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THE INFORMATION CONTENT OF EARNINGS ANNOUNCEMENTS IN THE EUROPEAN INSURANCE MARKET: AN EVENT STUDY ANALYSIS

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Abstract

We contribute to the extensive literature on the relationship between earnings announcements and market reactions by investigating the European insurance sector, which presents a wide difference in transparency between quarterly and semi-annual/annual reports. We design an event-study analysis comprising over 900 events in the period 2009-2016, testing if investors react differently to the two subsets of reports. We find that quarterly reports result in signals on stock prices' limited to few trading days, whereas semi-annual and annual reports produce bigger and more persistent impacts. Instead, we do not find evidence of differences impacting trading volumes. Our results are supportive of the recent EU decision to remove the obligation to publish quarterly reports to avoid short-termism and suggest that costs are greater than benefits for companies considering to adopt voluntary quarterly reports.

Keywords: Post-Earnings-Announcement Drift, Stock Prices, Volume Trading, Insurance, Event Study

1. Introduction and Motivation

Academics, regulators and practitioners have long been debating about earnings announcements' influence on investors' decisions. Results, after investigating different markets, sectors, companies, time-spans and through alternative methodologies, are still inconclusive.

The relationship between firms, their reporting, investors' perception and their reaction is particularly complex. On one side, the quality of information flows lowers information asymmetries and improves firms' evaluation through a lower cost of capital. This supports, in particular, markets' demand for the enhanced and timely dissemination of financial information.

However, producing and managing disclosures bears costs especially for firms: this could represent an entry barrier to markets requiring frequent reporting. Moreover, the data required might be disproportionate or misleading concerning investors' needs. Finally, frequent information could promote short-termism, adding volatility and reducing long-term benefits on the cost of capital.

Recently, a comprehensive report joining the academic, regulatory and operational perspectives on the UK concluded that short-termism is a concern and is mainly caused by "the decline of trust and the misalignment of incentives throughout the equity investment chain" (Kay 2012, p. 9). Among the recommendations of this study, a call for a reduction in the frequency of reporting and in relying on performance and risk metrics is worth mentioning.

In the light of this debate, the European Union recently removed the obligation for quarterly financial reporting of listed entities, allowing exchanges and Member countries to reconsider their advantages and disadvantages regarding transparency, efficiency and stability of financial markets.

In the meantime, the European insurance sector is experiencing an outstanding amount of reporting and regulatory changes. On one side, insurers' reporting increasingly includes disclosures in the supervisory perspective (lately, Solvency 2). On the other side, the IAS/IFRS framework proved a source of accounting mismatch for insurers, between fair valued financial assets and (mainly) cost-based technical provisions.

Insurers, more than other firms, present particularly dense and complex reporting that could exacerbate the negative externalities of disclosures. Within this stream, this study examines how interim reports influence investors for listed European companies included in the STOXX Europe 600 Insurance Index, for the period 2009-2016 and with an event-study methodology.

We aim at investigating if and how investors react to insurers' earnings announcements. Our results can also provide suggestions to insurers' management in weighting pros and cons of quarterly reporting.

The remainder of this paper is structured as follows. Section 2 reviews the literature and presents our hypothesis, Section 3 describes out data and methodology, Section 4 discusses our findings, and Section 5 concludes with our final remarks and suggestions for future research.

2. Literature Review and Hypothesis Development

Literature that investigates the role of firms' disclosures is rich, in the accounting as well as in the corporate finance and corporate governance fields. Seminal work, dating back to 1920s and 1930s, share the view that more disclosure is beneficial. However, as the issues of asymmetric information emerged as a research area, theoretical and empirical studies began to disentangle the complexities of disclosures within the principal-agent framework in firms. The idea that an increase in disclosures reduces the non-diversifiable risk premium applied to discount firms' future cash flows is still valid, but research is not conclusive yet.

Diamond and Verrecchia (1991) provide the first contribution modeling the positive impact of disclosures on the cost of capital. Subsequently, several papers added empirical evidence on the role played by various features of disclosures, with different approaches and, at least partially, mixed results. However, older contributions did not lose their validity: Landsman and Maydew (2002) report how over time (1972-1998) the information content of quarterly earnings announcements increased, also supporting the relevance of the specific measures proposed by Beaver (1968).

Voluntary disclosures reduce information asymmetries and improve the liquidity of equity markets (Welker, 1995), returns, attention to the firm and institutional ownership (Healy *et al.* 1999), bid-ask spreads and trading volumes of stocks (Leuz and Verrecchia, 2000). Market reactions in terms of trading volumes are also explainable as a measure of opinion divergence (Garfinkel and Sokobin, 2006). An increased frequency of reporting reduces information asymmetry and the cost of equity, with no evidence of differences between mandatory and voluntary disclosures (Fu *et al*. 2012), but a positive link between business diversifications and voluntary segment disclosure are reported for Australia in Chan and Watson (2011).

