starks et al., 2006)[18] and herding behavior (Barber et al., 2009; Hsieh, 2013). Corresponding to empirical evidence on the disposition effect, individual shareholders are more reluctant to realize capital losses than to realize capital gains (e.g., Barberis and Xiong, 2009). This is consistent with a stronger pricing elasticity to an unexpected increase in stock demand. The ambiguous findings on dividend-paying stocks in Table 9 fit well with our interpretation that the stock market reactions closely before and after the TY 2008/2009 were driven by individual investors with a small degree of tax awareness and tax knowledge.

6. **Conclusion**

Our paper addresses the connection between tax capitalization effects and the attention of stock market participants. Extending existing research (Amoako-Adu et al., 1992; Lang and Shackelford, 2000; Dai et al., 2008), we argue that the impact of capital gains taxation on share prices and trading volumes depends on the attention of investors. We focus on deadlines and media coverage as factors affecting investor attention. While the impact of media coverage has been discussed by recent research (e.g., Tetlock, 2011; Liu et al., 2014, with

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[18]   In addition to window dressing, tax loss selling is an important explanation for the turn-of-the-year effect (e.g,, Poterba and Weisbenner, 2001; Starks et al., 2006; Sikes, 2014).

further references), the role of deadlines on investor attention has not been addressed so far. Based on a framework of rational inattention (Sims, 2003; Reis, 2006), we argue that the marginal value of decision-specific information increases closely before the deadline of a decision. Therefore, deadlines should focus the attention especially of individual investors.

For our empirical analysis, we use the introduction deadline of a major reform of the German capital gains taxation of individual investors at the 1st of January 2009 (CGTR 2009). Capital gains of shares acquired after that date were taxed with a rate of 26.38%, while capital gains of earlier acquisitions were tax-free after a minimum holding period of one year. The reform provided a strong incentive for individual investors to buy shares before 2009, while institutional investors were not affected. As the CGTR 2009 had been announced in 2007, tax-aware investors had sufficient opportunity to anticipate the reform in their trading decisions.

Using triple-difference estimation with NYSE Euronext Paris and London Stock Exchange as the control group and the preceding and following turn-of-the-year cycles as control periods, we find evidence of a strong and temporary increase in abnormal trading volumes, daily returns, and share prices shortly before the introduction date at the TY 2008/2009 and a subsequent reversal of returns and trading volumes in the five trading days thereafter. Corresponding to our estimates, we find an aggregate abnormal return of about 11.5% over the last five trading days in 2008. We also find evidence for a shifting of trades from 2009 to 2008. Our results suggest that the introduction deadline of the CGTR 2009 focused the attention of individual investors on the last trading days of 2008 resulting in a temporary increase of stock prices closely before the introduction deadline. Late inattentive investors, which might be considered as noise traders, paid a high mark-up for the acquisition of "tax-free" shares in the last trading days of 2008.

Apart from the deadline, we hypothesize an impact of CGTR media reports on stock prices and trading volumes. We find evidence that daily press articles on the CGTR 2009 increased

daily returns as well as trading volumes in the period before the introduction deadline. Following the literature on herding behavior (e.g., Barber et al., 2009) empirical tests on the average trading volume per transaction suggest further that the identified market reactions on the CGTR 2009 deadline and CGTR media reports were driven by individual investors with small trading volumes per transaction. Heterogeneity tests suggest that stock market reactions at the TY 2008/2009 were stronger for small capitalization stocks and stocks with a loss in the average stock price during the last year (loser stocks). This fits well with the observation that small capitalization stocks are more strongly affected by herding behavior (Barber et al., 2009; Hsieh, 2013) and turn-of-the-year effects (Starks et al., 2006; Sikes, 2014).

Our paper shows that deadlines of earlier announced events and corresponding media reports may have a strong impact on short-term trading and stock prices. We interpret our findings as evidence that deadlines and media reports focus the attention of more or less uninformed individual investors (noise traders) and may result in herding behavior and volatile stock market reactions. While our interpretation is supported by evidence on lower average trading volumes per transaction as a proxy for trading of individual investors, other explanations could be possible as well.

For example, one might argue that the volatile market reactions closely before the CGTR 2009 deadline resulted from strategic trading decisions delaying the acquisition of "tax-free" stocks to the last possible moment. However, considering the short-term nature of the CGTR 2009 impact, it seems unlikely that such strategies would have been based on expected changes in fundamentals within the last weeks of December 2008 (especially as this period is important for some but clearly not all industries, e.g., Christmas has a high relevance for retail stores and logistics). Thus, corresponding "strategic" behavior might in effect result as well from noise traders being 'alarmed' by the CGTR 2009 deadline and corresponding media articles on "tax-free" shares. An alternative and from our perspective more convincing explanation for our findings could be procrastination. Psychological and economic research

suggests that individuals tend to procrastinate in their actions and especially their savings behavior (e.g., Bernartzi and Thaler, 2004).

While alternative theoretical explanations should be able to explain our empirical evidence, they would lead to similar implications as the rational inattention framework of Sims (2003) and Reis (2006). Also in case of strategic investor behavior or investor procrastination deadlines should be relevant for investor attention and could result in herding behavior of investors. We conclude that deadlines seem to play an important role in the dissemination of stock market information and may have a strong impact on trading behavior.

Appendices

Appendix A: Definition of variables

Table A1 provides the definition of variables in our regression models.

[Table A1 about here]

Appendix B: Additional figures and regression cross checks

We calculate residual plots in the same way as in figures 3 to 5 for our control periods 2007–2008 and 2009–2010, which can be considered as pseudo-reform years. The results are documented in Figure A1. We observe that the common trend assumption is also satisfied in the control periods. However, we do not find a similar dynamic for trading volumes, daily returns, and share prices as in the treatment period. This holds especially for the daily returns, which are almost identical for the treatment group and the control group in both control periods.

[Figure A1 about here]

While our graphical evidence seems compelling, it might nevertheless be driven by our calculation approach. Therefore, we construct similar plots for unconditional daily mean values of trading volumes (in logs), daily returns, and share prices (in logs) for the treatment and control groups. To account for the fact that average trading volumes and share prices

differ between groups and periods, we normalize both dependent variables with their average value of the corresponding group and period (e.g., the mean share price of German shares in 2007–2008). We find that these unconditional plots in Figure A2 are very similar to our residual plots for abnormal trading volumes, daily returns, and share prices in Figures 3 to 5. Hence, graphical results do not seem to be driven by our regression approach. We calculate similar unconditional mean plots for pseudo-reform periods. Since the corresponding figures are almost identical to the residual plots in Figure A1, we abstain from reporting these results.

[Figure A2 about here]

In the following, we calculate a number of cross-checks for our baseline regressions in Section 5.2. First, we control for the robustness of our control group and our control periods. Hence, we increase the number of control periods from two (2007–2008 and 2009–2010) to four (2006–2007, 2007–2008, 2009–2010, 2010–2011) and we expand our control group (French and UK capital market) by all listed stocks from the Spanish capital market (Madrid Stock Exchange). The results are provided in Tables A2 and A3 and correspond to our baseline regressions.

