

# **The Role of *Metaphors* in Financial Texts**

**Andrew Salway and Khurshid Ahmad  
University of Surrey, Guildford, Surrey. UK**

**23 September, 1997**

## **Abstract**

Language used by financial analysts and journalists, in texts such as news articles, official reports and in-depth analyses, is suffused with instances of figurative speech, ranging from metaphor to marketing spins. A computer based information system which is to be applied in the financial domain should be endowed with some sense of the metaphors which are characteristic of its language.

We report the analysis of a corpora of financial texts, which we hope will pave the way for the development of an electronic lexical resource to enrich an Information Retrieval system, through the utilisation of the metaphoric phenomena of financial discourse. The results presented demonstrate the widespread use of metaphor in financial texts and begin to characterise their distribution by way of a grouping according to the theme of verticality.

## **Table Of Contents**

<b>1. Introduction</b>	<b>2</b>
<b>2. Outline of Investigation</b>	<b>5</b>
<b>2.1 A Corpus of Financial Texts</b>	<b>5</b>
<b>2.2 Method of Analysis</b>	<b>6</b>
<b>3. Results</b>	<b>7</b>
<b>3.1 Experiment 1 - Knowles' health metaphors</b>	<b>7</b>
<b>3.2 Experiment 2 - Lexical and semantic variants of health metaphors</b>	<b>9</b>
<b>3.3 Experiment 3 - Evidence for a cognitive metaphor?</b>	<b>9</b>
<b>4. Preliminary Conclusions</b>	<b>10</b>
<b>References</b>	<b>11</b>
<b>Appendix A - Health Metaphors with Lexical and Semantic Variants</b>	<b>12</b>

## 1. Introduction

Financial news and finance-related learned texts, including those items based on the opinions or analyses of authoritative persons, sometimes contain words and phrases which cannot be easily found or defy entry in financial thesauri or encyclopaedias. It is also possible such texts may contain words or phrases such that these words and phrases are used to substitute or to displace commonly used words and phrases. Last, but not least, the opinion-maker or the influential analyst may also use less comprehensive words for the more comprehensive ones, e.g., genus instead of species, or vice versa.

Financial news and learned texts appear, therefore, to be adorned with: *metaphors*, *metonyms* and *synecdoches*. These are linguistic phenomena that involve the substitution of words and phrases on the grounds of some understood relation between the original and its substitute. In the cases which are taken up by a linguistic community the substitution will lose its novelty over time, leading to, for example, *trivial metaphors*. We list examples of these linguistic phenomena, taken from recent financial texts, see Table 1 below.

The provision of a rigorous distinction of the grounds on which metaphor, metonymy and synecdoche are based is not the intention of this paper. Rather, we accept that these are related phenomena and difficult to disentangle (see Eco 1984: 87-129, for the definition, or rather elaboration, of the three terms). For now we will adhere to the following 3-way split, which is drawn from Eco: (i) metaphoric relations involve the invocation of some (maybe previously unrecognised) analogy or similarity between concepts; (ii) metonymy substitutes words for one another on the basis of a relations such as object/purpose, container/content, cause/effect and material/object; (iii) synecdoche is traditionally reserved for those cases where substitutions are made on the basis of genus/species relations.

The purpose of this document is to ascertain whether quantitative methods, either statistical or logical, can be used to detect metaphors, and whether cognate metonyms and synecdoches can be used to comprehend such metaphors, so as to route a given news item or learned paper to, say, the relevant financial trader.

**Table 1: Examples of ‘substitutions’ in text**

<p>Trivial Metaphor</p> <p><i>investors demonstrated little <b>appetite</b> after thanksgiving holiday</i> [Wall Street Journal, 3 December]</p> <p><i>gdp was somewhat <b>anemic</b></i> [CNN Financial News, 7 November]</p> <p><i>producing new jobs at a <b>healthy</b> pace</i> [Wall Street Journal, 31 October]</p> <p><i>will lose market share and <b>suffer</b> lower risk</i> [Alan Greenspan, 7 October]</p> <p><i>economy was <b>hurt</b> badly by a global slowdown</i> [CNN Financial News, 8 November]</p> <p><i>is a little bit of <b>indigestion</b> here and in both the bond market</i> [Wall Street Journal, 16 October]</p>
<p>Innovative Metaphor</p> <p><i>‘barely a blip of inflation on the radar screen’</i> [CNN Financial News, 16 October]</p> <p><i>‘if the financial world were a baseball game, the U.S. economy turned a triple play Thursday as three key economic indicators showed reasonably good signs about the economy’s health’</i> [CNN Financial News, 14 November]</p> <p><i>‘the famed barometer [DOW] cracked the 6,000 barrier’</i> [CNN Financial News, 17 October]</p>
<p>Metonymy</p> <p><i>Forex players say the <b>greenback</b> is poised to climb higher</i> [CNN Financial News, 27 November]</p> <p><i><b>banks</b> ... have been grouping their credits by risk class</i> [Alan Greenspan, 5 October]</p> <p><i><b>Wall Street</b> closely watches FOMC meetings</i> [CNN Financial News, 14 November]</p>
<p>Synecdoche</p> <p><i>the amount of risk bankers take in trying to meet their <b>corporate objectives</b></i>[A.G., 5 October]</p>