The opacity of reporting, instead, is empirically associated with a higher cost of capital and less trading in stocks (Bhattacharya *et al.* 2003; despite differences in methodology, also in Francis *et al.* 2005; and Barth *et al.* 2013).

The impact on the cost of capital is less clear. It is found positive only for firms that receive a low level of analyst attention (Botosan, 1997) and the effects are larger if "accounting based" measures of earnings are considered instead of "market-based" ones (Francis *et al.* 2004).

A positive role of disclosures is also reported on debt capital (Sengupta, 1998; Francis *et al.* 2005), however evidencing how this effect is present in particular for riskier firms. Moreover, debtors appear ready to increase the cost of their debt capital in exchange for more accounting flexibility that avoids covenant violations and costs of reporting duplications (Beatty *et al.* 2002).

On short-termism, Roe (2014) provides a comprehensive assessment of reasons against it, including its limited systemic impact, the inconclusiveness of findings so far, the role played by short-termed managers' compensation, and the limited evidence of a change in institutional investors' holding period. On the side of managers, a large number of CFOs would trade-off investment projects with positive present values if negative impacts would be produced on quarterly performance (Graham *et al.* 2005). No systematic post-earnings announcement drift to semi-annual reports is found in the Belgian stock market (Van Huffel *et al*. 1996). The information content of accounting figures and their impact on intraday trading leads to consistent reactions to good/bad news, but abnormal returns disappear after 15 minutes, and increases in trading volumes persist after prices converge to equilibrium (Louhichi, 2008). Contrasting results are achieved by other scholars.

More disclosures attract investors focused on short-termism that increases stocks' volatility (Bushee and Noe, 2000) and, in the case of seasoned equity offerings, "hype" the stocks and leads to persistent following negative returns (Lang and Lundholm, 2000). Despite the fact that disclosures, in general, improve the cost of capital, the opposite occurs for quarterly reporting due to the increase in volatility they seem to produce (Botosan and Plumlee, 2002). Investigating differences between voluntary and mandatory interim reports, there is little evidence that timeliness of reporting is enhanced by requirements of more frequent disclosures (Butler *et al.* 2007) and, more importantly, mandatory increases in frequency are found in the US to lead to a reduction in firms' investments (Kraft *et al.* 2017). A trade-off model on reporting frequency finds benefits regarding limiting negative net present value projects but at the same time increasing managers' short-termism (Gigler *et al*. 2014). Similarly, modelling leads to conclude that greater disclosures produce significant indirect costs, by aggravating agency issues, by increasing executive compensation and without adding value to firms (Hermalin and Weisbach, 2012). The different information content of interim reporting leads to differences in investors' reaction triggered by inhomogeneous reports (Gajewski and Quéré, 2001). More recently, reactions to earnings announcements are found influenced mainly by market uncertainty and sentiment (Bird *et al.* 2014), the quality of earnings (Ecker *et al.* 2006) yet behavioral implications are still open to investigation (Luo, 2014).

Despite the abundant literature evidenced above, few studies focus on the insurance sector and are concentrated in the non-life area. Foster (1975) provides a seminal role in this field, empirically rejecting the general assumption that statutory measures of underwriting earnings in the life and health insurance sector adversely affect their stock prices. More recently, the insurance industry experienced analysts' earnings forecasts superior to random walk models, and a positive effect of fair value reporting on the accuracy of forecasts, especially for life insurers (Fan *et al.* 2006).

In the property and casualty segment, reporting is affected by bias in the measure of claim provisions (Petroni, 1992), despite a less clear relationship between positive or negative earnings and the incentive to manage provisions (Beaver *et al.* 2003). Nonetheless, investors use the information content of disclosed estimation errors in earnings of property and casualty insurers to judge earnings' quality (Anthony and Petroni, 1997). Investors anticipate the incentive to manage earnings and judge their quality in the non-life sector (Christensen *et al.* 1999) and use earnings disclosures arising from major catastrophes to reduce the uncertainty they face (Christensen *et al.* 2002). Moreover, greater market reactions are associated with non-life larger

and more widely followed firms (Christensen *et al.* 2004) and are influenced by uncertainty among analysts (Christensen *et al.* 2005).