[Table A2 about here]

[Table A3 about here]

Furthermore, we provide estimates for a regular difference-in-difference specification. In these models, we do not consider control periods from the 2007/2008 and 2009/2010 turn-of-the-year cycles. Therefore, *SBefore* and *SAfter* control for general market trends, while *SBefore Germany* and *SAfter Germany* are interaction terms of these variables with a dummy variable for Germany and identify the stock market reactions of the German market, closely before and after the TY 2008/2009. Table A4 reveals similar results to our baseline case in Table 4. However, the estimated impact on trading volume is much higher than in the triple difference specification. Additional cross checks on pseudo-reform periods reveal that this

should be driven by a German-specific seasonality effect on trading volumes. Our triple difference model accounts for that aspect.

[Table A4 about here]

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Tables and Figures

Table 1: Capital gains tax reform of 2009

	Acquisition before 1 January 2009		Acquisition after 1 January 2009
Holding period	≤ 1 year	> 1 year	not relevant
Fraction of taxable capital gains	50%	0%	100%
Effective tax rate	$0.5 \cdot \tau^i \cdot \left(1 + \tau^s\right)$	tax-exempt	$\tau^c \cdot \left(1 + \tau^s\right)$
Effective tax rate on capital gains for different income tax rates (25%, 35%, 45%)			
25%	13.19%	0%	26.38%
35%	18.46%	0%	26.38%
45%	23.74%	0%	26.38%

τ^i is the progressive personal income tax rate, varying from 0% to 45%; τ^c is the general capital gains tax rate, 25%; and τ^s is the solidarity tax surcharge rate, 5.5%. We assume that the taxpayer is a resident of Germany. Shares are qualified as personal property, the participation quota never exceeded 1% over the last five years, and we do not consider personal exemptions or lump-sum deductions, which are of minor relevance.

Table 2: Newspaper articles published in Germany in 2008 describing the new German capital gains tax of 2009

Daily Newspapers		Print run	Total number of articles	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bild	*, ***	4,114,651	15	0	1	2	0	0	0	6	0	1	2	0	3
Süddeutsche Zeitung	*	537,857	128	9	8	9	16	7	8	9	5	12	17	8	20
Frankfurter Allgemeine Zeitung (FAZ)	*	467,405	218	9	10	28	20	18	15	16	13	14	31	19	25
Kölner Stadtanzeiger/Kölnische Rundschau	**	386,751	65	2	6	4	2	2	11	1	2	7	4	18	6
Ostthüringer Zeitung/Thüringer Allgemeine/Thüringer Landeszeitung	**	361,204	39	0	5	9	2	4	4	5	2	1	2	1	4
Die Welt/Die Welt Kompakt	**	358,298	184	11	11	31	15	10	24	11	9	13	11	15	23
Stuttgarter Zeitung	*	246,955	9	2	2	0	1	0	0	0	0	2	1	1	0
Frankfurter Rundschau	*	194,525	37	3	5	3	3	0	2	3	2	1	3	11	1
Handelsblatt		183,170	188	5	12	21	34	16	10	6	4	13	38	7	22
Der Tagesspiegel		169,025	18	1	0	1	1	2	0	1	0	4	0	3	5
Berliner Kurier		161,833	4	0	1	2	0	0	0	0	0	0	0	0	1
Berliner Morgenpost		157,332	22	2	0	2	1	1	4	1	1	1	2	0	7
Westdeutsche Zeitung		143,952	5	0	0	0	0	0	0	0	0	0	0	3	2
Tageszeitung (TAZ)		76,400	7	1	1	0	0	0	1	0	1	0	0	0	3
Total		**7,559,358**	**939**	**45**	**62**	**112**	**95**	**60**	**79**	**59**	**39**	**69**	**111**	**86**	**122**

This table reports Germany´s largest daily newspapers in terms of average print runs in 2008. Information regarding the print runs of German newspapers was provided by the German Association for the Determination of the Dissemination of Advertising Media (*Informationsgemeinschaft zur Feststellung der Verbreitung von Werbeträgern e.V. (IVW)*). The table shows the monthly number of newspaper articles published in Germany in 2008 that describe the new German capital gains tax of 2009. The sample was mainly obtained by research in the database WISO-net.de, which contains articles of most German transregional and regional newspapers. In addition, we analyzed the online archives of important newspapers that are not included in WISO (e.g., *Süddeutsche Zeitung*). We generally used the following search term: (*abgeltungsteuer** OR *abgeltungssteuer**) AND (**aktie** OR *finanzinstrument**). Hence, we searched for articles connecting information on the new flat capital gains tax, shares (*Aktie*) or financial instruments (*Finanzinstrument*). Note that *Abgeltungsteuer/Abgeltungssteuer* is the generally accepted term for the new German flat tax on capital gains, dividends, and interest.

* The articles of these newspapers were collected manually from the respective online archives and selected by the term *Abgeltungsteuer* or *Abgeltungssteuer* (new capital gains tax) in combination with *Aktie* (share) or *Finanzinstrument* (financial instrument).
** Some newspapers that cooperate closely and have the same regional catchment areas (e.g., *Kölner Stadtanzeiger* and *Kölnische Rundschau*) are displayed jointly.
*** The readership of the daily newspaper *Bild* is less well educated and, on average, among the low income earners in Germany. This explains the quite low number of articles on the CGTR 2009.

Table 3: Descriptive statistics

	German stock exchange			French stock exchange			UK stock exchange		
Observations	60,871			80,400			67,514		
Variable	Mean	Median	Standard deviation	Mean	Median	Standard deviation	Mean	Median	Standard deviation
Share price	28.62	10.40	82.42	54.14	18.35	276.30	446.80	265.92	624.96
Daily return (%)	0.01	0.00	4.16	-0.14	0.00	4.20	-0.03	0.00	3.68
Trading volume (1,000s)	654.96	20.90	3,567.96	473.86	5.80	2,051.03	3,973.42	704.75	15,483.75
Market value (millions)	2,640.05	150.55	9,014.87	3,084.72	170.66	10,784.47	3,737.34	567.72	11,387.86
Book value (millions)	1,666.70	105.79	5,571.93	2,146.86	158.13	7,103.48	2,178.12	298.39	7,857.89
EBITDA (millions)	695.53	25.47	2,311.37	614.06	31.11	2,320.77	666.95	79.60	2,770.61

Average daily share prices, market values, book values, and EBITDA are reported in local currency (euros or British pounds). Trading volume is reported in thousands of share trades per day. The daily return is the relative change in the share price compared to the share price of the preceding trading day.

