A Quantitative Corpus-Based Study of Evidentiality and Disagreement in Earnings Conference Calls

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This paper investigates the relationship between evidentials and disagreement expressions in the realm of financial communication. Specifically, we consider earnings conference calls (ECCs), a dialogue situation where executives discuss corporate results and the reasons behind them with financial analysts. Our research confirms the existence of a relationship between evidentials and disagreement expressions. Moreover, our empirical results underscore that the usage of different kinds of evidentials is strategically different in the presence of expressed disagreement between executives and financial analysts.

KEYWORDS: argumentation intensity, disagreement, earnings conference calls, evidentials

1. INTRODUCTION

The financial communication domain enables the observation of the entire communication process between corporate actors and investors, ranging from the exchange of information by executives to the making of informed decisions by investors. Such decisions, in turn, have an impact on stock prices and other financial metrics. Within the financial communication domain, the specific focus of our contribution is on

earnings conference calls (ECCs). ECCs are teleconferences held by top executives of listed companies on a quarterly basis to share information with financial analysts and, most importantly, to answer their questions.

ECCs are similar to press conferences in format and turn-taking structure, except the questioning comes primarily from securities analysts rather than from journalists. Analyst questioning in ECCs is part of an accountability process comparable to those enacted by journalistic questioning (Andone 2013) in other domains on the occasion of press conferences. Financial analysts are expected to act on behalf of investors enabling them to make informed decisions. In pragma-dialectical terms, this should cast analysts in the argumentative role of antagonists (cf. van Eemeren 2018: 23-24) critically testing the standpoints of executives. At the same time, analysts need to preserve a good relationship with executives to encourage more disclosure and to preserve access to them. The study of the questions of analysts and the replies of executives can reveal how analysts cope with these competing pressures.

ECCs tend to enjoy a substantial level of media coverage and often trigger non-negligible market reactions, even if the executives do not share any new information in their corporate presentation. For this reason, following (Palmieri, Rocci and Kudrautsava 2015), we claim that the most important part of an ECC is the Q&A session, and, specifically, the *argumentation* embedded therein. Palmieri, Rocci and Kudrautsava (2015) note that analysts are reluctant to challenge executives explicitly to back their opinions with arguments; instead, analysts prefer indirect strategies that typically involve drawing inferences about the company as well as asking executives to check the logic of their arguments confirming or disconfirming its conclusion. Rocci and Raimondo (2018) examine the "requests of confirmation of inference" showing how analysts mobilize various sources of information to exert an indirect pressure on executives to disclose more information, rectify false assumptions, provide better explanations, or offer more evidence for their forecasts. They show that *inferential evidential expressions* and *reportative evidentials* often appear in these questions.

In order to observe the impact of argumentation in ECC on investment decisions, we need to conduct a large scale quantitative study examining the correlation between the linguistic features of ECC and financial data of subsequent market movements. Existing approaches to financial text analysis are mostly limited to dictionary-based studies adopting a bag-of-words approach that is easily and transparently applicable to extremely large quantities of data. Argumentation is too complex a phenomenon to fit this approach. To overcome this hindrance, we propose a three-pronged approach that includes:

1. The development of context-specific computational methods for the automatic recognition and analysis of increasingly fine-grained argumentatively relevant discourse units. This effort falls into the *argumentation mining* research program (Stede and Schneider 2018). One of the advantages of context-specific methods is that mining can rely on the dialogical regularities of the argumentative activity types in question, which can be captured formally by a "dialogue system" (cf. Budzynska, Rocci & Yaskorska 2014).
2. The development of dictionary-based proxies of argumentation (argumentativity indexes) to study their distribution in the discourse units of ECCs. This is a short-term research strategy that can be expected to generate results that can be compared with and transparently measured against other shallow processing methods used in financial text analysis (Loughran and McDonald 2016).
3. The combination of the two above strategies at various levels of refinement and the extensive comparison with market data. This is the step that can potentially reveal the impact of arguments on financial decisions.

In this paper we carry out a preliminary quantitative investigation on a corpus of ECCs of listed companies to explore the distribution of linguistic cues related to *evidentiality* in questions posed by analysts and answers given by executives, as well as the co-occurrence of evidentials with disagreement indicators. Such an investigation can serve as a means of validating both *evidentiality* and *disagreement* expressions as candidate components of a dictionary-based *argumentativity* index.