On the opaqueness of insurers, Pottier and Sommer (2006) investigate the features that complicate the evaluation in this industry; these can be summarized in a smaller size, errors in provisioning, less use of reinsurance, more investment in stocks or low-grade bonds and more geographical diversification. More opaque business lines, measured by underwriting liabilities, generate costs for property and casualty insurers through adverse selection on their stock prices (Zhang *et al*. 2009). Finally, more informative earnings announcements are associated with smaller insurers, those with higher residuals in daily stock returns, companies less widely followed by analysts, property and casualty insurers with lower asset transparency, and life and health insurers with more use of reinsurance (Cotei *et al.* 2012).

Consistently with the previous literature and considering the special case of insurers, we design an event-study to test the following hypothesis.

H_{1a}: *Quarterly reports provide less significant and less persistent effects on prices than semi-annual and annual reports.*

H_{1b}: *Quarterly reports provide less significant and less persistent impacts on volumes than semi-annual and annual reports.*

Due to the different depth and breadth of quarterly reports, concerning audited and more regulated semi-annual and annual reports, we expect market reactions to be more affected by short-termism. Due to the more limited informative content of quarterly reports, we expect investors to focus more on reported and forecasted earnings and also to appraise the higher opacity of related figures. We are interested in measuring effects both as abnormal returns and as a cumulative abnormal return.

Moreover, we expect that reactions are not necessarily only captured by abnormal returns in prices, but also by more or less persistent increases in trading volumes around earnings announcements.

3. Data and Methodology

To test our hypothesis, our research design requires the application of the event study methodology, to link the market signal of earnings announcements to the relative performance of each company's stock.

More specifically, if an abnormal reaction to this information is observed regarding stock prices or trading volumes, then it can be concluded that earnings announcements provide valuable news to market participants. In terms of the econometric approach that we adopted, we refer to Binder (1998), Campbell *et al.* (1997) and Corrado (2011) for a detailed description.

We collect market and accounting data on European listed insurers through Bloomberg. In particular, we investigate a sample of all 34 firms included in the STOXX Europe 600 Insurance Index as of April 2017. Table 1 reports the names of these constituents and the country of origin, whereas Table 2 illustrates the relative weight of different countries on the index.

Table 1. List of constituents of the STOXX Europe 600 Insurance index as of April 2017

Company	Country	Symbol
ADMIRAL GRP	United Kingdom	ADM LN Equity
AEGON	Netherlands	AGN NA Equity
AGEAS	Belgium	AGS BB Equity
ALLIANZ	Germany	ALV GY Equity
ASSICURAZIONI GENERALI	Italy	G IM Equity
AVIVA	United Kingdom	AV/ LN Equity
AXA	France	CS FP Equity
BALOISE	Switzerland	BALN VX Equity
BEAZLEY	United Kingdom	BEZ LN Equity
CNP ASSURANCES	France	CNP FP Equity
DIRECT LINE INSURANCE GROUP	United Kingdom	DLG LN Equity
GJENSIDIGE FORSIKRING	Norway	GJF NO Equity
HANNOVER RUECK	Germany	HNR1 GY Equity
HELVETIA HLDG	Switzerland	HELN SW Equity
HISCOX	United Kingdom	HSX LN Equity
LEGAL & GENERAL GRP	United Kingdom	LGEN LN Equity
MAPFRE	Spain	MAP SM Equity
MUENCHENER RUECK	Germany	MUV2 GY Equity
NN GROUP	Netherlands	NN NA Equity
OLD MUTUAL	United Kingdom	OML LN Equity
PHOENIX GROUP HDG.	United Kingdom	PHNX LN Equity
POSTE ITALIANE	Italy	PST IM Equity
PRUDENTIAL	United Kingdom	PRU LN Equity
RSA INSURANCE GRP	United Kingdom	RSA LN Equity
SAMPO	Finland	SAMPO FH Equity
SCOR	France	SCR FP Equity
ST.JAMES'S PLACE CAPITAL	United Kingdom	STJ LN Equity
STANDARD LIFE	United Kingdom	SL/ LN Equity
STOREBRAND	Norway	STB NO Equity
SWISS LIFE HLDG	Switzerland	SLHN VX Equity
SWISS REINSURANCE COMPANY	Switzerland	SREN VX Equity
TRYG	Denmark	TRYG DC Equity
UNIPOLSAI	Italy	UNI IM Equity
ZURICH INSURANCE GROUP	Switzerland	ZURN VX Equity

Note: This table presents the insurers investigated by our study and resulting from their current inclusion in the STOXX Europe 600 Insurance Index. The composition of the index varies across the period considered in our analysis (2009-2016) and is referred to April 2017. The table also reports each company's symbol in Bloomberg that represents the main source of our market data.