Table 4: Market effects at the TY 2008/2009: Two trading days

Model	1	2	3	4	5	6
Dependent variable	Share price	Share price	Daily return	Daily return	Trading volume	Trading volume
SBefore	0.0221***	0.0207***	0.00676***	0.00677***	-0.885***	-0.885***
	(0.00154)	(0.00158)	(0.000339)	(0.000338)	(0.0223)	(0.0223)
SBefore Germany	0.00736*	0.00886***	-0.00289***	-0.00290***	0.589***	0.589***
	(0.00403)	(0.00310)	(0.000856)	(0.000856)	(0.0397)	(0.0397)
SBefore 0809	-0.0215***	-0.0203***	0.00204**	0.00204**	0.159***	0.160***
	(0.00408)	(0.00404)	(0.000953)	(0.000953)	(0.0307)	(0.0306)
SBefore DDD	**0.0701***	0.0548***	0.0265***	0.0266***	0.883***	0.885***
	(0.00850)	**(0.00739)**	**(0.00250)**	**(0.00250)**	**(0.0525)**	**(0.0525)**
SAfter	0.0313***	0.0307***	0.00489***	0.00489***	-0.204***	-0.204***
	(0.00151)	(0.00149)	(0.000579)	(0.000579)	(0.0175)	(0.0175)
SAfter Germany	0.00487	0.00600*	0.00248**	0.00248**	-0.0112	-0.0109
	(0.00390)	(0.00307)	(0.00110)	(0.00110)	(0.0289)	(0.0289)
SAfter 0809	0.00536	0.0103***	0.0199***	0.0199***	-0.157***	-0.156***
	(0.00390)	(0.00386)	(0.00127)	(0.00127)	(0.0318)	(0.0318)
SAfter DDD	**0.0550***	**0.0470***	**-0.0193***	**-0.0192***	**-0.0167**	**-0.0196**
	(0.00816)	**(0.00776)**	**(0.00257)**	**(0.00257)**	**(0.0547)**	**(0.0548)**
EBITDA		-0.000136		2.18e-06		0.000238***
		(0.000109)		(1.47e-06)		(6.99e-05)
Market value		0.862***		-0.00303***		0.0565
		(0.0183)		(0.000438)		(0.0418)
Book value		-0.0684***		0.000903		0.0769**
		(0.0241)		(0.000652)		(0.0385)
Constant	3.859***	-1.029***	-0.00278***	0.0119***	4.118***	3.364***
	(0.00913)	(0.186)	(0.000105)	(0.00275)	(0.0118)	(0.292)
Stock fixed effects	YES	YES	YES	YES	YES	YES
Market–year fixed effects	YES	YES	YES	YES	YES	YES
Industry–year fixed effects	NO	YES	NO	YES	NO	YES
Number of observations	208,785	208,785	208,785	208,785	208,785	208,785
Number of stocks	1,315	1,315	1,315	1,315	1,315	1,315
Adjusted R–squared	0.977	0.992	0.00845	0.00888	0.907	0.907
Within R–squared	0.473	0.829	0.00779	0.00831	0.0645	0.0687

The dependent variables are the logarithm of share price, the daily return (in percentage points), and the logarithm of the trading volume (in thousands). Estimates are calculated by OLS with stock fixed effects. Heteroscedasticity-robust standard errors are clustered by stock level and documented in parentheses. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. A list of variable definitions is provided in Appendix A.

Table 5: Market effects at the TY 2008/2009: Two trading days and five trading days (5D)

Model	1	2	3	4	5	6
Dependent variable	Share price	Share price	Daily return	Daily return	Trading volume	Trading volume
SBefore	0.0123***	0.0114***	0.00222***	0.00222***	-0.495***	-0.495***
	(0.00108)	(0.00111)	(0.000511)	(0.000511)	(0.0200)	(0.0200)
SBefore Germany	-0.00288	-0.00486**	-0.00230**	-0.00229**	0.421***	0.421***
	(0.00420)	(0.00235)	(0.00114)	(0.00114)	(0.0376)	(0.0377)
SBefore 0809	0.00438*	0.00437**	0.00855***	0.00855***	0.00190	0.00291
	(0.00265)	(0.00219)	(0.00139)	(0.00139)	(0.0321)	(0.0320)
SBefore DDD	**0.0534***	**0.0536***	**0.00876***	**0.00877***	**0.213***	**0.212***
	(0.00690)	**(0.00537)**	**(0.00318)**	**(0.00318)**	**(0.0554)**	**(0.0554)**
SAfter	0.0118***	0.0107***	0.00672***	0.00672***	-0.213***	-0.213***
	(0.00114)	(0.00123)	(0.000756)	(0.000756)	(0.0202)	(0.0201)
SAfter Germany	-0.00899***	-0.00682***	0.000231	0.000227	0.0654*	0.0650*
	(0.00336)	(0.00226)	(0.00142)	(0.00142)	(0.0343)	(0.0343)
SAfter 0809	-0.0370***	-0.0322***	0.0117***	0.0117***	-0.232***	-0.231***
	(0.00267)	(0.00277)	(0.00167)	(0.00167)	(0.0365)	(0.0365)
SAfter DDD	**0.0430***	**0.0262***	**-0.00598*	**-0.00594*	**0.228***	**0.227***
	(0.00726)	**(0.00656)**	**(0.00315)**	**(0.00315)**	**(0.0628)**	**(0.0629)**
SBefore (5D)	0.0117***	0.0112***	0.00478***	0.00478***	-0.419***	-0.419***
	(0.00153)	(0.00149)	(0.000387)	(0.000387)	(0.0226)	(0.0226)
SBefore Germany (5D)	0.0115***	0.0152***	-0.000563	-0.000574	0.179***	0.179***
	(0.00344)	(0.00296)	(0.000734)	(0.000734)	(0.0331)	(0.0331)
SBefore 0809 (5D)	-0.0254***	-0.0240***	-0.00651***	-0.00652***	0.172***	0.172***
	(0.00454)	(0.00427)	(0.000872)	(0.000873)	(0.0260)	(0.0260)
SBefore DDD (5D)	**0.0185**	**0.00242**	**0.0184***	**0.0185***	**0.706***	**0.708***
	(0.00828)	**(0.00697)**	**(0.00219)**	**(0.00219)**	**(0.0479)**	**(0.0479)**
SAfter (5D)	0.0214***	0.0219***	-0.00160***	-0.00160***	-0.0194	-0.0194
	(0.00162)	(0.00156)	(0.000412)	(0.000412)	(0.0156)	(0.0156)
SAfter Germany (5D)	0.0152***	0.0143***	0.00228***	0.00228***	-0.0657**	-0.0649**
	(0.00370)	(0.00319)	(0.000857)	(0.000857)	(0.0284)	(0.0285)
SAfter 0809 (5D)	0.0429***	0.0431***	0.00818***	0.00818***	0.0903***	0.0902***
	(0.00409)	(0.00400)	(0.00111)	(0.00111)	(0.0311)	(0.0311)
SAfter DDD (5D)	**0.0139**	**0.0220***	**-0.0127***	**-0.0127***	**-0.211***	**-0.213***
	(0.00887)	**(0.00829)**	**(0.00210)**	**(0.00210)**	**(0.0515)**	**(0.0515)**
Controls	NO	YES	NO	YES	NO	YES
Stock fixed effects	YES	YES	YES	YES	YES	YES
Market–year fixed effects	YES	YES	YES	YES	YES	YES
Industry–year fixed effects	NO	YES	NO	YES	NO	YES
Number of observations	208,785	208,785	208,785	208,785	208,785	208,785
Number of stocks	1,315	1,315	1,315	1,315	1,315	1,315
Adjusted R–squared	0.977	0.992	0.0101	0.0106	0.907	0.908
Within R–squared	0.977	0.992	0.0101	0.0106	0.907	0.908

The dependent variables are the logarithm of share price, the daily return (in percentage points), and the logarithm of the trading volume (in thousands). Estimates are calculated by OLS with stock fixed effects. Heteroscedasticity-robust standard errors are clustered by stock level and documented in parentheses. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The controls include *EBITDA*, *Market value* and *Book value*. A list of variable definitions is provided in Appendix A.