Before we begin to outline a case study for investigating the use of metaphors in a corpus of financial news, comprising announcements and pronouncements on the US and German economies from October to December 1996, it is important to elaborate, albeit briefly, as to why metaphors are used for adorning prose as scientific and technical as financial news is; indeed, such adornment<sup>1</sup> should be and is readily found in poetry and *belles-lettres*.

<sup>1</sup>The term 'adornment' has been used to good effect by Knowles (1996) in a discussion of 'health metaphors in financial text'.

The use of metaphor can be motivated by any number of reasons, and despite work on the whys and wherefores of metaphor since antiquity, authors like Eco (1984) and Lakoff (1987), would have us believe attempts to delineate these reasons can be at best tentative]. Be that as it may, these authors indicate that individuals are quite free to enumerate their own reasons. Therefore, following Knowles (1996) and Lakoff (1987), one may have the following reasons for using a metaphor:

- The authoritative person, say, Chair of the Federal Reserve Bank, has access to sensitive data, such as prices and incomes data, which is embargoed for a certain time, and the person has to make comment on a given economy during the embargo period
- The authoritative person or persons wish to motivate others to follow them without wishing to be prescriptive and informal: after-dinner speeches, annual celebratory lectures and so forth
- The opinion-former is 'trying to make sense of his or her experience and uses imaginative mechanisms (metaphor, metonymy and mental imagery) for making sense of experience' (cf. Lakoff, 1987)
- Spin doctors, itself a metaphoric entity, may use 'contrived ornamentation' to put a particular gloss on emergent financial disasters or for exaggerating or misappropriating financial success stories
- Journalists seek new and interesting ways in which to report financial news in order to capture their readers' attention and to explicate new happenings in the financial world.

The examples listed above encompass cases which would generally be described as 'figurative language' in that novel metaphors are being created for the particular occasion. It is such novel metaphors that may be picked up by the financial community at large, and become assimilated into its language, such that through being used frequently they do not create the same impact as when coined. Lakoff describes how metaphor plays a crucial role in conceptual and linguistic organisation, such that the conceptual and linguistic systems of a community rest on a bed of shared, cultural metaphors. So when we examine our corpus of financial texts, we will be looking for not only imaginative and innovative metaphors, but also for evidence of a deep-rooted system of shared metaphors.

Information Retrieval Systems rely largely on 'thesauri' for classifying and retrieving texts. These thesauri, rather collections of domain-specific terms that are sometimes organised using

a conceptual schema involving key domain-primitives, rely on frequency of usage information and on various subjective and objective measures of 'relevance' (Salton 1987). It is difficult to envisage a situation where an extant thesauri can be used for retrieving texts that contain reports of an innovation, e.g. reports of new financial instruments, or reports that tend to discredit existing concepts and ideas. A thesauri-based search is essentially a reductive process: the whole domain *formalised* in terms of known terms and known inter-term relationships.

Metaphors, and related substitutional devices available to competent speakers of a language, help in the articulation of innovations, in the articulation of nuances, and in the articulation of subtle contradictions.

An understanding of metaphor, followed by the creation of a computational framework which can exploit such an understanding, will lead to more targeted retrieval of texts and more accurate analysis of texts. As a first step towards the establishment of such an understanding we have analysed sets of candidate metaphors in order to explicate their distribution and usage in a corpus of financial text.

## **2. Outline of Investigation**

### **2.1 A Corpus of Financial Texts**

The investigation reported in this paper was performed on a corpus of financial texts that were gathered from the World Wide Web (WWW) over a period of 3 months (October - December 1996). This corpus is being developed as part of the University of Surrey's effort for the ESPRIT project (22 271) ACE<sup>1</sup>. This work forms part of long-standing and ongoing research in the areas of terminology and text analysis, and in the areas of information management and knowledge engineering.