Table 2. Country weights and companies in the STOXX Europe 600 Insurance Index (April 2017)

Country	Weight (%)	Companies
United Kingdom	30.5	12
Germany	23.4	3
Switzerland	17.0	5
France	12.3	3
Italy	5.0	3
Finland	4.4	1
Netherlands	3.8	2
Belgium	1.5	1
Norway	1.1	2
Spain	0.8	1
Denmark	0.2	1
Total	**100.0**	**34**

Note: This table presents the weight in percentage of each country in the STOXX Europe 600 Insurance index as of April 2017, based on the free float market cap, as well as the number of companies it represents.
Source: Stoxx (2017)

In our reference sample, as it is frequently the case for cross-country indexes, some countries are over-represented, and others are under-represented, leading to concerns about the ability of measures to exclude currency effects or juridical differences. We do not feel that this is biasing our results significantly since we rely on data that is expressed in the same third-country currency (USD); moreover, accounting frameworks and regulation are similar or can be considered equivalent in a juridical sense (for instance, in the case of Switzerland).

Quarterly earnings announcements dates are extracted from Bloomberg. However, due to the related dataset being incomplete, we also collected earnings announcement dates from company's websites. This collection of data allowed us to cross-check the correctness of this information for all firms. In the following pages, we will refer to Q1 and to Q3 to indicate first and third quarter reports, to Q2 for semi-annual reports and to Q4 for annual reports. Also, daily data regarding closing prices and trading volumes are collected from Bloomberg dataset.

The final database covers the period ranging from March 2009 to March 2017. We decided to start our analysis in 2009 for two reasons. On one side, information on earnings announcements before this date, when missing in Bloomberg's dataset, are no longer present in most websites of firms. On the other hand, earnings and market reactions before that date could be exposed to an excessive impact of the aftermath of the financial crisis, especially on equity instruments of financial institutions as in our case. This fact could lead to related signals around earnings announcement dates to overreact if compared to a normalized market environment.

We, therefore, analyze a sample including a total of 937 earnings announcements. Table 3 shows the number of event dates per year, while Table 4 shows the average delay between two contiguous announcements and its standard deviation.

Table 3. Number of sampled earnings announcements per year

Year	Q1	Q2	Q3	Q4	Total
2009	25	29	25	30	109
2010	26	29	24	31	110
2011	26	31	27	31	115
2012	27	31	28	32	118
2013	28	32	28	32	120
2014	28	33	29	33	123
2015	28	33	29	34	124
2016	25	34	25	34	118
Total	**213**	**252**	**215**	**257**	**937**

Note: This table presents the size of our sample in terms of the number of earnings announcements per year and per timing of the specific report. Q1 refers to first-quarter reports, Q2 to semi-annual reports, Q3 for third-quarter reports and Q4 to annual reports.

Source: Authors' data processing.

Table 4. Time interval between earnings announcements

Report	Mean	St. dev.
Q1 to Q2	63	7
Q2 to Q3	67	9
Q3 to Q4	78	11
Q4 to Q1	48	12

Note: This table presents the time interval across our sample between subsequent reports, in terms of cross-year and cross-firm mean and standard deviation of calendar days. Q1 refers to first-quarter reports, Q2 to semi-annual reports, Q3 for third-quarter reports and Q4 to annual reports.

Source: Authors' data processing.

It can be noted that annual reports, requiring both a larger breadth and depth of information to be provided to investors, present a wider time interval from the previous report than it is the case for other quarters. Moreover, the annual report is frequently published very close to first quarter results, as shown in the shorter time interval between Q4 and Q1. This could lead to consequences in terms of market signals considering that for a longer period (Q3 to Q4) markets do not have information on companies' earnings, whereas in a shorter window (Q4 to Q1) the information is provided with greater frequency, yet with a very different depth.

In line with Fama *et al.* (1969) and Gajewski and Quéré (2001), we use continuously compounded returns and examine multi-day windows of 20 trading days centered on the event day. This, in order to account for both potential imprecision about earnings announcement date (for instance, some information could be distributed earlier than the official release date) and the uncertainty related to the speed of the event's effect on security prices (for example, the announcement could be close to other market-wide major events that influence investors' reaction).

To capture the effect of the event on stock *i* at time *t*, the normal return is defined in terms of the market model (Sharpe, 1964); thus the abnormal return is given by:

$$u_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \quad (1)$$

where R_{it} represents the observed return for security *i* at time *t* and R_{mt} is the market index return at the same time, and $\hat{\alpha}_i$ and $\hat{\beta}_i$ are ordinary least square estimates of market model parameters based on a 250 days windows between -250 days and -21 days before the earnings announcement day (*t = 0*) , excluding the announcements windows of previous quarters.