Table 6: Deadline effects and media effects

Model	1	2	3	4	5	6	7	8
Dependent variable	Daily return	Daily return	Daily return	Daily return	Trading volume	Trading volume	Trading volume	Trading volume
Articles	7.98e-05***	7.39e-05***	7.31e-05***	7.31e-05***	-0.00143***	0.00208***	0.00192***	0.00192***
	(5.57e-06)	(5.87e-06)	(6.01e-06)	(6.01e-06)	(0.000283)	(0.000302)	(0.000303)	(0.000303)
Articles Germany	3.05e-05***	2.74e-05**	3.53e-05***	3.15e-05***	0.00179***	-0.00179***	-0.00147***	-0.00141***
	(1.08e-05)	(1.13e-05)	(1.16e-05)	(1.17e-05)	(0.000530)	(0.000538)	(0.000541)	(0.000539)
Articles 2008	-8.57e-05***	-8.82e-05***	-7.70e-05***	-7.70e-05***	0.00433***	0.00439***	0.00438***	0.00438***
	(7.19e-06)	(7.50e-06)	(7.47e-06)	(7.47e-06)	(0.000421)	(0.000448)	(0.000454)	(0.000454)
Articles DDD	**0.000103***	**6.18e-05***	**3.92e-05***	**2.44e-05***	**0.00651***	**0.00549***	**0.00493***	**0.00519***
	(1.35e-05)	**(1.38e-05)**	**(1.39e-05)**	**(1.42e-05)**	**(0.000751)**	**(0.000785)**	**(0.000792)**	**(0.000828)**
Articles DDD (December)				**8.42e-05***				**-0.00149***
				(2.50e-05)				**(0.000870)**
SBefore DDD		**0.0242***	**0.00753***	**0.00604***		**0.694***	**0.102***	**0.128***
		(0.00256)	**(0.00321)**	**(0.00322)**		**(0.0563)**	**(0.0582)**	**(0.0595)**
SAfter DDD		**-0.0189***	**-0.00586***	**-0.00583***		**0.0351**	**0.216***	**0.215***
		(0.00253)	**(0.00316)**	**(0.00316)**		**(0.0565)**	**(0.0631)**	**(0.0630)**
SBefore DDD (5D)			**0.0176***	**0.0165***			**0.625***	**0.645***
			(0.00216)	**(0.00220)**			**(0.0480)**	**(0.0471)**
SAfter DDD (5D)			**-0.0131***	**-0.0130***			**-0.173***	**-0.174***
			(0.00207)	**(0.00207)**			**(0.0540)**	**(0.0541)**
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Stock FE	YES	YES	YES	YES	YES	YES	YES	YES
Market–year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry–year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	411,869	411,869	411,869	411,869	411,869	411,869	411,869	411,869
Stocks	1,313	1,313	1,313	1,313	1,313	1,313	1,313	1,313
Adjusted R–squared	0.00264	0.00609	0.00692	0.00695	0.907	0.908	0.909	0.909
Within R–squared	0.00228	0.00575	0.00660	0.00664	0.0289	0.0426	0.0459	0.0460

The dependent variables are the logarithm of the trading volume and the daily return in percentage points. Estimates are calculated by OLS with stock fixed effects. Heteroscedasticity-robust standard errors are clustered by stock level and documented in parentheses. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Controls include *EBITDA*, *Market value*, *Book value*, *SBefore*, *SBefore Germany*, *SBefore 0809*, *SAfter*, *SAfter Germany*, and *SAfter 0809*. A list of variable definitions is provided in Appendix A.

Table 7: Analysis of trading volume: Tax effects at the TY 2008/2009

Model	1	2	3	4	5	6
Dependent variable	Trading volume	Trading volume	Trading volume	Volume per transaction	Volume per transaction	Volume per transaction
SBefore	-1.208***	-1.208***	-1.218***	-0.151***	-0.152***	-0.156***
	(0.0278)	(0.0279)	(0.0279)	(0.0135)	(0.0134)	(0.0134)
SBefore Germany	0.172***	0.171***	0.173***	0.0311	0.0322	0.0325
	(0.0403)	(0.0404)	(0.0407)	(0.0201)	(0.0201)	(0.0201)
SBefore 0809	0.107***	0.106***	0.0980***	0.0658***	0.0670***	0.0705***
	(0.0289)	(0.0289)	(0.0293)	(0.0190)	(0.0189)	(0.0190)
SBefore DDD	**0.368*****	**0.369*****	**0.372*****	**-0.109*****	**-0.111*****	**-0.111*****
	(0.0689)	**(0.0689)**	**(0.0697)**	**(0.0337)**	**(0.0336)**	**(0.0334)**
SAfter			-0.279***			-0.0952***
			(0.0240)			(0.0104)
SAfter Germany			0.0463			0.00516
			(0.0421)			(0.0190)
SAfter 0809			-0.217***			0.0998***
			(0.0343)			(0.0185)
SAfter DDD			0.0907			0.00414
			(0.0671)			(0.0348)
Controls	NO	YES	YES	NO	YES	YES
Stock fixed effects	YES	YES	YES	YES	YES	YES
Market–year fixed effects	YES	YES	YES	YES	YES	YES
Number of observations	24,127	24,127	24,127	24,127	24,127	24,127
Number of stocks	140	140	140	140	140	140
Adjusted R–squared	0.814	0.815	0.817	0.929	0.937	0.938
Within R–squared	0.271	0.273	0.285	0.112	0.213	0.216

The dependent variables are the logarithm of the trading volume and the logarithm of the trading volume per transaction. Estimates are calculated by OLS with stock fixed effects. Heteroscedasticity-robust standard errors are clustered by stock level and documented in parentheses. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Controls include *EBITDA*, *Market value*, and *Book value*. A list of variable definitions is provided in Appendix A.

Table 8: Analysis of trading volume: Media effects

Model	1	2	3	4	5	6	7	8
Dependent variable	Trading volume	Trading volume	Trading volume	Trading volume	Volume per transaction	Volume per transaction	Volume per transaction	Volume per transaction
Articles	0.00117**	-0.000477	0.00455***	0.00388***	-0.000941***	-0.00190***	-0.000638**	-0.00139***
	(0.000549)	(0.000550)	(0.000547)	(0.000534)	(0.000333)	(0.000281)	(0.000273)	(0.000280)
Articles Germany	0.00442***	0.00379***	0.00231**	0.00139	-0.00146	-0.00187**	-0.00133**	-0.00171**
	(0.00104)	(0.000950)	(0.00112)	(0.000951)	(0.000921)	(0.000749)	(0.000562)	(0.000729)
SBefore				-1.376***				-0.161***
				(0.0361)				(0.0182)
SBefore Germany				0.405***				-0.148***
				(0.0790)				(0.0305)
Controls	NO	YES	YES	YES	NO	YES	YES	YES
Stock fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	34,089	34,089	31,303	34,089	34,089	34,089	31,303	34,089
Number of stocks	137	137	137	137	137	137	137	137
Adjusted R–squared	0.819	0.822	0.848	0.836	0.948	0.950	0.954	0.950
Within R–squared	0.00236	0.0188	0.0583	0.0965	0.00304	0.0324	0.0295	0.0401

The dependent variables are the logarithm of the trading volume and the logarithm of the trading volume per transaction. Estimates are calculated by OLS with stock fixed effects. Heteroscedasticity-robust standard errors are clustered by asset level and documented in parentheses. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Controls include *EBITDA*, *Market value*, and *Book value*. A list of variable definitions is provided in Appendix A.

