# Evidentiality and Disagreement in Earnings Conference Calls: Preliminary Empirical Findings

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**Abstract.** In financial communication, earnings conference calls represent a remarkable resource to understand the impact of argumentation on the decision-making process of the investing community. In this paper, we present some preliminary findings from a corpus-based study of earnings conference calls held by listed companies; specifically, we look at the distribution of evidentials in question and answer turns and their correlation with disagreement expressions. Our empirical results suggest that evidentials are argumentative indicators and characterize the argumentative roles of executives and analysts.

**Keywords:** Evidentiality  $\cdot$  Disagreement  $\cdot$  Financial Communication.

# 1 Introduction

Financial communication is an ideal setting for the medium-to-large-scale analysis and evaluation of arguments and the observation of their impact on the decision-making process of investors. Our focus is on earnings conference calls (ECCs); held shortly after the release of a listed company's quarterly results, an ECC generally begins with a corporate presentation by a company's chief executives followed by a round of questions posed to the executives by the financial analysts (the Q&A session). As shown in [1], the most effective part of an ECC is the argumentation in the Q&A session. Earlier argumentation modeling efforts targeted at ECCs have focused on formalizing an argumentatively relevant dialogue protocol validated on a small manually annotated corpus of ECCs [2]. Here we proceed with a multi-pronged research strategy, which combines a coarse rule-based automatic annotation dialogue moves in a large corpus of ECCs with the dictionary-based study of potential indicators of argumentation. These shallow methods are directly comparable with the kind of sentiment analysis used in finance research [3].

# 2 Data and Methods

Our study of evidentials as potential indicators for the characterization of argumentative moves in ECCs is based on two corpora: a small, manually annotated one, containing 46 conference call transcripts (508,787 words) and a relatively large one, containing 1,134 call transcripts (with 3,797,907 words in the corporate presentations 1,605,855 words in the questions, and 4,229,270 words in the replies).

The large corpus was segmented based on 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 predictable, with analysts asking questions and corporate players providing answers. Fully unsupervised coarse-grained dialog act labelling was performed with a Finite State Machine (all operator segments were ignored).

Taking inspiration from the results of corpus studies of evidential lexemes as argumentative indicators [5], we built a 208 item dictionary of words and n-grams meant to capture evidentiality as the encoding of the source of information and epistemic status of the propositional content of an utterance. The dictionary was built starting from corpus studies of evidentiality in English (especially [4]) and progressively manually refined through the study of corpus concordances. The dictionary items are categorized according to the types of meanings of evidentials represented in Figure 1.

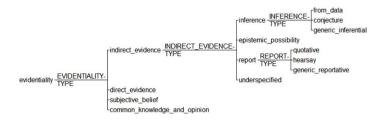


Fig. 1. Types of meanings of evidentials

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A disagreement dictionary (158 n-grams) was also created. It includes adversative and concessive connectives, lexical expressions of disagreement, negations and hedges. The dictionary, which partially draws on previous argument mining approaches to disagreement [6], and 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).

# 3 Preliminary Empirical Findings

#### 3.1 Distribution of Evidentials in the calls

Table 1 shows a breakdown of the various evidentiality types, providing the number of occurrences of each type in the corporate presentations ( $\mathbf{P}$ ), the questions posed by the analysts ( $\mathbf{Q}$ ), and the answers provided by the executives ( $\mathbf{A}$ ), along with the frequency of each evidentiality type per thousand words in the presentations ( $\mathbf{f}_P$ ), the questions ( $\mathbf{f}_Q$ ), and the answers ( $\mathbf{f}_A$ ).