The cumulative abnormal return for stock *i* over the event window of days t_1 through t_2 is defined as

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} u_{it} \quad (2)$$

and can be used to provide some insights about how the information conveyed into earnings announcements is absorbed in subsequent days.

We consider three commonly used parametric statistical tests from the literature in our analysis. The first statistic is obtained by dividing the mean abnormal return by the cross-sectional standard deviation:

$$T_t = \frac{\bar{u}_t}{\sigma_t/\sqrt{N}} \quad (3)$$

where:

$$\bar{u}_t = \frac{1}{N}\sum_{i=1}^{N} u_{it} \quad (4)$$

and:

$$\sigma_t = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(u_{it}-\bar{u}_t)^2}. \quad (5)$$

To test if mean abnormal returns are significantly different from zero, the null hypothesis $\bar{u}_t = 0$ is tested.

The second is a variant of the Patell (1976) Z-test, the so-called standardized cross-sectional test (Boehmer *et al.* 1991), defined as follows:

$$Z_t = \frac{N^{-1/2}\sum_{i=1}^{N} u_{it}/s_{it}}{\sigma_t} \quad (6)$$

where s_{it} is defined as follows:

$$s_{it} = \sqrt{\left(\frac{1}{M_i-2}\sum_{k=-270}^{-21} {u_{ik}}^2\right)\left[1 + \frac{1}{M_i} + \frac{\left(R_{mt}-\bar{R}_{m,est}\right)^2}{\sum_{k=-270}^{-21}\left(R_{mk}-\bar{R}_{m,est}\right)^2}\right]} \quad (7)$$

M_i is the number of non-missing estimation period returns for stock *i* and $\bar{R}_{m,est}$ is the mean daily market index return in the estimation period.

In this case, the null hypothesis to be tested is $N^{-1/2}\sum_{i=1}^{N} u_{it}/s_{it} = 0$.

These two test statistics will also be used to study the impact of earnings announcements on daily trading volumes, computed as the natural logarithm of the product of prices and traded quantities of each day.

For multi-day windows involving cumulative abnormal returns, we follow the suggestions of Campbell *et al.* (2010) and incorporate in the aforementioned test of Patell a correction for the serial dependence in successive prediction errors that are based on the same parameter estimates. The procedure is based on the following two steps. First, the standardized cumulative abnormal return is calculated as:

$$SCAR_i(t_1, t_2) = \frac{CAR_i(t_1,t_2)}{S_{CAR_i(t_1,t_2)}} \quad (8)$$

where [t_1, t_2] is an interval in the event window and $S_{CAR_i(t_1,t_2)}$ denotes the corrected standard deviation accordingly to the following formula:

$$S_{CAR_i(t_1,t_2)} = \sqrt{\left(\frac{1}{M_i-2}\sum_{k=-270}^{-21} {u_{ik}}^2\right) W_i \left[1 + \frac{W_i}{M_i} + \frac{\left(R_{mt} - W_i \bar{R}_{m,est}\right)^2}{\sum_{k=-270}^{-21}\left(R_{mk} - \bar{R}_{m,est}\right)^2}\right]} \quad (9)$$

with W_i being the number of non-missing daily returns for stock *i* in the event window. Successively, the standardized cross-sectional statistic for the interval [t_1, t_2] is given by

$$Z_t = \frac{N^{-1/2}\sum_{i=1}^{N} SCAR_i(t_1,t_2)}{\sigma_{SCAR}} \quad (10)$$

where σ_{SCAR} is defined as follows:

$$\sigma_{SCAR} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}\left(SCAR_i(t_1,t_2) - \frac{1}{N}\sum_{j=1}^{N} SCAR_j(t_1,t_2)\right)^2}. \quad (11)$$

4. Discussion of Findings

According to the literature and our methodological strategy, we started to investigate abnormal returns around earnings announcements between two datasets: quarterly announcements (first and third quarter – Q1 and Q3) and semi-annual and annual reports (Q2 and Q4).

This comparison is consistent with our expectation that more opaque and less detailed announcements (Q1 and Q3) could lead to a lower level of reaction between investors. Moreover, we are interested in comparing both abnormal returns and abnormal volumes.