At the time of analysis our corpus contained 130 (predominantly American) English financial texts - culled from a variety of sources on the World Wide Web (WWW), and comprised a total of 115,413 word tokens and 7,562 word types<sup>2</sup>. The selection of texts for the corpus

---

<sup>1</sup> Analyst's Control Environment

<sup>2</sup> It should be noted that some texts acquired from the WWW include 'noise' in the form of repeated headings, hyperlink labels and some HTML coding. Though present in our corpus we do not believe such noise to have a detrimental effect on our results.

resulted in a blend of both short news stories, official reports and speeches - this breakdown is shown in Table 2 below.

**Table 2 - Breakdown of the Surrey Financial Corpus**

	News Stories	Official Reports	Speeches	TOTAL
<b>No. of texts</b>	118	9	3	130
<b>No. of tokens</b>	57675	52102	5573	115413

## 2.2 Method of Analysis

We started our investigation by following Knowles (1996) who specifically describes the appearance of so-called ‘health metaphors’ in a 6 million word corpus of texts from the *Financial Times*. These were identified from the set of high-frequency words in Knowles’ corpus. Knowles makes the distinction between those metaphors which are consciously used by authors to embellish works of fiction and poetry and those which are so deeply embedded in the individual’s and the community’s linguistic competence that their use passes by barely noticed. It is examples of this latter set that Knowles identifies in his paper, and it is these which we used for our first analysis - see Table 3, below. (Note that American spellings were added to the list for the purpose of analysis).

**Table 3 - Terms analysed in Experiment 1 (from Knowles (1996:791-2))**

abort	bruise	depression	haemorrhage	inject	pain	revitalise	strength	umbilical
addiction	casualty	diet	hamstring	injured	palatable	revive	stricken	vibrant
ailing	choke	disease	handicap	life	palliative	robust	suffer	viral
alive	chronic	endemic	hangover	life-blood	panic	rupture	support system	weak
anaemic	clone	epidemic	headache	limp	paralysis	sanity	surgery	weaken
anaesthetic	collapse	exhaust	health	medicine	patient	scar	symptom	wound
anatomy	complexion	exposure	healthy	mid-life	pulse	shock	syndrome	
appetite	contagion	famine	hunger	miscarry	rally	sick	teething	
atrophy	convalesce	fat	hungry	muscle	recipe	sleepy	temperature	
backbone	cripple	fatal	hurt	myopic	recovery	slim	thin	
bill of health	cure	fatigue	immune	nerve	recuperate	stagger	tired	
bleed	debilitating	fever	incubation	nourish	rehabilitation	starve	transplant	
blood	decline	fit	indigestion	nurse	relapse	sterilisation	trauma	
breath	depressed	geriatric	infection	overweight	resuscitate	stomach	tumble	

For a second analysis we expanded this set of terms by: (i) including related word forms, e.g. *declines* and *declined*, in addition to *decline*; and (ii) including semantically related terms (as judged by the authors), e.g. *feeble* in addition to *weak*, and *short-sighted* in addition to *myopic*. (See Appendix A for this expanded list of terms).

In both experiments we were interested in characterising the distribution and use of the terms under investigation by way of statistical and contextual analysis.

We were also interested in getting a better impression of the texture of our corpus by performing a ‘weirdness’ analysis. This method is reported in detail elsewhere (cf. Ahmad 1995). For present purposes it is sufficient to state that a ‘weirdness’ metric can be calculated for a word token by dividing its relative frequency of occurrence in a given corpus, by its relative frequency in a corpus considered representative of general language. (In this instance, the Longman’s Corpus of Contemporary English 1908-1981, 20 million words of general language English). The resulting value will be (much) greater than 1 for those word tokens which are being instantiated more than ‘normal’ in the given corpus. The third experiment reported in this paper shows how one aspect of the make-up of our corpus is made salient by such an analysis.

Our analyses were performed using *System Quirk* - a set of software tools for text and terminology analysis that has been developed at the University of Surrey over the past eight years. It has been used extensively by terminologists, linguists and knowledge engineers both for research and for the development of applications (e.g. electronic termbanks and expert systems).

### **3. Results**

#### **3.1 Experiment 1 - Knowles’ health metaphors**

For this analysis *System Quirk* was provided with the list of ‘health metaphors’, as identified by Knowles (1996), and asked to return their frequency in the Surrey financial corpus, and contextual extracts of each of their instances. The frequencies are presented in Table 4 below which is followed by an overview of some contextual examples. (Note that zero frequency counts, i.e. 90 of Knowles’ 118 metaphors, are omitted from the table).