2. RELATED WORK

In this section, we review the relevant literature pertaining to earnings conference calls (2.1) and the semantic category of evidentiality (2.2), focusing on what is more directly connected to argumentation. To date, the two phenomena have not been considered jointly; to the best of our knowledge, this paper is the first to consider the linguistic dimension within the context of ECCs, which have been shown to be a highly argumentative setting. (Palmieri, Rocci and Kudrautsava 2015; Rocci and Raimondo 2018).

2.1 Earnings conference calls

The effectiveness of earning conference calls (ECCs) have been discussed by finance literature across the last few decades. The study of ECCs has to be considered together with the general interest for voluntary disclosure

for listed companies. Starting from Diamond and Verrecchia (1991), the finance scholarship put in evidence the trade-off happening in not-mandatory corporate disclosure: from one side, corporations would like to communicate more to lower the perceived risk and therefore their cost of capital but on the other side they would like to retain all of the information to maintain their informational advantage and not to favour any competitors.

ECCs are a special case inside the voluntary disclosure toolbox, being mandatory but at the same time expected and very effective, both on the corporate decision and on the stock prices (Brown, Hillegeist, and Lo 2004; Bushee, Matsumoto, and Miller 2004) This is also because the earnings conference calls have proved to be particularly effective in affecting stock market dynamics, as they are able to change the beliefs and the behaviour of investors even when they do not share any previously unreleased information. (Price et al. 2012; Jiang et al. 2019). Nevertheless, the vast majority of research on this topic has focused on simple and shallow textual characteristics like positive or negative sentiments or complexity proxies; we claim a deeper understanding based on relevant linguistic features might be effective in grasping the meaning of such a genre. Next section will go deeper into the function of evidentials, generally and with a special focus on financial communication.

2.2 Evidentials and epistemicity in discourse

Evidentiality is the semantic category corresponding to the indication of the speaker's source of information of the propositional content of the utterance (cf. Chafe and Nichols 1986, Willett 1988, Dendale 1994, Boye 2012). As Chafe and Nichols (1986) put it, the category of evidentiality concerns "the linguistic coding of epistemology". While the concept of evidentiality originated in anthropological and typological linguistics especially in relation to languages (e.g. Quechua, cf. Faller 2002) where assertions based on direct perception, reports and inference are characterized by different obligatory morphological markings, it was later extended to cover also variety of non-grammaticalized lexical, phraseological and discursive strategies that speakers use to signal the source of information of what they are asserting.

In this broader perspective, Boye (2012: 2) considers evidentiality as one of the two main components of *epistemicity*, the other being *epistemic modality*. While epistemic modality, according to Boye, is concerned with specifying the *degree* of *epistemic support* for the asserted proposition, evidentiality specifies the *kind* of epistemic justification vouching for it. While the distinction between the two concepts is clear it is often the case that a linguistic expression carries at the same time both modal and evidential information, as it happens with a variety of

epistemic possibility and necessity expressions, which also point to inference as the source of information (cf. Miecznikowski, Rocci & Zlatkova 2013, Rocci 2017) - so that some linguists have started speaking of *epistential* expressions.

In a pragmatic perspective, which is the more directly relevant for our argumentation concerns, Sbisà (2014) sees evidentiality as covering the range of devices and strategies "that encode or implicate information about whether and how the preparatory conditions of an assertive speech act are satisfied", i.e. specifies what kind of competence, authority or credentials the speaker has to make an assertion. It is therefore pretty natural to think that the interactional conditions in which the need of specifying credentials for assertion arise are often the same in which argumentative confrontations arise. While the use of evidentials in an assertive speech act is not necessarily immediately followed by the presentation of arguments in support of its propositional content, it has been shown that, at least certain evidential expressions act systematically and subtly as very precise argumentative indicators (see Musi 2014, Miecznikowski & Musi 2015, Rocci 2017, Musi and Rocci 2017).