Table 5. Abnormal returns around quarterly announcements

Day	Q1-Q3			Q2-Q4		
	AR	**T**	**p-value**	**AR**	**T**	**p-value**
-4	0.0003	1.6164	0.1060	0.0007	3.9577	0.0001***
-3	-0.0008	-4.1639	0.0000***	0.0008	5.0232	0.0000***
-2	0.0011	4.5628	0.0000***	0.0011	6.3444	0.0000***
-1	0.0008	3.5970	0.0003***	0.0006	3.6288	0.0003***
0	0.0001	0.1717	0.8637	0.0035	6.4249	0.0000***
1	-0.0020	-7.0824	0.0000***	0.0026	10.8494	0.0000***
2	-0.0004	-1.7173	0.0859	0.0010	4.3339	0.0000***
3	-0.0002	-1.0726	0.2835	-0.0007	-4.1299	0.0000***
Wilcoxon signed rank test			**R+**	**R-**	**z-value**	**p-value**
			221	682	-2.8821	0.004***

Note: This table presents the result for the abnormal returns in the days surrounding earnings announcement dates, as well as the T-statistic and its p-value. Q1-Q3 refers to quarterly reports, Q2-Q4 to semi-annual and annual reports. The table includes the Wilcoxon signed rank test between Q1-Q3 and Q2-Q4, including the Z-statistic and its p-value. Significance codes: *** at the 1% level.

Table 5 presents the findings of our first comparison. We find that abnormal returns are highly significant (at the 1% level) for the whole event window that we consider (i.e. 4 days earlier to 3 days following announcements) only in the case of semi-annual and annual reports. Moreover, these returns are positive until the last day in the event window and tend to increase approaching the event date and to furtherly grow significantly from day [0] to day [+2]. In the case of quarterly reports, the significance is high only partially, from day [-3] to day [-1] and in day [+1], but lacks any statistical relevance in the other days. Moreover, abnormal returns are only partially positive (especially, they become negative after the announcement date) and express lower levels and a decreasing trend.

In order to confirm that the two sets of abnormal returns are statistically different, and being the two samples not normally distributed, we carry the non-parametric Wilcoxon signed rank test. We find strong evidence, at the 1% level, that the two samples differ in their mean ranks. To furtherly extend these considerations, we continued our analysis by testing cumulative abnormal returns around quarterly announcements in a larger event window (i.e. [-20, +20]) in the two subsets. Firstly, we plotted the distribution of results to appraise graphically the relevant differences in the two different sets of earnings announcements: results are provided in Figure 1.

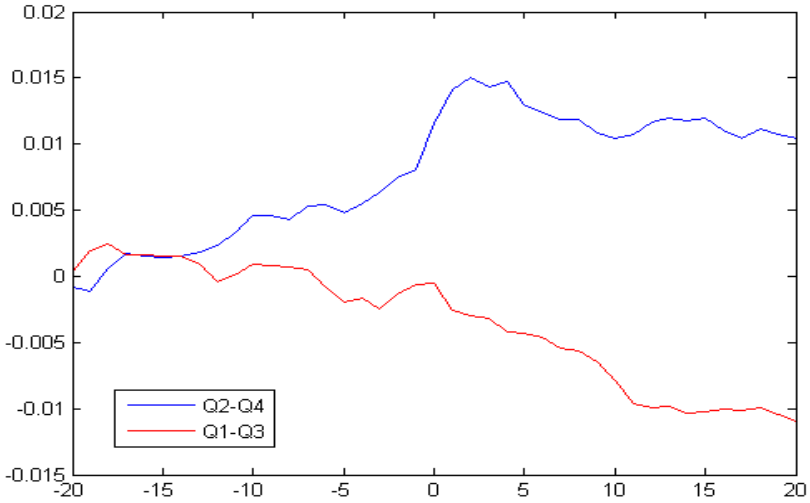

Figure 1. Cumulative abnormal returns around the quarterly announcements

Note: This figure plots the signal attributable to earnings announcements, in terms of cumulative abnormal returns, in the event-window [-20;+20]. The comparison provided is between Q1-Q3 (quarterly reports) and Q2-Q4 reports (semi-annual and annual reports).

It seems that previous results on abnormal returns are confirmed: the two distributions differ significantly especially from 13 days before the announcement date and keep a different path afterwards. The signal is weaker for Q1 and Q3 reports and concentrated very close to the announcement date. Instead, the effect has a greater magnitude for Q2 and Q4 reports and also shows a longer persistence after the announcement date.

To confirm these more intuitive findings, we tested cumulative abnormal returns also econometrically and in different event windows with different sizes (from 5 days to 2 days), around or before the announcement date. Results are provided in Table 6.