Table 9: Heterogeneity tests

Model	1	2	3	4	5	6
Dependent variable	Daily return	Daily return	Daily return	Trading volume	Trading volume	Trading volume
SBefore	0.0147***	0.00593***	0.00930***	0.207***	-0.930***	-0.728***
	(0.00142)	(0.000420)	(0.00110)	(0.0640)	(0.0261)	(0.0662)
SBefore Germany	-0.00887***	-0.00240***	-0.00482***	0.639***	0.585***	0.663***
	(0.00330)	(0.000886)	(0.00183)	(0.0960)	(0.0473)	(0.0825)
SBefore 0809	-0.00931**	-0.00255	0.00809	-0.374***	0.0905	0.127
	(0.00381)	(0.00271)	(0.00566)	(0.101)	(0.101)	(0.176)
SBefore DDD	**0.0447***	**0.000454**	**0.0195***	**1.300***	**0.802***	**0.914***
	(0.00786)	**(0.00647)**	**(0.00706)**	**(0.152)**	**(0.215)**	**(0.192)**
SAfter	0.00970***	0.00695***	0.0163***	0.173***	-0.154***	0.0975
	(0.00298)	(0.000576)	(0.00359)	(0.0640)	(0.0216)	(0.0686)
SAfter Germany	0.00317	0.00100	-0.00462	-0.157*	-0.0105	-0.202**
	(0.00436)	(0.00117)	(0.00404)	(0.0937)	(0.0364)	(0.0819)
SAfter 0809	0.0137***	-0.000297	0.0177***	-0.631***	-0.113	-0.611***
	(0.00460)	(0.00386)	(0.00491)	(0.113)	(0.0832)	(0.1000)
SAfter DDD	**-0.0340***	**-0.00587**	**-0.0230***	**-0.0392**	**-0.177**	**0.366***
	(0.00830)	**(0.00761)**	**(0.00653)**	**(0.186)**	**(0.300)**	**(0.131)**
SBefore DDD × Market value	**-0.00332***			**-0.0777***		
	(0.00120)			**(0.0228)**		
SAfter DDD × Market value	**0.00296**			**0.0147**		
	(0.00126)			**(0.0279)**		
Loser		-0.000865***			0.0686**	
		(0.000238)			(0.0294)	
SBefore DDD × Loser		**0.0282***			**0.0637**	
		(0.00721)			**(0.236)**	
SAfter DDD × Loser		**-0.0165**			**0.186**	
		(0.00818)			**(0.311)**	
Dividend			0.000768**			0.0708**
			(0.000361)			(0.0326)
SBefore DDD × Dividend			**0.00663**			**-0.00830**
			(0.00752)			**(0.204)**
SAfter DDD × Dividend			**0.0100**			**-0.391**
			(0.00695)			**(0.154)**
DD dummy variables	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES
Stock fixed effects	YES	YES	YES	YES	YES	YES
Market–year fixed effects	YES	YES	YES	YES	YES	YES
Industry–year fixed effects	YES	YES	YES	YES	YES	YES
Number of observations	208,785	208,785	184,208	208,785	208,785	184,208
Number of stocks	1,315	1,315	1,157	1,315	1,315	1,157
Adjusted R–squared	0.00910	0.00917	0.00980	0.907	0.907	0.908
Within R–squared	0.00857	0.00865	0.00948	0.0740	0.0693	0.0756

The dependent variables are the daily return (in percentage points), and the logarithm of the trading volume (in thousands). Estimates are calculated by OLS with stock fixed effects. Heteroscedasticity-robust standard errors are clustered by stocklevel and documented in parentheses. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Controls include *EBITDA*, *Market value* and *Book value*. For the models 1 and 4, DD dummy variables include *SBefore*, *SBefore Germany*, *SBefore 0809*, *SBefore x Market value*, *SBefore Germany x Market value*, *SBefore 0809 x Market value*, *SAfter*, *SAfter Germany*, *SAfter 0809*, *SAfter x Market value*, *SAfter Germany x Market value,* and *SAfter 0809 x Market value*. For the models 2 and 5, DD dummy variables include *SBefore*, *SBefore Germany*, *SBefore 0809*, *SBefore x Loser*, *SBefore Germany x Loser*, *SBefore 0809 x Loser*, *SAfter*, *SAfter Germany*, *SAfter 0809*, *SAfter x Loser*, *SAfter Germany x Loser,* and *SAfter 0809 x Loser*. For the models 3 and 6, DD dummy variables include *SBefore*, *SBefore Germany*, *SBefore 0809*, *SBefore x Dividend*, *SBefore Germany x Dividend*, *SBefore 0809 x Dividend*, *SAfter*, *SAfter Germany*, *SAfter 0809*, *SAfter x Dividend*, *SAfter Germany x Dividend,* and *SAfter 0809 x Dividend*. A list of variable definitions is provided in Appendix A.

Table A1: Definition of variables

Variable	Definition
Dependent variables	
Daily return	Relative change of the actual share price compared to the share price of the last trading day
Share price	Logarithm of the average share price in local currency of the current trading day
Trading volume	Logarithm of the number of shares traded (in thousands) on one trading day
Trading volume per transaction	Logarithm of the daily transaction volume in the local currency (number of shares traded multiplied with the daily average share price) divided by the daily number of market transactions
Triple difference dummy variables for trading days before the TY 2008/2009	
SBefore	Dummy variable with a value of 1 in the last <u>two</u> trading days of the German market before the TY 2008/2009
SBefore Germany	Interaction term of SBefore and a dummy variable for Germany
SBefore 0809	Interaction term of SBefore and a dummy variable for the 2008–2009 period
SBefore DDD	Interaction term of SBefore, a dummy variable for Germany and a dummy variable for the 2008–2009 period; identifier of market reactions shortly before the TY 2008/2009
SBefore (5D)	Dummy variable with a value of 1 in the last <u>five</u> trading days of the German market before the TY 2008/2009
SBefore Germany (5D)	Interaction term of SBefore (5D) and a dummy variable for Germany
SBefore Germany (5D)	Interaction term of SBefore (5D) and a dummy variable for the 2008–2009 period
SBefore DDD (5D)	Interaction term of SBefore (5D), a dummy variable for Germany and a dummy variable for the 2008–2009 period; identifier of market reactions in the five days before the TY 2008/2009
Triple difference dummy variables for trading days after the TY 2008/2009	
SAfter	Dummy variable with a value of 1 in the last <u>two</u> trading days of the German market after the TY 2008/2009
SAfter Germany	Interaction term of SAfter and a dummy variable for Germany
SAfter 0809	Interaction term of SAfter and a dummy variable for the 2008–2009 period
SAfter DDD	Interaction term of SAfter, a dummy variable for Germany and a dummy variable for the 2008–2009 period; identifier of market reactions shortly after the TY 2008/2009
SAfter (5D)	Dummy variable with a value of 1 in the last <u>five</u> trading days of the German market after the TY 2008/2009
SAfter Germany (5D)	Interaction term of SAfter (5D) and a dummy variable for Germany
SAfter Germany (5D)	Interaction term of SAfter (5D) and a dummy variable for the 2008–2009 period
SAfter DDD (5D)	Interaction term of SAfter (5D), a dummy variable for Germany and a dummy variable for the 2008–2009 period; identifier of market reactions five days after the TY 2008/2009
Variables for the identification of media effects	
Articles	Average weekly number of articles on the CGTR 2009; Saturdays and Sundays are considered as the first trading days of a trading week; for consistence of the triple difference estimation strategy, we match the number also to observations of the control group (by trading day) and to observations of the control periods (by calendar days)
Articles Germany	Interaction term of Articles and a dummy variable for Germany
Articles 2008	Interaction term of Articles and a dummy variable for the year 2008
Articles DDD	Interaction term of Articles, a dummy variable for Germany, and a dummy variable for the year 2008; identifier of the impact of CGTR 2009 media reports on the German stock market in 2008
General control variables	
EBITDA	EBITDA (earnings before interests, taxes, depreciation, and amortization) per share; for each turn-of-the-year cycle we rely on EBITDA of the coming year (e.g., 2009 for TY 2008/2009) to consider earnings expectations
Market value	Logarithm of the average market capitalization in millions of local currency in the first ten days of the observation period
Book value	Logarithm of the average book value of equity in millions of local currency
Variables for heterogeneity tests	
Dividend	Dummy variable with a value of one for dividend-paying stocks
Loser	Dummy variable with a value of one for stocks with a reduction of average stock price at the end of the year compared to the average stock price at the end of the last year
SBefore DDD x Dividend	Interaction term of SBefore DDD and Dividend
SAfter DDD x Dividend	Interaction term of SAfter DDD and Dividend
SBefore DDD x Loser	Interaction term of SBefore DDD and Loser
SAfter DDD x Loser	Interaction term of SAfter DDD and Loser
SBefore DDD x Market value	Interaction term of SBefore DDD and Market value
SAfter DDD x Market value	Interaction term of SAfter DDD and Market value