A detailed map of the argumentative functions of different types of evidentiality remains to be done. In this perspective it seems promising to look at recent linguistic research on epistemicity conducted in a dialogical, interactional perspective, such as Pietrandrea (2018). In the interactional perspective *epistemicity* is not seen merely as an individual attitude pre-existing discourse that is merely expressed through discourse. Rather, the category is defined on the backdrop of the interactive management of a Hamblinian commitment store, as the range of expressions and strategies involved in *epistemic grounding*, i.e. the process of "shared validation of the truth-value of the commitments" (Pietrandrea 2018: 175). While processes of epistemic grounding are not necessarily argumentative, it is clear that an argumentative discussion, conceptualized in pragma-dialectical terms, is a relevant site for epistemic grounding in the confrontation stage (where differences of opinion are manifested), in the opening stage (where joint commitments are established) as well as in the concluding stage (where retraction and addition of commitment happens).

3. RESEARCH QUESTIONS

On the backdrop of the research goals stated in the introduction, and of the lines of investigation sketched in Section 2, we set out to provide a preliminary quantitative investigation of how corporate executives and financial analysts characterize the source of their assertions. We limit our investigation to lexical indicators and multi-word phraseological units, leaving aside grammatical or intonational markers.

Our hypothesis is that the distribution of evidential expressions in ECCs is a notable indicator of the presence and prominence of argumentation. This hypothesis has been refined by observing the distribution of a dictionary-based indicators of evidentiality in the parts and turns of ECCs.

We expect the distribution of evidentials to fit the picture of ECCs as argumentative interactions emerging from qualitative studies, in particular in what pertains to the characterization of the argumentative roles of corporate executives and financial analysts (cf. Rocci and Raimondo 2017). We also expect the distribution of evidential expressions to accurately reflect the different sources of information that executives (corporate insiders) and analysts (corporate outsiders) have at their disposal. In fact, an important step in validating the dictionary of evidential expressions is ascertaining how accurately it captures the social and epistemic structure of the ECC.

In order to validate evidentiality as an *argumentativity index*, we observe its co-occurrence with disagreement indicators. By definition, argumentation necessarily entails disagreement (cf. van Eemeren 2018: 1). In view of our hypothesis, we expect the distribution of lexical and phraseological evidential expressions to correlate positively with disagreement expressions across the corpus of ECC calls.

4. METHODOLOGY

4.1 Corpora and annotation

Two corpora are involved in this investigation: a small one containing 46 conference call transcripts with a total of 508,787 words (henceforth referred to as Small Corpus) and a relatively large one (henceforth referred to as Large) containing 1,134 call transcripts (with 3,797,907 words in the corporate presentations 1,605,855 words in the analysts' questions, and 4,229,270 words in the corporate replies).

The Small Corpus is manually annotated at multiple layers using the latest version (v. 3.3, 2019) of the UAM-CT annotation software (cf. O'Donnell 2008). The annotation labels cover the basic segmentation of the ECC, turn taking, as well as finer grained functional categories of argumentatively relevant dialogue acts. The annotation scheme and its significance is discussed in Palmieri, Rocci and Kudrautsava (2015), Budzynska, Rocci and Yaskorska (2014), Rocci and Raimondo (2017).

For the automatic quantitative analysis of the Large Corpus, we took advantage of the deterministic structure of the call transcripts. Since the presentation and Q&A sessions are always labelled and the participants are always listed along with their roles, the call dynamics are fairly predictable, with analysts asking questions and corporate players providing answers. Based on this, we performed coarse-grained dialog

act labelling with a Finite State Machine and ignored all operator segments. The advantage of this coarse-grained labelling is that it is completely unsupervised and requires no training (which means there is no need for a large labelled dialog act dataset). The main drawback of this approach is that it fails to isolate out analysts' acknowledgements. As part of our work in progress, we are currently investigating semi-supervised approaches that leverage transfer learning from contextualized word embeddings [Devlin et al., 2019]. The Finite State Machine employed for the coarse-grained labeling was implemented in Python using the Pandas library, while the NLTK library was employed for corpus segmentation and tokenization (based on regular expressions).

4.2 Evidentiality Dictionary

A dictionary of evidentials (208 n-grams) was assembled following corpus-based studies on evidentiality in English (especially Bednarek 2006) and progressively refined through the study of concordances in the Small Corpus. Expressions in the dictionary are associated with types of evidence according to the following taxonomy of evidential meanings:

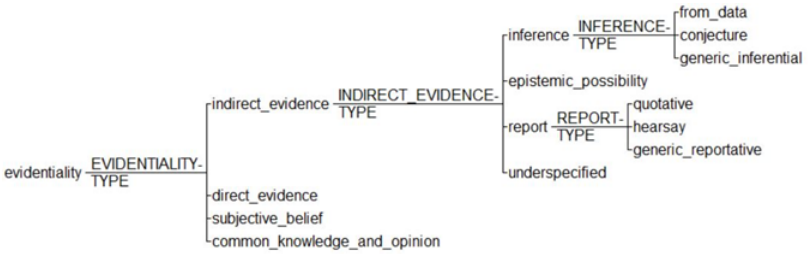

Figure 1. Typology of evidential meanings, implemented as a UAM-CT systemic network.