Table 6. Cumulative abnormal returns around earnings announcements

Event window	Q1-Q3			Q2-Q4		
	CAR	Z	p-value	CAR	Z	p-value
[-3, -1]	0.0006	1.5862	0.1127	0.0026	32.7392	0.0000***
[-3, +1]	0.0014	1.9391	0.0525	0.0067	31.5945	0.0000***
[-2, -1]	0.0002	0.4116	0.6806	0.0019	28.8209	0.0000***
[-2, +1]	0.0011	1.3673	0.1715	0.0060	28.8061	0.0000***
[-1, +1]	0.0019	9.1111	0.0000***	0.0051	31.7797	0.0000***
[-1, 0]	-0.0008	0.6508	0.5151	0.0002	45.5698	0.0000***
[0, +1]	0.0009	2.5434	0.0110**	0.0041	30.7197	0.0000***

Note: This table presents the result for the cumulative abnormal returns in different event windows surrounding earnings announcement dates, as well as the Z-statistic and its p-value. Q1-Q3 refers to quarterly reports, Q2-Q4 to semi-annual and annual reports. Significance codes: *** at the 1% level, ** at the 5% level.

The findings are confirmed. Semi-annual and annual reports show high significance in cumulative abnormal returns in all windows (at the 1% level). Moreover, the level of cumulative abnormal returns is consistently higher when windows include the event date and the following days. In the case of quarterly reports, the same significance is obtained only for the event window [-1, +1], with a weaker significance in the case of the [0, +1] window (at the 5% level). Moreover, the level of cumulative abnormal returns is significantly lower, in particular where we can compare results with statistical significance.

Jointly, findings on abnormal and cumulative abnormal returns confirm our first hypothesis ($\mathbf{H_{1a}}$): quarterly reports provide less significant and less persistent effects on prices than semi-annual and annual reports. We argue that this result could be explained by the different breadth and depth of information provided by the two groups of reports. Q1 and Q3 reports are not able to produce material impacts on stock prices (small and not statistically significant cumulative abnormal returns) and effects are not persistent. Q2 and Q4, instead, seem to offer material contents to assess the fundamentals of the reporting entity that will be important in a longer term.

At this point, it could be argued that prices alone do not express entirely the capability of information to attract investors. This may happen because, if there are conflicting interpretations of the quantity or quality of earnings announced, price changes could be limited, but this does not mean that a reaction on investors was stimulated. For this reason, we extend our analysis to capture abnormal effects on trading volumes of stocks, rather than prices. We compute trading volumes as the natural logarithm of the product of prices and traded quantities of each day.

Again, as a first step, we plot the two distributions of trading volumes in the event window [-20, +20]. Results are provided in Figure 2, whereas Table 7 summarizes the outcome of the Wilcoxon signed rank test.

Results confirm that the two distributions are not statistically different. Therefore, we reject our second hypothesis ($\boldsymbol{H_{1b}}$): the impact on trading volumes of Q1 and Q3 reports is not significantly different from Q2, and Q4 reports. A potential explanation, which we are not able to test empirically with our data, is that the two contrasting results on stock prices and trading volumes could depend on the type of investors that are attracted by the two different subsets of reports. In other terms, it is possible to argue that when information is poorer in terms of quality and quantity (Q1 and Q3) the increase in trading volumes could be the result of high-frequency trading systems or equivalent strategies. Such investors should be interested more in a quick response to the few information available (in particular, “surprise” of the announcement concerning expectations) and to obtain returns from large volumes entering and exiting the stock market even if price changes are small. This evidence is in contrast with the case of more informative reports that could convey more signals regarding the long-term quality of earnings announced, that attract a greater share of more patient investors interested in companies’ fundamentals. This could explain at the same time why trading volumes do not differ between Q1-Q3 and Q2-Q4 reports, but so do abnormal returns and their persistence.

Table 7. Wilcoxon signed rank test on abnormal trading volumes around earnings announcement dates

Wilcoxon signed rank test	R+	R-	z-value	p-value
	385	476	-0.5896	0.5555

Note: This table provides the Wilcoxon signed rank test between Q1-Q3 (quarterly reports) and Q2-Q4 (semi-annual and annual reports) in terms of abnormal trading volumes, calculated as the natural logarithm of the product of each day reference price and related trading quantities, including the Z-statistic and its p-value.