Evidentiality type	P	Q	A	Total	$\mathbf{f}_P$	$\mathbf{f}_Q$	$\mathbf{f}_A$
Common knowledge	550	93	1819	2462	0.14	0.06	0.43
Direct	3946	2872	10237	17055	1.04	1.79	2.42
Epistemic Possibility	1400	8541	5062	15003	0.37	5.32	1.20
Generic Indirect	153	48	76	277	0.04	0.03	0.02
Inference	23847	21102	29144	74093	6.28	13.15	6.89
Report	330	4947	2304	7581	0.09	3.08	0.54
Subjective	4188	5098	30402	39688	1.10	3.18	7.19
Grand Total	34414	42701	79044	156159	9.06	26.61	18.69

**Table 1.** The table reports the distribution of the evidentials in the corpus, distiguishing between the different types. For each evidential category we report its absolute and relative frequency, also taking in consideration the different parts of the calls.

Table 2 takes a closer look at the distribution of the inferential evidentials, which account for nearly half of all evidentials in our corpus, as shown in Table 1. The distribution of the inferential evidentials is asymmetric between questions and answers, with most indicators showing a strong preference for questions. Only the highest certainty items are equally distributed among turns, or even show a preference for answers.

# 3.2 Correlation of Evidentiality and Disagreement in the Q&A Section

Figure 2 shows the number of tokens expressing disagreement versus the number of evidentials for each ECC in our corpus. The key finding is that evidentials

Form	Subtype	P	Q	A	Total	$\mathbf{f}_P$	$\mathbf{f}_Q$	$\mathbf{f}_A$
sign	From data	5963	869	4623	11455	1.57	0.54	1.09
prove	From data	5944	859	3072	9875	1.57	0.54	0.73
guess	Conjecture	164	6630	1982	8776	0.04	4.13	0.47
should	Conjecture	1492	2775	2269	6536	0.39	1.73	0.54
obviously	Conjecture	240	1653	4139	6032	0.06	1.03	0.98
probably	N.A.	168	537	3476	4181	0.04	0.33	0.82
show	From data	1621	344	1421	3386	0.43	0.21	0.34
proved	From data	1999	150	581	2730	0.53	0.09	0.14
seem	From data	101	1390	525	2016	0.03	0.87	0.12
clearly	From data	325	275	1182	1782	0.09	0.17	0.28
assume	Conjecture	629	582	445	1656	0.17	0.36	0.11
proving	From data	891	146	443	1480	0.23	0.09	0.10
looks	From data	112	821	506	1439	0.03	0.51	0.12
seems	From data	54	987	332	1373	0.01	0.62	0.08
could be	From data	159	367	738	1264	0.04	0.23	0.17

**Table 2.** The table reports the 15 most frequent inferential evidentials as found in our corpus. For each evidential the subtype is report together with its absolute and relative frequency, distinguishing also between the different parts of the calls.

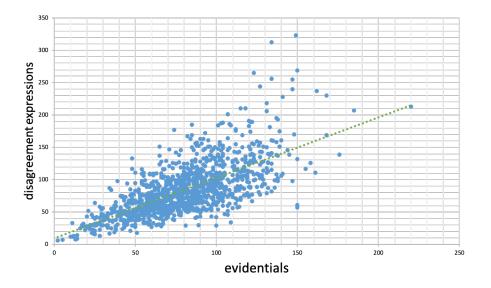


Fig. 2. The figure shows the correlation between evidentials and disagreement

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and disagreement are highly correlated ( $\rho = 0.69$ ). The correlation between disagreement and evidencial is also substantial if we consider the questions ( $\rho = 0.73$ ) and the answers ( $\rho = 0.68$ ) separately.

#### 4 Conclusion and Future Work

Our ECC corpus shows a marked difference in the distribution of evidentials in Q&A turns, matching the different epistemic position and argumentative role of executives and financial analysts. We also observe a substantial correlation between evidentiality and disagreement. Contrary to our initial expectation, the correlation is not exclusively driven by the questions posed by analysts, but also by the answers provided by the executives. The results suggest that disagreement and evidentiality dictionaries can function as sub-components of a dictionary-based indicator of argumentativity.

Our preliminary findings encourage us to pursue further investigations based on the combination of automatic segmentation of discourse units and dictionary-based methods.

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