**Table 4 - Absolute frequency of ‘health metaphors’ in the Surrey Financial Corpus**

Word Type	Number of Tokens in Corpus	Word Type	Number of Tokens in Corpus
decline	60	anemic	2
strength	41	collapse	2
weak	30	alive	1
recovery	26	bleed	1
rally	15	depressed	1
health	14	fat	1
healthy	13	fit	1
robust	12	handicap	1
life	11	hangover	1
hurt	7	indigestion	1
weaken	4	pain	1
appetite	3	revitalize	1
suffer	3	sick	1
thin	3	surgery	1

Though these figures suggest a proliferation of metaphors in our corpus, it is necessary to examine the words in context to better appreciate the nature of their use and distribution. Thus, concordances were produced. What we present here is a necessarily cursory analysis of the resultant data, which paves the way for further, in-depth investigation.

**Table 5 - An Example of Contextual Analysis of Health Metaphors**

<p><b>‘decline’</b> - This word is used in our corpus as both a noun (more frequently) and a verb, and almost always to refer to a numerical entity (often a percentage).</p> <p><i>on an 11 percent decline in earnings</i> [CNN Financial News, 17 October].  <i>refinancings continued to decline and other residential real estate</i> [Wall Street Journal, 31 October]  <i>month - on - month decline in consumer prices</i> [Wall Street Journal, 25 November]</p>
<p><b>‘strength’</b> - This word is attributed (metaphorically) to many abstract entities in the corpus.</p> <p><i>cleveland reports strength in sportswear and major appliances</i> [Wall Street Journal, 31 October]  <i>after the strength shown by the market during</i> [Wall Street Journal, 15 November]</p>
<p><b>‘health’</b> - This word highlights the importance of analysing contextual information when investigating metaphors, only 3 of its 14 instances are metaphoric. The other 11 instances of ‘health’ in the corpus are literal, e.g. as part of compound terms - ‘health care’ and ‘health management systems’.</p> <p><i>the economy’s health for november</i> [CNN Financial News, 1 November]</p>



### 3.2 Experiment 2 - Lexical and semantic variants of health metaphors

The exercise described above was repeated using an expanded set of terms in which both related word forms, and semantically related words were added to those analysed previously. (See Section 2.2 for a description of this expansion). The results are presented in Table 6.

**Table 6 - Absolute frequencies of variant health metaphors**

<b>Word Type</b>	<b>Number of Tokens in Corpus</b>	<b>Word Type</b>	<b>Number of Tokens in Corpus</b>
rose	225	dropping	2
<i>strong</i>	138	dead	1
rise	114	<i>depress</i>	1
<i>declined</i>	59	<i>recoveries</i>	1
drop	54	<i>breathed</i>	1
fall	52	<i>starved</i>	1
<i>declines</i>	43	<i>recovered</i>	1
risen	33	<i>feverish</i>	1
dropped	36	<i>depressing</i>	1
rises	10	<i>wounded</i>	1
drops	7	<i>rallies</i>	1
<i>suffering</i>	4	<i>rallied</i>	1
<i>suffered</i>	2		

The italicised words in Table 6 are those which are alternative forms of the words analysed in Experiment 1. The non-italicised words, i.e. those semantically related to the original set of words, tend to pertain to motion along a vertical plane (e.g. *rise*, *drop* and *fall*). This observation led us to postulate the existence of an underlying cognitive metaphor, guiding the authors of financial texts, which grounds certain aspects of financial discourse in terms of up and down. This hypothesis was considered further in the course of Experiment 3.

### 3.3 Experiment 3 - Evidence for a cognitive metaphor?

Many of the metaphors identified in the previous two experiments seem to relate to the notion of verticality, that is to say they describe motion along a vertical axis. We speculate that this proliferation of words is suggestive of an underlying cognitive metaphor, which is shared throughout the financial community.

In order to test our hypothesis we performed a ‘weirdness’ calculation on all words in the corpus whose literal connotation pertains to verticality, and whose absolute frequency in the corpus was greater than 10, (i.e. amongst the 20% most frequently occurring words). Table 7, below, presents the results, sorted by weirdness.