Table A2: Cross-checks: Extended number of control periods (2006–2007 to 2010–2011)

Model	1	2	3	4	5	6
Dependent variable	Share price	Share price	Daily return	Daily return	Trading volume	Trading volume
Before	-0.000703	0.0110***	0.00424***	0.00433***	-0.853***	-0.842***
	(0.00175)	(0.00120)	(0.000258)	(0.000260)	(0.0184)	(0.0184)
Before Germany	0.0113***	0.000915	-0.00251***	-0.00258***	0.543***	0.532***
	(0.00346)	(0.00238)	(0.000583)	(0.000586)	(0.0327)	(0.0326)
Before 0809	0.00227	-0.0101***	0.00457***	0.00449***	0.127***	0.117***
	(0.00406)	(0.00383)	(0.000936)	(0.000937)	(0.0286)	(0.0286)
Before DDD	**0.0624***	**0.0597***	**0.0263***	**0.0264***	**0.913***	**0.929***
	(0.00901)	**(0.00725)**	**(0.00241)**	**(0.00241)**	**(0.0496)**	**(0.0496)**
After	0.0275***	0.0229***	0.00578***	0.00587***	-0.120***	-0.134***
	(0.00188)	(0.00132)	(0.000451)	(0.000453)	(0.0132)	(0.0132)
After Germany	-0.00712**	0.00101	0.00155**	0.00142*	-0.0286	-0.0136
	(0.00319)	(0.00242)	(0.000786)	(0.000787)	(0.0214)	(0.0214)
After 0809	0.00806**	0.0176***	0.0190***	0.0189***	-0.242***	-0.227***
	(0.00405)	(0.00382)	(0.00123)	(0.00123)	(0.0300)	(0.0298)
After DDD	**0.0701***	**0.0519***	**-0.0183***	**-0.0182***	**0.00219**	**-0.0160**
	(0.00820)	**(0.00765)**	**(0.00246)**	**(0.00246)**	**(0.0520)**	**(0.0519)**
Controls	NO	YES	NO	YES	NO	YES
Stock fixed effects	YES	YES	YES	YES	YES	YES
Market–year fixed effects	YES	YES	YES	YES	YES	YES
Industry–year fixed effects	NO	YES	NO	YES	NO	YES
Observations	348,115	348,115	348,115	348,115	348,115	348,115
Number of stocks	1,356	1,356	1,356	1,356	1,356	1,356
Adjusted R–squared	0.964	0.990	0.00770	0.0103	0.895	0.898
Within R–squared	0.0166	0.330	0.00552	0.00411	0.00621	0.245

The dependent variables are the logarithm of share price, the daily return (in percentage points), and the logarithm of the trading volume (in thousands). Estimates are calculated by OLS. Heteroscedasticity-robust standard errors are clustered by stock level and documented in parentheses. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Controls include *EBITDA*, *Market value*, and *Book value*. A list of variable definitions is provided in Appendix A.

Table A3: Cross-checks: Extended control sample (United Kingdom, France, Spain)

Model	1	2	3	4	5	6
Dependent variable	Share price	Share price	Daily return	Daily return	Trading volume	Trading volume
Before	0.0204***	0.0192***	0.00555***	0.00555***	-0.784***	-0.784***
	(0.00147)	(0.00150)	(0.000357)	(0.000357)	(0.0231)	(0.0230)
Before Germany	0.00904**	0.0103***	-0.00168*	-0.00169*	0.487***	0.488***
	(0.00401)	(0.00306)	(0.000864)	(0.000864)	(0.0401)	(0.0402)
Before 0809	-0.0207***	-0.0199***	0.00249***	0.00248***	0.154***	0.155***
	(0.00386)	(0.00382)	(0.000909)	(0.000909)	(0.0287)	(0.0287)
Before DDD	**0.0692***	**0.0548***	**0.0261***	**0.0261***	**0.888***	**0.890***
	(0.00840)	**(0.00729)**	**(0.00248)**	**(0.00248)**	**(0.0514)**	**(0.0514)**
After	0.0293***	0.0293***	0.00548***	0.00548***	-0.176***	-0.176***
	(0.00157)	(0.00149)	(0.000542)	(0.000542)	(0.0166)	(0.0166)
After Germany	0.00686*	0.00746**	0.00189*	0.00188*	-0.0384	-0.0380
	(0.00392)	(0.00308)	(0.00108)	(0.00108)	(0.0283)	(0.0283)
After 0809	0.00666*	0.00999***	0.0199***	0.0198***	-0.127***	-0.126***
	(0.00359)	(0.00349)	(0.00117)	(0.00117)	(0.0292)	(0.0292)
After DDD	**0.0537***	**0.0473***	**-0.0193***	**-0.0192***	**-0.0469**	**-0.0494**
	(0.00802)	**(0.00758)**	**(0.00252)**	**(0.00252)**	**(0.0533)**	**(0.0533)**
Controls	NO	YES	NO	YES	NO	YES
Stock fixed effects	YES	YES	YES	YES	YES	YES
Market–year fixed effects	YES	YES	YES	YES	YES	YES
Industry–year fixed effects	NO	YES	NO	YES	NO	YES
Observations	228,462	228,462	228,462	228,462	228,462	228,462
Number of stocks	1,438	1,438	1,438	1,438	1,438	1,438
Adjusted R–squared	0.977	0.992	0.00779	0.00822	0.907	0.907
Within R–squared	0.478	0.824	0.00790	0.00844	0.0682	0.0732

The dependent variables are the logarithm of share price, the daily return (in percentage points), and the logarithm of the trading volume (in thousands). Estimates are calculated by OLS. Heteroscedasticity-robust standard errors are clustered by stock level and documented in parentheses. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Controls include *EBITDA*, *Market value*, and *Book value*. A list of variable definitions is provided in Appendix A.