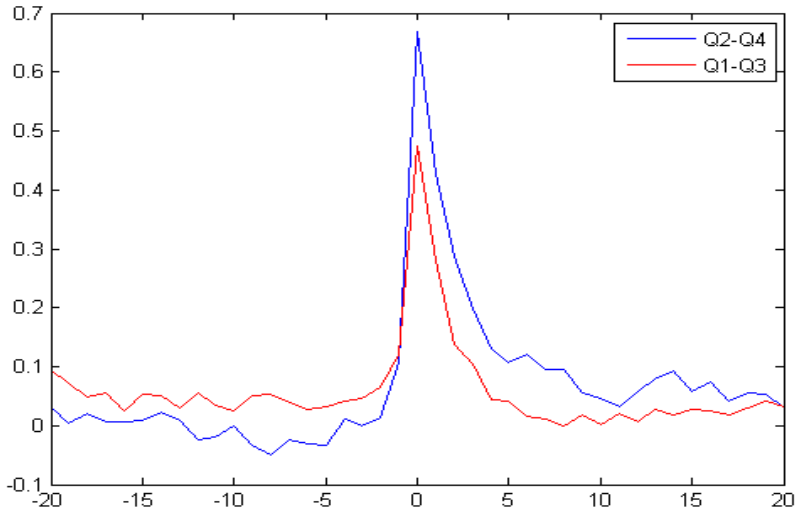

Figure 2. Abnormal trading volumes around earnings announcement dates

Note: This figure plots the signal attributable to earnings announcements, in terms of cumulative abnormal volumes calculated as the natural logarithm of each day's reference price and related traded quantities, in the event-window [-20;+20]. The comparison provided is between Q1-Q3 (quarterly reports) and Q2-Q4 reports (semi-annual and annual reports).

5. Conclusion

After decades of research in the accounting, corporate finance and governance areas trying to link earnings announcements and market reaction, theoretical and empirical evidence are still nonconclusive.

On one side frequency and quality of company reporting, while reducing information asymmetries with investors, should provide benefits in terms of market liquidity and efficiency, as well as a reduction in volatility that leads to a reduced cost of capital for firms. On the other hand, reporting is costly for firms to produce and for investors to analyze, potentially leading to adverse incentives on earnings management, misleading information or increased short-termism of managers' and investors' decisions.

In the light of this debate, the EU recently waived the previous requirement on listed entities to publish quarterly reports, leaving the decision on Member countries or, in the absence of a binding choice, to each firm.

The insurance sector, in this regard, provides an ideal setting to test market reactions to firm announcements that did not receive a fair attention so far in the literature. First of all, a specific reference to this sector is important due to the role played by these institutions in financial and insurance markets as institutional investors and risk absorbers. Then, insurance in Europe was recently subject to a growing attention to enhanced and converging solvency requirements (lately, Solvency 2) and to the application of both national GAAP and IAS/IFRS that are the result of different accounting frameworks and did not solve the opacity issue due to a mismatching measurement of assets, between a cost-based and a fair valuation, and liabilities, still widely diverging at the national and company level. Finally, this industry suffers more than others from the different qualitative contents of more structured, supervised and audited filings (semi-annual and annual reports), compared to more opaque measures of earnings (quarterly reports).

We contribute to this field by investigating market reaction to different earnings announcements for all listed European companies included in the STOXX Europe 600 Insurance Index in the period 2009-2016. In particular, we measured if the signal is different in terms of abnormal and cumulative abnormal returns and abnormal volumes around announcement dates, hypothesizing that both prices and volumes express a different reaction of markets contingent on the kind of published report.

Our findings are supportive of our hypothesis for returns. We find that more structured reports lead to a greater and, especially, more persistent effect on stock prices. Quarterly reports do react, but the signal is weaker and significant only for 3 days before and 1 day after the announcement date, and also inverting the sign of the abnormal return. The two types of announcements are significantly different in a statistical sense. Similar results are obtained for cumulative abnormal returns, with different event windows widely significant for semi-annual and annual reports, whereas only shorter windows that include the day after the announcement are significant for quarterly reports.

We do not find evidence of differences between the two sets of reports when we analyze traded volumes in monetary terms. In particular, the signal on volumes does not differ significantly between quarterly and semi-annual/annual reports. We argue that this could be linked to the presence of more short-term trading strategies, including high-frequency trading, in quarterly reports where earnings are opaquer, and the analysis of firms' fundamentals does not provide an advantage over a surprise effect on analysts' expectations.

Our results are therefore supportive of the EU decision to remove the obligation on quarterly reports since they seem to incentivize short-termism. Moreover, our findings should be interesting for firms that are considering if quarterly reports should be provided on a voluntary base: costs seem to exceed benefits of such decision.

Suggestions for future research in this area include the assessment of different reactions in case of positive or negative announcements, and the measure of the impact of different company features on investors' perception (life, non-life, reinsurance; earnings source and quality; exposure to financial markets, etc.). However, further segmentations are likely to be constrained on the limited number of insurers that are listed in worldwide equity markets.

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