As customary in discussions of evidentiality (Willett 1988), we distinguish direct and indirect evidence. As usual, direct evidence includes sensory experience. In the financial context of ECC, however, it has to be understood that this experience is rarely primary: it typically refers to direct involvement in company operations and direct access to company data, data which presuppose a technological and bureaucratic apparatus processing information. Indirect evidence covers both inference and reports, with their respective subtypes. As usual, *quotatives* referring to a specific source are set apart from indeterminate *hearsay* within the reportative category. The distinctions between *inference based on data*, and *conjectures* relying on general knowledge is also well attested in the literature (see the works cited in Rocci 2017: 365). While closely related to inferential evidentials, epistemic possibility expressions (cf. Miecznikowski, Rocci and Zlatkova 2013) that suggest a

hypothesis based on its compatibility with the available evidence have been treated as a *sui generis* kind of indirect evidentiality. The typology of evidential meanings is completed by two categories that are somewhat negative in nature, as they refrain from locating the source of information either in direct or indirect evidence. *Subjective* epistemic expressions, defined according to Nuyts (2001), locate the source of information in individual subjective experience and correspond to the "speaker's indication that (s)he alone knows (or has access to) the evidence and draws conclusions from it" (Nuyts 2001: 393). Conversely, expressions situating information as part of common knowledge or part of commonly shared beliefs act as *markers of common ground*, signalling that the information does not need to be epistemically grounded through mention of a source.

4.2 Disagreement Dictionary

A disagreement dictionary (158 *n*-grams) was also created to include adversative and concessive connectives, lexical expressions of disagreement, negations and hedges. We assembled our disagreement dictionary based on the assumption that adversative and concessive connectives polyphonically index antagonist voices, pointing to a mixed dispute where actual or potential opposite standpoints are being countered by arguments. Another assumption is that negations are intrinsically polyphonic; if participants make copious use of negation, it is often because they expect an opposing standpoint to be put forth. Finally, in polite contexts, people use hedges or mitigating devices to introduce disagreement (e.g. to be honest). The dictionary, which partially draws on previous argument mining approaches to disagreement (Budzynska et al. 2016), and it contains a wide array of adversative and concessive connectives, negations, expressions that explicitly indicate disagreement, and hedges or mitigating devices to introduce disagreement (e.g. to be honest).

5. RESULTS AND INTERPRETATION

In this section, we present a number of empirical observations that have emerged from our quantitative corpus-based study.

5.1 Epistemic possibility

Our first observation concerns epistemic possibility expressions, such as *maybe, might,* or *perhaps*, which we kept as a separate category of indirect evidentiality. We note that the distribution of these epistemic possibility modals is markedly skewed towards the questions posed by analysts. The modal *maybe*, for instance, has a relative frequency (per thousand words)

of 3.83 in questions as opposed to 0.58 in answers. *Table 1* shows that most epistemic possibility modals exhibit the same behavior.

#	Form	Evidence Type	Evidence Subtype	presentations	questions	answers	TOTAL	P/1000W	Q/1000W	A/1000W	%P	%Q	%A
1	maybe	Epistemic Possibility		187	6154	2440	8781	0.05	3.83	0.58	2%	70%	28%
2	might	Epistemic possibility		217	1341	1464	3022	0.06	0.84	0.35	7%	44%	48%
3	may be	Epistemic Possibility		796	320	527	1643	0.21	0.20	0.12	48%	19%	32%
4	perhaps	Epistemic Possibility		72	578	336	986	0.02	0.36	0.08	7%	59%	34%
5	may have	Epistemic Possibility		128	148	295	571	0.03	0.09	0.07	22%	26%	52%

Table 1. The table reports the presence of epistemic possibility evidentials in the corpus. The absolute and relative frequencies and the distribution of the occurrences are also detailed, taking into consideration the different parts of the calls.