Table A4: Cross-checks: Difference-in-difference approach

Model	1	2	3	4	5	6
Dependent variable	Share price	Share price	Daily return	Daily return	Trading volume	Trading volume
Before	-9.68e-05	-8.51e-06	0.00885***	0.00885***	-0.732***	-0.732***
	(0.00368)	(0.00369)	(0.000904)	(0.000904)	(0.0304)	(0.0304)
Before Germany	**0.0669***	**0.0668***	**0.0237***	**0.0237***	**1.491***	**1.492***
	(0.00644)	**(0.00644)**	**(0.00235)**	**(0.00235)**	**(0.0542)**	**(0.0542)**
After	0.0408***	0.0409***	0.0248***	0.0248***	-0.362***	-0.363***
	(0.00361)	(0.00362)	(0.00128)	(0.00128)	(0.0276)	(0.0276)
After Germany	**0.0548***	**0.0546***	**-0.0165***	**-0.0165***	**-0.0274**	**-0.0272**
	(0.00671)	**(0.00671)**	**(0.00241)**	**(0.00241)**	**(0.0494)**	**(0.0494)**
Controls	NO	YES	NO	YES	NO	YES
Stock fixed effects	YES	YES	YES	YES	YES	YES
Market–year fixed effects	YES	YES	YES	YES	YES	YES
Industry–year fixed effects	NO	YES	NO	YES	NO	YES
Observations	67,148	67,148	67,148	67,148	67,148	67,148
Number of stocks	1,260	1,260	1,260	1,260	1,260	1,260
Adjusted R–squared	0.996	0.996	0.0299	0.0299	0.916	0.916
Within R–squared	0.0109	0.0128	0.0104	0.0105	0.0289	0.0290

The dependent variables are the logarithm of share price, the daily return (in percentage points), and the logarithm of the trading volume (in thousands). Estimates are calculated by OLS. Heteroscedasticity-robust standard errors are clustered by stock level and documented in parentheses. The superscripts ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Controls include *EBITDA*, *Market value*, and *Book value*. A list of variable definitions is provided in Appendix A.

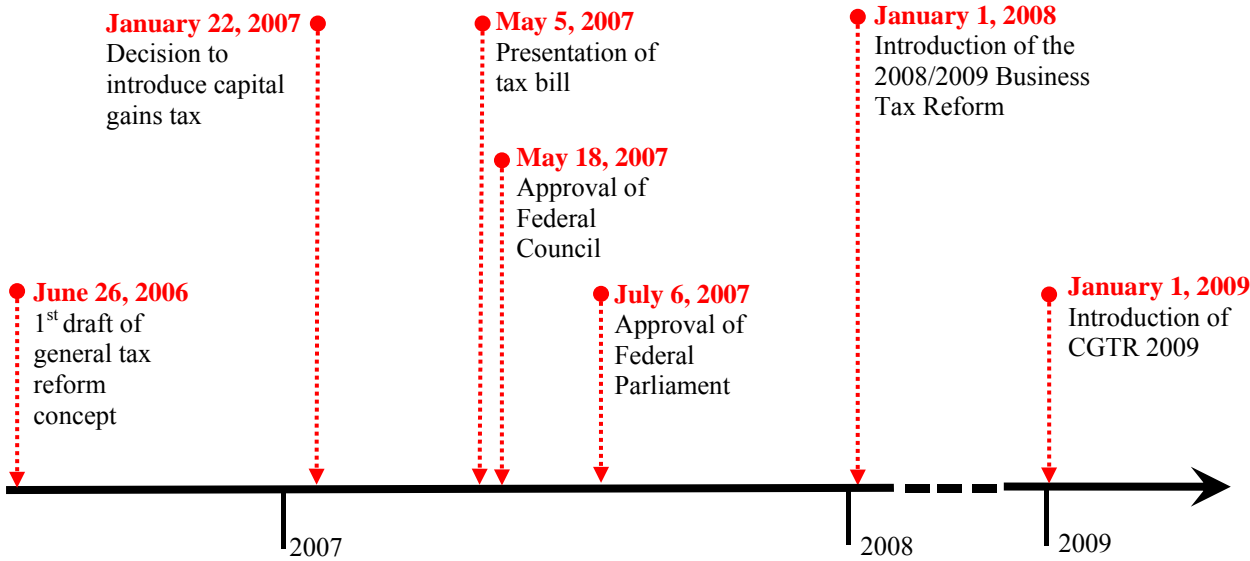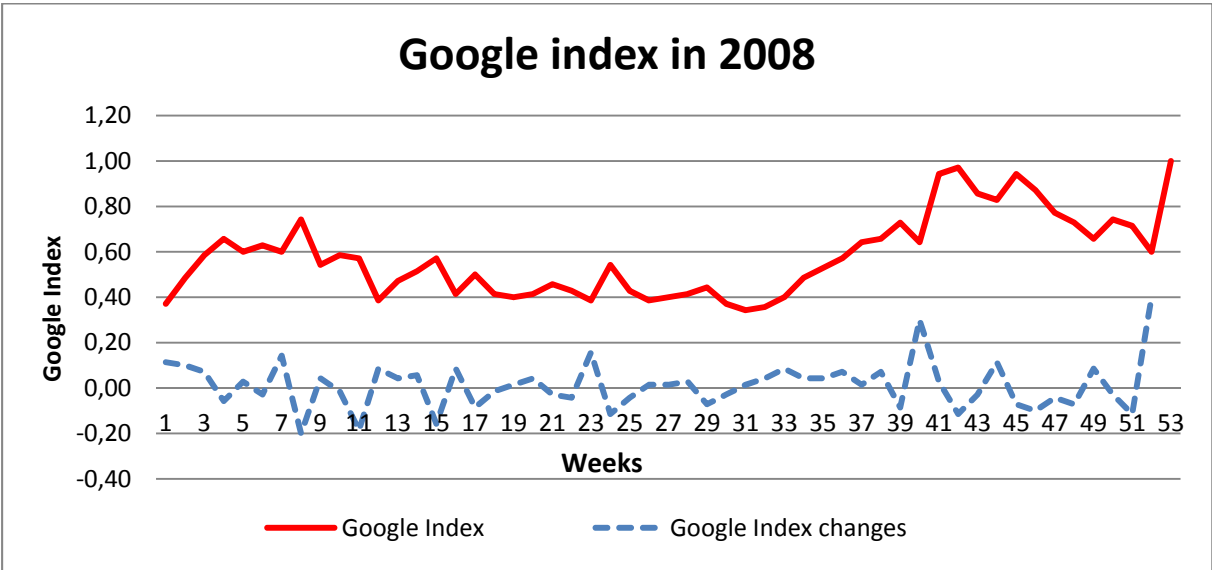**Figure 1: Timing of the 2008/2009 Business Tax Reform**

January 22, 2007
Decision to
introduce capital
gains tax

May 5, 2007
Presentation of
tax bill

January 1, 2008
Introduction of the
2008/2009 Business
Tax Reform

May 18, 2007
Approval of
Federal
Council

June 26, 2006
1st draft of
general tax
reform
concept

July 6, 2007
Approval of
Federal
Parliament

January 1, 2009
Introduction of
CGTR 2009

2007   2008   2009

Figure 2: Google Trends analyses, 2008

Data Source: Google Trends (www.google.com/trends).