**Table 7 - Words pertaining to verticality in the Surrey Financial Corpus, ordered by ‘weirdness’**

Word	Abs. Freq.	Relative Frequency	Weirdness	Word	Abs. Freq.	Relative Frequency	Weirdness
declines	43	3.7258e-04	153.5	fell	109	9.4443e-04	7.06948
pickup	11	9.531e-05	54.538	higher	101	8.7512e-04	6.67678
declined	59	5.1121e-04	35.1027	lower	66	5.7186e-04	4.45545
increases	102	8.8378e-04	23.955	highest	17	1.473e-04	4.34713
growth	206	0.00178489	21.3028	level	104	9.0111e-04	4.33507
decrease	36	3.1192e-04	20.0799	falling	25	2.1661e-04	3.99839
risen	33	2.8593e-04	18.0678	below	47	4.0723e-04	3.09784
decline	60	5.1987e-04	15.8421	low	61	5.2854e-04	2.88954
rose	225	0.00194952	15.7613	raise	11	9.531e-05	2.74214
increased	149	0.00129102	14.5326	fallen	11	9.531e-05	2.14342
rising	70	6.0652e-04	12.1776	high	89	7.7114e-04	2.14032
increase	162	0.00140365	11.5939	top	49	4.2456e-04	1.9832
levels	80	6.9316e-04	11.3687	up	292	0.00253	1.09992
rise	114	9.8776e-04	10.4561	raised	11	9.531e-05	1.06589
lowest	17	1.473e-04	9.98124	down	129	0.0011177	0.908354
drop	54	4.6788e-04	8.08587	under	36	3.1192e-04	0.53609

What this table shows is the disproportionate abundance of all but a few ‘vertical’ words in the corpus. It is interesting to note that ‘up’ and ‘down’ - perhaps the parents of all ‘vertical’ words - appear almost normally (i.e. weirdness very close to 1).

#### 4. Preliminary Conclusions

Data has been presented to indicate the wide extent of usage of metaphors in the production and understanding of financial texts. It is encouraging to note that work continues in relating metaphors to texts, including financial texts. It is expected that the list of candidate metaphors will be used for tracking news and information related to major financial events.

## References

Ahmad (1995), Khurshid Ahmad. 'Pragmatics of Specialist Terms: The Acquisition and Representation of Terminology'. In Petra Steffens (Ed.). *Machine Translation and the Lexicon. (Proc. of the 3<sup>rd</sup> EAMT Workshop, Heidelberg 1995)*. Heidelberg: Springer. pp 51-76.

Eco (1984), Umberto Eco. *Semiotics and the Philosophy of Language*. Indiana University Press, Bloomington.

Knowles (1996), Francis Knowles. 'Lexicographical Aspects of Health Metaphors in Financial Text' in Martin Gellerstam, Jerker Järborg, Sven-Göran Malmgren, Kerstin Norén, Lena Rogström and Catarina Røjder Pappmehl (Eds.). *Euralex '96, Proceedings Part II*, (pp. 789-796). Department of Swedish, Göteborg University.

Lakoff (1987), George Lakoff. *Women, Fire and Dangerous Things. What Categories Reveal About the Mind*. The University of Chicago Press.

Salton (1987), Gerard Salton. *Automatic Text Processing: The Transformation, Analysis, and Retrieval of Information by Computer*. Addison-Wesley Publishing Company.

## Appendix A - Health Metaphors with Lexical and Semantic Variants

abort*	addict*	agony	ail*	alive
anaemic	anaesthetic	anatom*	anemic	anesthetic
appetite*	atroph*	backbone*	bearable	bill of health
bleed*	blood*	breakdown	breath*	bruise*
care for	casualt*	choke*	chronic	clone*
collapse*	complexion*	contag*	convalesc*	crash
cripple*	cure*	dead*	decay*	decline*
dehabilitat*	depress*	diet*	disab*	diseas*
drop*	endemic	epidemic*	exhaust*	exposure*
fail*	fall	famine*	fat*	fatal*
fatigue*	fed	feeble	feed	fever*
fit*	flesh*	geriatric*	haemorrhag*	hamstring*
handicap*	hangover*	headache*	health*	hemorrhag*
hunger*	hungry	hurt	ill	immune
incubat*	indigestion*	infect*	inject*	injur*
joint*	life	life	life-blood	limp
living	medicine*	mid-life	miscarr*	muscle*
myopic	nerv*	nourish*	nurse*	old
operat*	overweight	pain*	palatable	palliative
panic*	paralysis	patient*	physical*	physique
plump	prolaps*	pulse	rall*	recipe*
recover*	recuperate*	rehabilitat*	relapse*	resuscitat*
revitalis*	revitaliz*	reviv*	rise*	robust*
rose	rot	rott*	rupture*	sanity
scar*	shock*	short sighted	short-sighted	sick
sign	skelet*	skinny	sleepy	slim
stagger*	starv*	sterilis*	steriliz*	stomach*
strangle*	strength	stricken	strong	structure
suffer*	support system	surgery	surpris*	sustain
symptom*	syndrome*	teething	temperature*	terminal
thin	tire*	tired	tissue	tonic*
transplant*	trauma*	tumble*	umbilical	vibrant
vibrant*	viral	wane	waning	weak
weaken	wound*			

\* - denotes wildcard