While frequency of these expressions in questions may be due, in part, to politeness concerns (Crawford Camiciottoli 2009), it also reflect how analysts seek to expand the boundaries of corporate disclosure by raising hypotheses compatible with the available evidence (Rocci and Raimondo 2017).

5.2 Reportative forms

Reportative forms are also more frequent in questions, as reported in *Table 2*. Interestingly, the most frequent expressions refer to the interlocutor as the source, with analysts quoting corporate disclosures as well as information shared during the presentation at the beginning of the ECC (for instance, *you've mentioned, you're seeing, you said*). Expressions indicating hearsay are very rare (none of them are to be found among the top fifteen most common expressions). References to third-party sources are also comparatively rate.

#	Form	Evidence Type	Evidence Subtype	presentations	questions	answers	TOTAL	P/1000W	Q/100 0W	A/1000W	%P	%Q	%A
1	you mentioned	Report	Quotative	25	1356	357	1738	0.01	0.84	0.08	1%	78%	21%
2	you're seeing	Report	Quotative	33	921	451	1405	0.01	0.57	0.11	2%	66%	32%
3	you said	Report	Quotative	10	794	300	1104	0.00	0.49	0.07	1%	72%	27%
4	you talked	Report	Quotative	25	890	101	1016	0.01	0.55	0.02	2%	88%	10%
5	you saw	Report	Quotative	91	284	410	785	0.02	0.18	0.10	12%	36%	52%
6	i hear	Report		8	205	54	267	0.00	0.13	0.01	3%	77%	20%
7	says	Report	Quotative	43	30	131	204	0.01	0.02	0.03	21%	15%	64%
8	i heard	Report		4	146	35	185	0.00	0.09	0.01	2%	79%	19%
9	we hear	Report		15	46	69	130	0.00	0.03	0.02	12%	35%	53%
10	we've heard	Report		7	49	35	91	0.00	0.03	0.01	8%	54%	38%
11	tells	Report	Quotative	20	7	49	76	0.01	0.00	0.01	26%	9%	64%
12	when you say	Report	Quotative	0	30	23	53	0.00	0.02	0.01	0%	57%	43%
13	you've said	Report	Quotative	1	46	4	51	0.00	0.03	0.00	2%	90%	8%
14	we heard	Report		7	22	21	50	0.00	0.01	0.00	14%	44%	42%
15	they say	Report		3	8	34	45	0.00	0.00	0.01	7%	18%	76%

Table 2. The table reports the presence of reportative evidentials in the corpus. The subtype, the absolute and relative frequencies and the distribution of the occurrences are also

detailed, taking into consideration the different parts of the calls.

5.3 Inferential expressions

#	Form	Evidence Type	Evidence Subtype	presentations	questions	answers	TOTAL	P/1000 W	Q/1000 W	A/1000 W	%P	%Q	%A
1	sign	Inference	From data	5963	869	4623	11455	0.23	0.54	1.09	52%	8%	40%
2	prove	Inference	From data	5944	859	3072	9875	0.23	0.54	0.73	60%	9%	31%
3	guess	Inference	Conjecture	164	6630	1982	8776	1.75	4.13	0.47	2%	76%	23%
4	should	Inference	Conjecture	1492	2775	2269	6536	0.73	1.73	0.54	23%	42%	35%
5	obviously	Inference	Conjecture	240	1653	4139	6032	0.44	1.03	0.98	4%	27%	69%
6	probably	Inference		168	537	3476	4181	0.14	0.33	0.82	4%	13%	83%
7	show	Inference	From data	1621	344	1421	3386	0.09	0.21	0.34	48%	10%	42%
8	proved	Inference	From data	1999	150	581	2730	0.04	0.09	0.14	73%	5%	21%
9	seem	Inference	From data	101	1390	525	2016	0.37	0.87	0.12	5%	69%	26%
10	clearly	Inference	From data	325	275	1182	1782	0.07	0.17	0.28	18%	15%	66%
11	assume	Inference	Conjecture	629	582	445	1656	0.15	0.36	0.11	38%	35%	27%
12	proving	Inference	From data	891	146	443	1480	0.04	0.09	0.10	60%	10%	30%
13	looks	Inference	From data	112	821	506	1439	0.22	0.51	0.12	8%	57%	35%
14	seems	Inference	From data	54	987	332	1373	0.26	0.62	0.08	4%	72%	24%
15	could be	Inference	From data	159	367	738	1264	0.10	0.23	0.17	13%	29%	58%