Figure 3: Abnormal trading volumes, TY 2008/2009
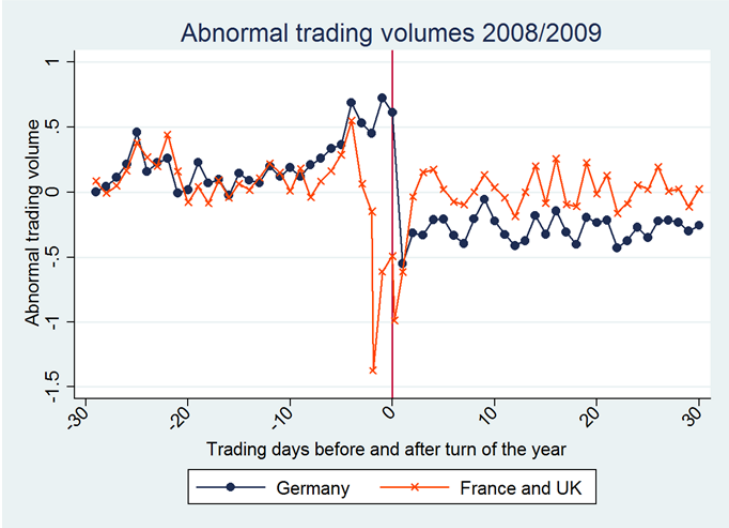
Figure 4: Abnormal daily returns, TY 2008/2009
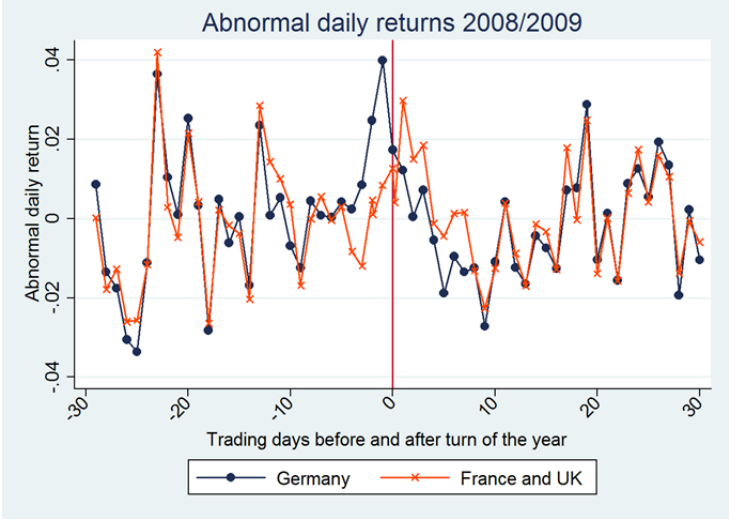
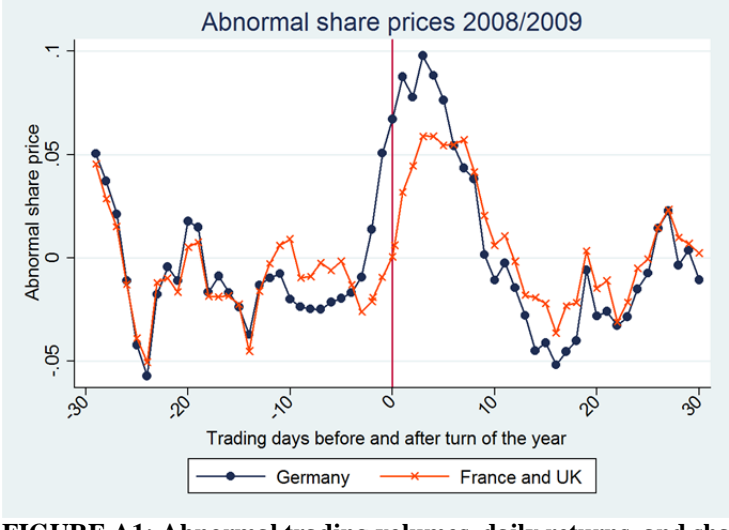**Figure 5: Abnormal share prices, TY 2008/2009**

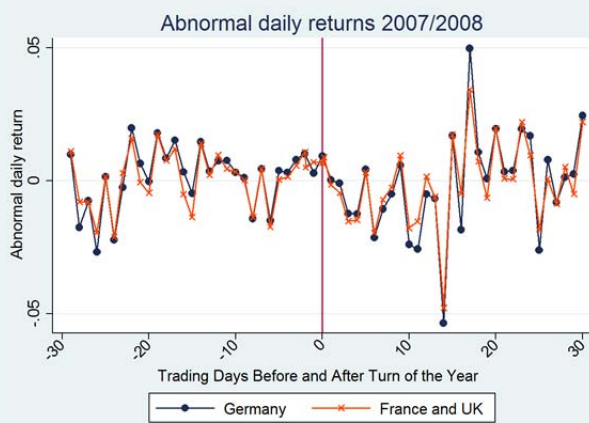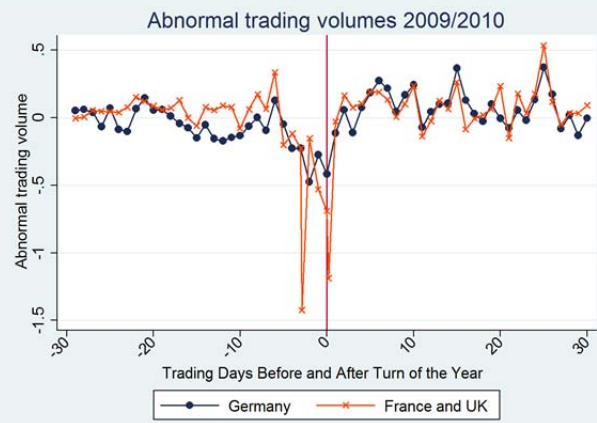**FIGURE A1: Abnormal trading volumes, daily returns, and share prices, TY 2007/2008, TY 2009/2010**
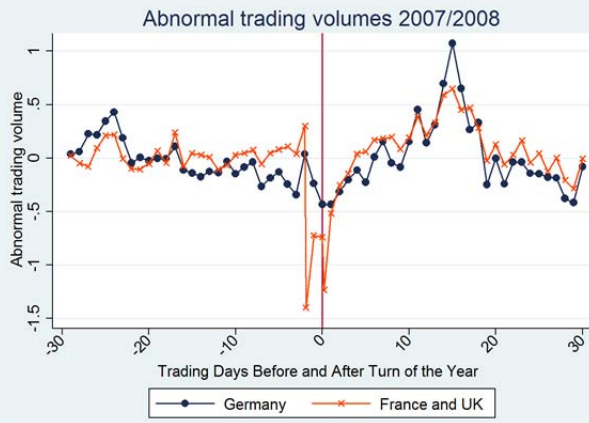
FIGURE A2: Unconditional trading volumes, daily returns, and share prices, TY 2008/2009