Table 3. The table reports the presence of inferential evidentials in the corpus. The subtype, the absolute and relative frequencies and the distribution of the occurrences are also detailed, taking into consideration the different parts of the calls

The distribution of inferential evidential expressions is less clear-cut. Yet it is possible to observe interesting asymmetries also in the distribution of these markers. We can observe that two “classic”, very transparent, inferential evidentials such as *looks* (#13) and *seems* (#14), corresponding to a medium level of confidence, have a marked preference for questions, together with lower confidence items such as *guess* (#3). High comfidence inferentials such as *obviously* (#5) and *clearly* (#10) have a preference for answers.

5.4 Subjective expressions

Verbs such as *to think* and *to believe* that are used to anchor propositions in the subjective viewpoint of the speaker are also unequally distributed and clearly skewed toward managerial answers, because executives routinely underscore the subjectivity of their perspective by prefacing their answers with *we think* and *we believe*. Such subjective expressions are far more frequent in the answers as well as in the presentations given by executives than in the questions posed by analysts, as shown in *Table 4*.

#	Form	Evidence Type	Evidence Subtype	presentations	questions	answers	TOTAL	P/1000W	Q/100 0W	A/100 0W	%P	%Q	%A
1	i think	Subjective		618	3347	19914	23879	0.16	2.09	4.71	3%	14%	83%
2	we think	Subjective		292	1253	4123	5668	0.08	0.78	0.97	5%	22%	73%
3	we believe	Subjective		2629	11	1474	4114	0.69	0.01	0.35	64%	0%	36%
4	we feel	Subjective		197	10	1696	1903	0.05	0.01	0.40	10%	1%	89%
5	i don't think	Subjective		23	78	960	1061	0.01	0.05	0.23	2%	7%	90%
6	i believe	Subjective		234	219	518	971	0.06	0.14	0.12	24%	23%	53%
7	i feel	Subjective		51	26	288	365	0.01	0.02	0.07	14%	7%	79%
8	i do think	Subjective		8	10	290	308	0.00	0.01	0.07	3%	3%	94%
9	we're thinking	Subjective		9	34	175	218	0.00	0.02	0.04	4%	16%	80%
10	we do think	Subjective		5	1	184	190	0.00	0.00	0.04	3%	1%	97%
11	we do believe	Subjective		24	1	152	177	0.01	0.00	0.04	14%	1%	86%
12	i'm thinking	Subjective		1	51	34	86	0.00	0.03	0.01	1%	59%	40%
13	i do believe	Subjective		4	2	79	85	0.00	0.00	0.02	5%	2%	93%
14	i just think	Subjective		3	9	61	73	0.00	0.01	0.01	4%	12%	84%
15	we still believe	Subjective		10	0	60	70	0.00	0.00	0.01	14%	0%	86%

Table 4. The table reports the presence of subjective evidentials in the corpus. The absolute and relative frequencies and the distribution of the occurrences are also detailed, taking into consideration the different parts of the calls.

5.5 Direct evidence

Forms typically associated with direct evidence and, in particular, forms of the verb *to see* are also typical of the answers of executives and, to a certain extent, of their presentations, as reported in *Table 4*. The verb *to see*, however, is not employed literally, but rather refers to the data accessibility, in particular with respect to accounting figures. Furthermore, *to see* is often used while referring to trends, with direct evidence bleeding into predictive inference.

#	Form	Evidence Type	Evidence Subtype	presentations	questions	answers	TOTAL	P/100 0W	Q/100 0W	A/100 0W	%P	%Q	%A
1	we see	Direct		718	228	2571	3517	0.19	0.14	0.61	20%	6%	73%
2	you see	Direct		117	1702	818	2637	0.03	1.06	0.19	4%	65%	31%
3	we saw	Direct		895	194	1416	2505	0.24	0.12	0.33	36%	8%	57%
4	we're seeing	Direct		280	172	1927	2379	0.07	0.11	0.46	12%	7%	81%
5	we've seen	Direct		254	269	1268	1791	0.07	0.17	0.30	14%	15%	71%
6	you can see	Direct		484	19	393	896	0.13	0.01	0.09	54%	2%	44%
7	we are seeing	Direct		326	26	504	856	0.09	0.02	0.12	38%	3%	59%
8	we continue to	Direct		397	10	283	690	0.10	0.01	0.07	58%	1%	41%
9	we have seen	Direct		218	24	308	550	0.06	0.01	0.07	40%	4%	56%
10	i see	Direct		50	105	167	322	0.01	0.07	0.04	16%	33%	52%
11	we did see	Direct		39	5	189	233	0.01	0.00	0.04	17%	2%	81%
12	we also saw	Direct		110	2	33	145	0.03	0.00	0.01	76%	1%	23%
13	we can see	Direct		18	19	99	136	0.00	0.01	0.02	13%	14%	73%
14	i've seen	Direct		13	16	51	80	0.00	0.01	0.01	16%	20%	64%
15	as you've seen	Direct		18	4	55	77	0.00	0.00	0.01	23%	5%	71%

Table 5. The table reports the presence of direct evidentials in the corpus. The absolute and relative frequencies and the distribution of the occurrences are also detailed, taking into consideration the different parts of the calls.

5.6 Common knowledge

Information is embedded in a common knowledge frame with expressions such as *as you know* or *we all know.* This is rather rare in questions and happens nearly exclusively in the presentations and answers given by executives. It should be noted that expressions indicating common knowledge can point to either an inclusive *we* or an exclusive *we* referring to the company insiders.

#	Form	Evidence Type	presentations	questions	answers	TOTAL	P/100 0W	Q/100 0W	A/100 0W	%P	%Q	%A
1	as you know	Common knowledge	293	18	927	1238	0.08	0.01	0.22	24%	1%	75%
2	we know	Common knowledge	220	58	731	1009	0.06	0.04	0.17	22%	6%	72%
3	we all know	Common knowledge	13	10	57	80	0.00	0.01	0.01	16%	13%	71%
4	people know	Common knowledge	6	0	21	27	0.00	0.00	0.00	22%	0%	78%
5	you guys know	Common knowledge	0	4	23	27	0.00	0.00	0.01	0%	15%	85%
6	everyone knows	Common knowledge	10	0	16	26	0.00	0.00	0.00	38%	0%	62%
7	everybody knows	Common knowledge	4	1	17	22	0.00	0.00	0.00	18%	5%	77%
8	as you probably know	Common knowledge	1	0	17	18	0.00	0.00	0.00	6%	0%	94%
9	it's a fact	Common knowledge	1	0	7	8	0.00	0.00	0.00	13%	0%	88%
10	people believe	Common knowledge	0	2	2	4	0.00	0.00	0.00	0%	50%	50%
11	businesses know	Common knowledge	1	0	0	1	0.00	0.00	0.00	100%	0%	0%
12	it's known	Common knowledge	1	0	0	1	0.00	0.00	0.00	100%	0%	0%
13	it's well known	Common knowledge	0	0	1	1	0.00	0.00	0.00	0%	0%	100%

Table 6. The table reports the presence of common knowledge evidentials in the corpus. The absolute and relative frequencies and the distribution of the occurrences are also detailed, taking into consideration the different parts of the calls.

The data on the distribution of evidentials in ECC conversational turns show a remarkably consistent picture of this activity type and its epistemic asymmetries. Financial analysts are company outsiders aiming to learn more about a company in order to broaden their evidential basis for valuation; they are interested both in eliciting new information and in testing evaluative standpoints of executives. This is consistent with their use of inferential evidentiality as they deploy elaborate guesswork to elicit confirmation, disconfirmation, or further details from executives. In the same way, analysts refer back to what executives have previously disclosed as premises for further inferences or as pieces of a puzzle whose consistency has to be checked.

Executies are the insiders and leverage on their superior access to more direct information and rarerly present themselves as drawing inferences, but when they venture outside the region of the already disclosed, they bound to be extremely non committal. This is consistent with claims to knowledge put forth by executives as well as their use of direct evidentials, and it is also consistent with the use of feeling, thinking, believing frames in the answers (the very forms that are usually covered by the safe harbour statement read at the beginning of all ECCs).

5.6 The relation between evidentiality and disagreement

Having observed that the distribution of different evidential categories captured by the dictionaries reflects in interesting ways the different roles of analysts and managers in the ECC interaction it remains to be seen if differences in the overall frequency of evidential expressions across different ECCs reflect differences in the prominence of argumentation across these interactions. In order to do so we identify another proxy of argumentative confrontations through the disagreement dictionary introduced in section 4.2. This is, in fact, a first step to validate evidentiality frequency as an *argumentativity index*. As observed above, we expected the distribution of evidential expressions to correlate positively with disagreement expressions across the corpus of ECC calls, under the hypothesis that *both* dictionaries are proxies of the underlying argumentative discussions.

We compute the general level of disagreement and evidentiality for each ECC. In the graph below (*Figure 2)*, each point is a single ECC and its x represents the evidentiality level while its y is the disagreement level (both measured as the number of relevant tokens).

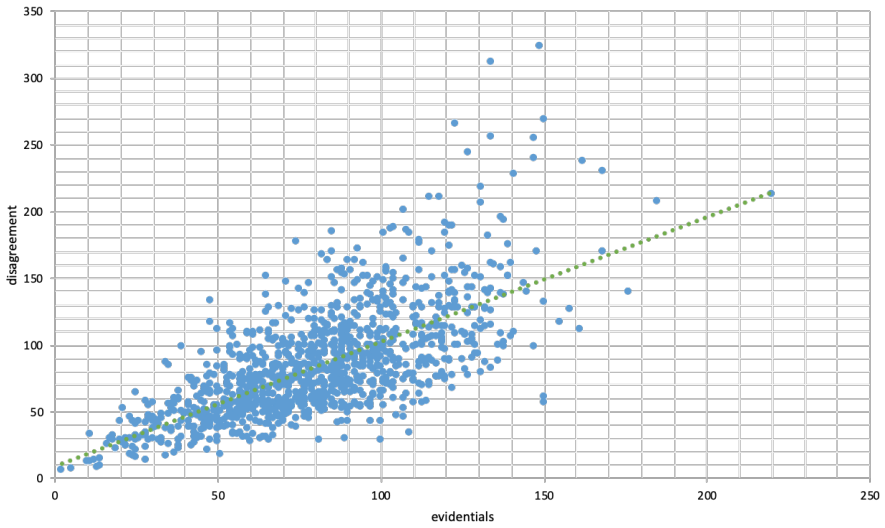

Figure 2. The figure reports the correlation between the usage of evidentials and disagreement expressions in the calls. Each point represents a single call, its x-coordinate representing the evidentials occurrences count and its y-coordinate the disagreement one.

We can observe in Figure 2 that an increase in the usage of evidentials clearly correlates with an increase in the usage of disagreement expressions. The correlation between disagreement expressions and

evidentials is equal to 0.69 on the whole sample (0.77 in presentations, 0.73 in questions, and 0.68 in answers).

The high correlation between evidentials and disagreement sheds some light on the argumentative content of the dialogues within the ECCs, suggesting a stronger presence of argumentation when either more evidentials are used or a stronger sense of disagreement is conveyed.

The significance of these findings for our research is twofold. Firstly, observing the correlation of evidentiality and disagreement represents a first step in developing a composite lexically based *argumentativity index* at the level of the whole ECC transcript. Such an index can be can be compared with other lexically based indexes, such as tone, used in financial text analysis and studied in relation to subsequent market developments. Secondly, evidentiality appears to be worth examining in greater detail in view of a deeper approach to the retrieval and reconstruction of argumentative discourse units (argumentation mining) in ECCs, be it in within an explicit rule-based approach or in the choice of features for machine learning.

6. CONCLUSION

Our corpus-based study served to highlight several key aspects of evidentiality and disagreement in ECCs. While our previous qualitative studies mainly focused on evidentiality in the questions of analysts, our empirical results reveal that the answers given by executives also use evidentials to achieve their intended goals. We also showed that the distribution of evidentials can be skewed toward questions or answers, depending on the specific type of evidentials. Moreover, our data shows a substantial correlation between evidentiality and disagreement that is not driven only by questions, but also by answers. These findings encourage us to pursue further studies based on the combination of automatic segmentation of discourse units and dictionary-based methods.

Furthermore, the empirical findings illustrated in this paper suggest a computationally efficient way of tracking and measuring the presence and the intensity of argumentation (argumentativity), paving the way to a large-scale study of argumentation in ECCs as well as in other areas of financial communication.

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